



**Verified Carbon
Standard**

DR CONGO MANGROVE BLUE CARBON PROJECT



ClimeTrek

Document Prepared by ClimeTrek Limited

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CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Project	4
1.2	Sectoral Scope and Project Type	5
1.3	Project Eligibility	5
1.4	Project Design	8
1.5	Project Proponent	9
1.6	Other Entities Involved in the Project	9
1.7	Ownership.....	9
1.8	Project Start Date	10
1.9	Project Crediting Period	11
1.10	Project Scale and Estimated GHG Emission Reductions or Removals	11
1.11	Description of the Project Activity	11
1.12	Project Location	13
1.13	Conditions Prior to Project Initiation	14
1.14	Compliance with Laws, Statutes and Other Regulatory Frameworks	21
1.15	Participation under Other GHG Programs	24
1.16	Other Forms of Credit.....	24
1.17	Sustainable Development Contributions	25
1.18	Additional Information Relevant to the Project	26
2	SAFEGUARDS	26
2.1	No Net Harm	26
2.2	Local Stakeholder Consultation	26
2.3	Environmental Impact	26
2.4	Public Comments	26
2.5	AFOLU-Specific Safeguards	26
3	APPLICATION OF METHODOLOGY.....	27
3.1	Title and Reference of Methodology	27
3.2	Applicability of Methodology	27
3.3	Project Boundary	30
3.4	Baseline Scenario	30

3.5	Additionality	31
3.6	Methodology Deviations	31
4	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	32
4.1	Baseline Emissions	32
4.2	Project Emissions	32
4.3	Leakage.....	32
4.4	Net GHG Emission Reductions and Removals	32
5	MONITORING	32
5.1	Data and Parameters Available at Validation	33
5.2	Data and Parameters Monitored.....	33
5.3	Monitoring Plan.....	34
APPENDIX		35

1 PROJECT DETAILS

1.1 Summary Description of the Project

The mangrove areas of the Democratic Republic of Congo (DRC) fall under the global category grouping of Central African mangrove ecoregion. They are found within the Central Congo Province occupying an area of 23,684 hectares.¹ Mangrove forests of DRC are crucial because of its importance in provision of goods and services which are unique to this type of forest such as shoreline protection and being a feeding and breeding ground of commercially important fisheries due to the location of these forests at the tidal estuaries ecosystems of River Congo. DR Congo mangroves support unique marine biodiversity of crocodiles, hippopotamus, and endangered manatees. Additionally, they provide other services and products to communities living adjacent to the forest such fish and honey and also act as natural storm breakers and prevent excessive flooding. Furthermore, the mangroves are also recognised as climate superheroes for their ability to remove carbon from the atmosphere more efficiently (3-5 times more than terrestrial forests) and store it in their systems.

Despite these uses, the DRC Mangrove Forest has seen degradation and deforestation over the years, with about 1161 hectares lost in the last ten years, translating to an annual loss of 116ha/year². The threats facing these mangroves include the encroachment of the areas by the nearby communities leading to conversion of forest land to settlement and other land uses that is linked to population increase over the years, coupled with unsustainable harvesting for wood and firewood for varied purposes. The resulting consequences of the DR Congo mangrove deforestation and degradation now threatens the livelihood of the local coastal people as they get exposed to coastal flooding and other natural calamities. Additionally, the loss of mangroves leads to the release of the carbon stored by the ecosystem back into the atmosphere, thereby accelerating climate change.

The continued loss of mangroves has caught the attention of local communities and government stakeholders who are now working to come up with different innovative management approaches which aim at preventing, halting, and reversing mangrove deforestation and degradation. Payments for ecosystem services (PES) schemes, such as Reduced Emissions from Deforestation and Forest Degradation (or REDD) are emerging as new market-based approaches for forest conservation and management. Unfortunately, a majority of PES projects in DR Congo currently implemented or under development pertain to terrestrial forests. This is despite mangroves and associated ecosystems containing higher carbon sequestration and storage potential.

¹ <https://www.globalmangrovewatch.org/country/COD>

² <https://storage.googleapis.com/earthenginepartners-hansen/GFC-2021-v1.9/download.html>

Mangroves of DR Congo have been estimated to store carbon of 808 t C/ha³ translating to total carbon stock of 19,136,575.04 tC. But the degradation which has been estimated to be 116ha/yr has activated greenhouse emissions from the lost vegetation cover as well as from the top 1.0m of sediments. Through the implementation of the mangrove REDD+ project in the area, the project proponents aim to conserve the mangrove areas by addressing the drivers of deforestation leading to a potential emission reduction of 689,274 tCO₂e/year. Furthermore, the project proponent also aims to restore the already degraded and deforested area of 1161 ha during the project lifetime that will lead to additional emission reductions of 33,379 tCO₂e/yr along with other benefits such as shoreline protection and biodiversity conservation.

Thus, this REDD and RWE project is expected to avoid unplanned deforestation and degradation, along with restoration of the already degraded areas on an area of 23,684ha equating to 21,691,891 tCO₂e in emissions reductions over the 30-year project lifetime with an annual average of 723,063 tCO₂e.

1.2 Sectoral Scope and Project Type

Sector Scope: 14- Agriculture, Forestry and other Land Uses (AFOLU)

Project category: Reduced Emission from Deforestation and forest Degradation (REDD)

Afforestation, Reforestation and Revegetation (ARR)

Project Type: Avoided Unplanned Deforestation and Degradation (AUDD)

This is not a grouped project.

1.3 Project Eligibility

The projects abide by VCS methodology requirement V4.3, for Reduced Emissions from Deforestation and Degradation (REDD) projects, with target activities that enhance carbon sequestration and sink in the forest systems. Thus, the project is eligible under the scopes of the VCS Program:

- The project meets all applicable rules and requirements set out under the VCS Program.
- The project applies a methodology eligible under the VCS Program.
- The implementation of this project activity does not lead to the violation of any applicable law.

³ Ajonina, G. N., Kairo, J., Grimsditch, G., Sembres, T., Chuyong, G., & Diyouke, E. (2014). Assessment of mangrove carbon stocks in Cameroon, Gabon, the Republic of Congo (RoC) and the Democratic Republic of Congo (DRC) including their potential for reducing emissions from deforestation and forest degradation (REDD+). The land/ocean interactions in the coastal zone of West and Central Africa, 177-189.

- This is an eligible AFOLU project category under the VCS Program: reduced emissions from deforestation and degradation (REDD);
- This project is not located within a jurisdiction covered by a jurisdictional REDD+ program.
- Implementation partners are identified in the project activity.
- This project does not convert native ecosystems to generate GHG. The project area only contains native forested land for a minimum of 10 years before the project start date.
- This project does not occur on wetlands and does not drain native ecosystems or degrade hydrological functions.
- Non-performance risk will be analysed in accordance with the VCS Program document AFOLU Non-Permanence Risk Tool⁴

The project is being developed with the approved VCS methodology VM0007 “REDD+ Methodology Framework (REDD+ MF)”, v1.6. The pertinent points of eligibility around REDD are stated below:

- The project area faces threats of deforestation that includes clearance of the land for tree harvesting, settlements, crop production (agriculturalist) or ranching or aquaculture.
- There is no documented and uncontested legal right to deforest the land for these purposes.
- The areas are being deforested by the residents of the project area.
- There is fuelwood collection and charcoal production in the baseline scenario.

The pertinent points of eligibility around RWE are stated below:

- The degraded areas have been abandoned for two or more years prior to the project start date.
- The degraded area is not suitable for commercial profitable activities due to salinity intrusion.
- The degraded area is under the land use that will continue at a similar or greater level of service or production during the project crediting period as shown in the REDD criteria.

⁴ https://verra.org/wp-content/uploads/2019/09/AFOLU_Non-Permanence_Risk-Tool_v4.0.pdf

Furthermore, according to the VCS Standard v4.4⁵ and considering the DR Congo Mangrove Blue Carbon Project characteristics, four main sections must be followed by the project so that it is eligible. The following highlights how this project adheres to such eligibility criteria:

Section 3.1 General Requirements

The project attends to all the applicable requisites of section 3.1 as listed below.

- Section 3.1.1: The project meets all applicable rules and requirements as set out under the VCS program. More details about the methodology are given in section 3.2, Applicability of Methodology.
- Section 3.1.2: A methodology eligible under the VCS Program is applied in full, namely, Methodology for Implementation of REDD+ Methodology Framework (REDD+ MF) v1.0. (VM0007).
- Section 3.1.4: Implementation is legal under the laws of Democratic of Republic as well as the respective states' legislation. All laws considered during the compliance process are presented in section 1.14 of this document.
- Section 3.1.7: Rules and requirements of the VCS program take precedence over other approved GHG Program when there is a conflict between them.
- Section 3.1.8: All capacity limits and relevant requirements are considered when a methodology from an approved GHG program is used.

Section 3.2 AFOLU-Specific Matters

All applicable minor sections of the 3.2. section have requirements followed by this project:

- Section 3.2.2: The project is not located within a region covered by a jurisdictional REDD+ program, then it is not necessary to follow the requirements related to nested projects set out in the VCS Program document called Jurisdictional and Nested REDD+ Requirements.
- Section 3.2.3: All implementation partners are identified in Section 1.6 of this document.
- Section 3.2.4: Project activities do not convert native ecosystems to generate GHG credits. As stated in section 1.13 and as confirmed by geospatial data, the land has not been cleared of native ecosystems within 10 years of the project start date. The geospatial analysis also concludes that fauna and flora of the project area are part of the Congo rainforest.

⁵ <https://verra.org/wp-content/uploads/2022/12/VCS-Standard-v4.4-FINAL.pdf>

- Section 3.2.5: Project activities do not drain or degrade hydrological functions to generate GHG credits. Their resources are not used, and their riparian forest remains intact.
- Section 3.2.7: The project is going to reassess the defined baseline every six years in order to consider possible methodologies updates and changes in the drivers and/or behaviour of agents that cause changes in the reference area.
- Section 3.2.8: Project activities do not occur on wetlands, then specific requirements for WRC projects are not necessarily to be followed.

Appendix 1 Eligible AFOLU Project Categories

Appendix 1 from the VCS Standard v4.4 details the eligibility criteria for every type of activity. Since the DR Congo Mangrove Blue Carbon Project is a REDD and RWE project; paragraphs A1.5 to A1.8 are the important ones for this project. The requirements attended by this project are listed below.

- Reduce emissions from deforestation by avoiding illegal loggers to invade the property to transform forest land into non-forest land in a direct human-induced conversion.
- The eligible area is composed of qualified forests once they have more than 10 years of existence prior to the project start date.
- The activities covered under the REDD+ project category have specifically the goal to avoid unplanned (unsanctioned) deforestation and degradation, configuring as an AUDD kind of project.

This project is therefore designed to implement activities that reduce human activities in the mangrove forest including clearance of the land for tree harvesting for non-commercial purposes, settlements, crop production (agriculturalist) or ranching or aquaculture and unplanned deforestation firewood or fuelwood, thus allowing for conservation and maintenance of the forest cover as well as restoring the degraded area of the forest. The project uses a methodology certified under the VCS program VM0007, with applicability in Avoided Unplanned Deforestation and Degradation in tidal wetlands. This project fits under the different modules as has been identified in the methodology viz. M-REDD, M-ARR, M-TW, X-STR,X-UNC,BL-UP, BL-TW, LK-ASU, LK-ECO, CP-AB, C-PD.

1.4 Project Design

The project includes multiple locations or project activity instances but is not being developed as a grouped project.

1.5 Project Proponent

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Contact person	Capt. DK Balian
Title	Chief Executive Officer (CEO)
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1.6 Other Entities Involved in the Project

Organization name	Groupment Malela
Role in the Project	Group Leader of the Malela Community Land
Contact person	Kutshi Baka Simon II
Title	Chief of Malela Group
Address	<i>Territory of Moanda, Central Congo Province, DR Congo</i>
Telephone	+253 819702089
Email	

Organization name	Groupment Kinlau
Role in the Project	Group Leader of the Kinlau Community Land
Contact person	Nzinga Nkanu Monique
Title	Chief of Kinlau Group
Address	<i>Territory of Moanda, Central Congo Province, DR Congo</i>
Telephone	
Email	

1.7 Ownership

All the land and natural resources thereof in DR Congo are under State ownership. While there is a process of obtaining concessions over land areas in DR Congo by an individual, group, or entity to utilise the land or the resource by getting such permission from the government, for certain areas, the government recognises the rights of the communities presiding in the area or have historically presided over the areas and provides customary rights to the chieftains of such communities to utilise the land and the resources of such areas. The chieftains from the communities of Malela and Kinlau have been provided such customary rights by the Government which also indicates that their sons will continue to have the customary rights over these mangrove areas. To reinforce the prevalence and provision of the customary rights of the Malela and Kinlau communities, the mangrove areas are considered as nature reserves bifurcated in two zones namely Parc marin des mangroves (Zone A) and Parc marin des mangroves (Zone B). This identification happened back in 1992, and the areas were designated as Ramsar site on January 18, 1996⁶. Thus, through such official paperwork, the customary rights were provided to the chieftains of the two communities. These communities of Malela and Kinlau living adjacent to the mangrove site have signed a carbon rights agreement with ClimeTrek to utilise the mangrove areas for a carbon project by carrying out conservation activities that reduce the continued degradation of the mangroves in Marine Park and restore the already degraded areas.

Under carbon rights agreement, the signing parties i.e., the chieftains of Malela and Kinlau are free to confer the carbon rights to ClimeTrek Ltd., in developing the carbon project after agreement of the benefit sharing mechanism in which the communities will receive financial benefits and capacity building support through the implementation of the project. Under this agreement, parties design a mechanism through which the project and its activities are undertaken, even further preparing a benefit-sharing scheme accruing from the monetisation of the carbon credits in the carbon market, thereby unlocking important climate finance for the conservation and restoration of the mangrove zones.

1.8 Project Start Date

According to the requirements established by the VCS Standard version 4.4 document, “The project start date of an AFOLU project is the date on which activities that led to the generation of GHG emission reductions or removals are implemented (e.g., preparing land for seeding, planting, changing agricultural or forestry practices, rewetting, restoring hydrological functions, or implementing management or protection plans)”.

The sustainable forest management plan was ideated and the development of the same started on 01st May 2020 in consultation with the Groupment Malela chief after the latter was appointed officially as the group leader in October 2018, and have the community rights to the lands. This conceptualisation of the management plan of the mangrove areas marks the start date of the

⁶ <https://www.afrik21.africa/rdc-le-parc-marin-des-mangroves-menace-par-le-port-en-eau-profonde-de-banana/>

project, and this indicates that the project proponent started taking active measures for the promotion of activities that leads to the generation of GHG emission reductions. Thus, this date represents the effective date on which the project began generating GHG emissions reduction in the project area and is the start date of the project.

1.9 Project Crediting Period

This project crediting period is 30 years, with the first instance crediting starting on 01/05/2020 and ending on 30/04/2050. The crediting type is renewable for two times with a maximum crediting period of 100 years.

Crediting period start date: 01 May 2020

Crediting period end date: 30 April 2050

Crediting period: 30 years.

Type of crediting period: Renewal. And the project crediting period will be renewed three times with a total project crediting period not to exceed 100 years.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The estimated annual GHG emission reductions/removals of the project are:

100,001 – 1,000,000 tCO₂e/year

Project Scale	
Project	x
Large project	

1.11 Description of the Project Activity

The DR Congo mangrove carbon project is a conservation project and is set within the Central Congo Province, Territory Moanda occupying 23,684 hectares. These mangroves play an important role in the local and national economies through the provision of wood and non-wood products to the people in a non-commercial angle, supporting fisheries, coastal protection, and stability as well as contributing to biodiversity conservation. The morphological structure of mangrove help reduces the strength and impact of waves on the shore and their root system stabilise the coast reducing and preventing erosion. The biodiversity found in the DRC mangrove include crocodile, hippopotamus, leatherback turtle and the endangered manatee, and a variety of reptiles, amphibians, and birds including African fish eagle, greater flamingo, kingfisher, and goliath heron some of the coveted bird sightings. The communities living adjacent to these

mangroves have continued to enjoy both goods such as wood products for non-commercial purposes, honey and fish from the mangrove and at the same time get protection from storm surges and cyclones. Additionally, the mangrove here has continued to support marine tourism where there are boat rides within the mangrove⁷. Together with provisions of multiple goods and services to society, mangroves and associated ecosystems capture and store huge stocks of carbon in both above-and below-ground components⁸.

Despite their enormous benefits to coastal livelihoods, mangrove cover in DR Congo is decreasing at an alarming rate with 116 hectares estimated to be lost yearly for the last ten years thereby threatening the livelihoods of communities living by the coast. These losses have largely been driven by unsustainable wood extraction for charcoal making, as a source of heat or light⁹, land clearance for subsistence agriculture and timber harvesting for non-commercial uses, illegal sand mining, unsustainable boat docking (fishing is an important livelihood activity in the mangrove area and has resulted to sprouting of landing sites through the clearing of mangrove areas) and climate-mediated storms and flooding. Due to the low-lying nature of the DR Congo coastal areas, it has continued to face erosion due to a combination of the topography, the sandy nature of the soils, and the effect of oceanic dynamics (height of the swells, speed of the breaking of the waves, tides, storms)¹⁰ as well as deteriorating natural barriers of mangroves. While the storm and tides cannot be remedied, the disappearance of the mangrove due to the anthropogenic pressures of deforestation and degradation can be reversed which would subsequently prevent sea encroachment. Loss of mangroves also impacts local economies witnessed through shortages of harvestable products, reduction in fisheries and loss of protective functions.

To prevent this degradation ClimeTrek and its partners are therefore implementing a conservation project in these mangroves to prevent further deforestation and degradation by addressing the above identified drivers of deforestation and degradation and building financial capacity of the communities to reduce the need of them exploiting the forests thereby reducing the stress of the mangrove forests. The target activities are the protection of the remaining forest cover by initiating mechanisms that reduce such stress on the forests, engaging the communities through awareness drives, bettering the economic and financial capacity of the communities and restoring the degraded areas. These activities are well recognised under community development as well as the climate change agenda. Implementing these activities will lead to carbon emission reduction as well as carbon removal from the atmosphere.

⁷ <https://national-parks.org/congo-dr/mangroves>

⁸ Ajonina et al. 2014. *The land/ocean interactions in the coastal zone of West and Central Africa*, 151-166.

⁹ <https://www.thegef.org/news/best-both-worlds-embracing-environmental-protection-pursuit-prosperity-democratic-republic>

¹⁰ <chrome-extension://efaidnbmninnibpcjpcglclefindmkaj/https://unfccc.int/resource/docs/natc/rdcnc2exsume.pdf>

To effectively protect the mangroves, the project implementer will work closely with the State government, forest agencies (Service Permanent d'Inventaire et d'Aménagement Forestiers), and communities living around the forest to come up with strategies to minimise the degradation of mangroves. Activities under this would include capacitation to the local communities on the sustainable use of forest products as well as capacity building through financial upliftment, training local forest scouts on monitoring and surveillance methods, and development of a participatory management plan for forest utilisation.

Under the restoration goal of the project, project activities include training the communities and engaging them on the best ways to restore the degraded areas as well as plantation activities for the restoration of the wetland ecosystem. The latter module for restoration includes aspects like identifying and mapping drivers of mangrove degradation, degraded areas identification, restoration species matching, preparing nurseries where necessary and the actual out planting followed by monitoring.

The development of this carbon project will have benefits to a) climate in which reduction in degradation will allow for more carbon removal from the atmosphere lowering global warming, b) increase in forest cover allows for more biodiversity- both fauna and flora contributing to the Convention on Biodiversity Conservation, 3) community benefits in terms of continued supply of materials from the forest, improved livelihood through the carbon credit funds as well as employment for local scouts and project coordinators. Through a benefit-sharing scheme, communities around the forest will prioritise activities that are beneficial to be funded through the funds including equipping local hospitals and improving road infrastructure among others. Additionally, intact mangrove forests will protect the coastal communities in case of typhoons and increase shoreline resilience from erosion.

1.12 Project Location

The DR Congo mangrove project is located at the mouth of River Congo in the Province Bas-Congo, in Moanda territory where about 23683 hectares of mangrove occur (05°45'-06°05'S, 12°45'-13°00'E map). Some of the mangroves fall within a park, (Parc Marin des Mangroves)¹¹ and also enjoy the status of the Ramsar site but continue to be degraded.¹²

¹¹ http://www.ramsar.org/cop7/cop7_nr_congo_dr.htm

¹² <https://rsis.ramsar.org/ris/788>



Climate and topography

¹⁴ <https://www.wikiwand.com/en/Moanda%2C Democratic Republic of the Congo#Climate>

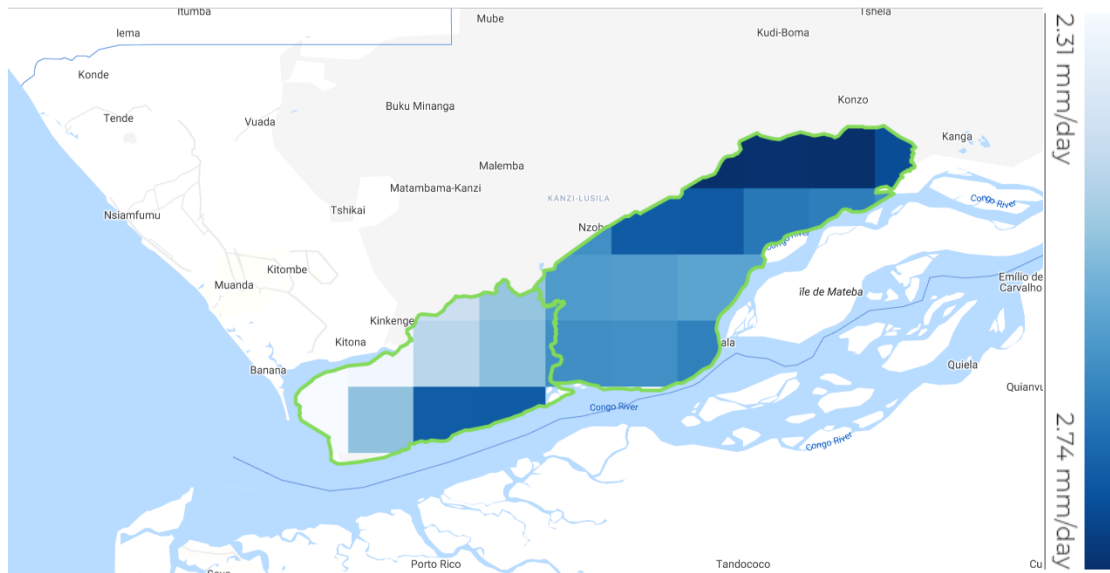


Figure 2: Precipitation in Moanda region. Source: CHIRPS.¹⁵

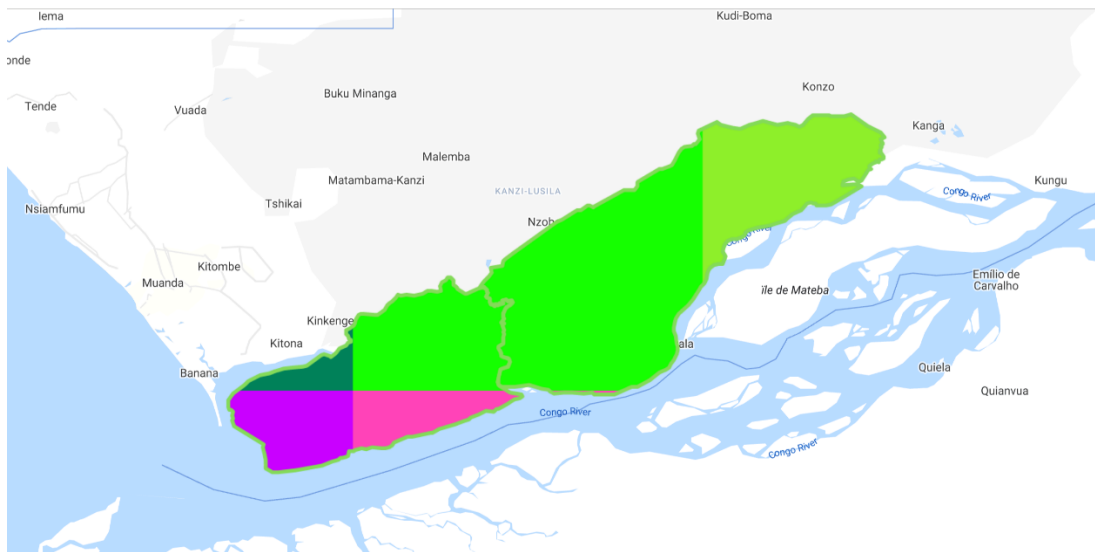


Figure 3: Climate Reanalysis by ECMWF. Source: ERA5¹⁶

¹⁵ <https://chc.ucsb.edu/data/chirps>

¹⁶ <https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels?tab=overview>

Climate data for Moanda (altitude: 31 metres or 102 feet) [▲]													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C (°F)	31.3 (88.3)	31.3 (88.3)	32.1 (89.8)	31.9 (89.4)	30.8 (87.4)	28.1 (82.6)	26.3 (79.3)	26.3 (79.3)	28.1 (82.6)	30.2 (86.4)	30.3 (86.5)	31.1 (88.0)	29.8 (85.7)
Daily mean °C (°F)	26.8 (80.2)	26.8 (80.2)	27.4 (81.3)	27.2 (81.0)	26.3 (79.3)	23.4 (74.1)	21.7 (71.1)	21.8 (71.2)	23.8 (74.8)	26.2 (79.2)	26.3 (79.3)	26.8 (80.2)	25.4 (77.7)
Average low °C (°F)	22.4 (72.3)	22.4 (72.3)	22.7 (72.9)	22.6 (72.7)	21.8 (71.2)	18.7 (65.7)	17.2 (63.0)	17.4 (63.3)	19.5 (67.1)	22.2 (72.0)	22.4 (72.3)	22.5 (72.5)	21.0 (69.8)
Average rainfall mm (inches)	81 (3.2)	132 (5.2)	145 (5.7)	166 (6.5)	59 (2.3)	0 (0)	0 (0)	1 (0.0)	6 (0.2)	29 (1.1)	127 (5.0)	87 (3.4)	833 (32.6)

Source: Climate-Data.org^[3]

Figure 4: Climate of Moanda Region, DRC. Source: Climate-Data.org¹⁷

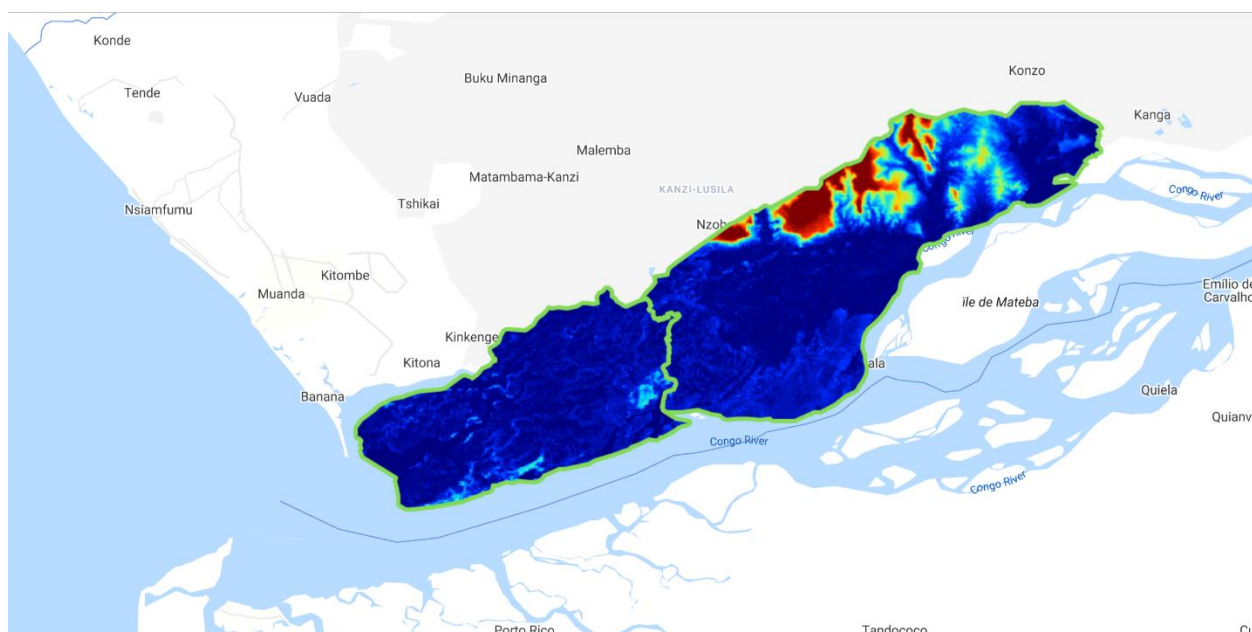


Figure 5: Topography of the Moanda region. Source: NASA¹⁸

Soil

The soils of the mangrove areas are predominantly sandy unconsolidated collarine, with poor water holding capacity and extreme alkalinity (Branam, 1978). The Congo River floods bring is sediments from the hinterlands which contribute to better growth of the mangrove.¹⁹

¹⁷ [https://www.wikiwand.com/en/Moanda%2C Democratic Republic of the Congo#Climate](https://www.wikiwand.com/en/Moanda%2C%20Democratic%20Republic%20of%20the%20Congo#Climate)

¹⁸ [https://cmr.earthdata.nasa.gov/search/concepts/C1546314043-LPDAAC ECS.html](https://cmr.earthdata.nasa.gov/search/concepts/C1546314043-LPDAAC_ECS.html)

¹⁹ [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://unfccc.int/resource/docs/natc/rdcnc2exsume.pdf](https://unfccc.int/resource/docs/natc/rdcnc2exsume.pdf)

Hydrology

DR Congo's coastline is about a 23-mile strip characterised by beaches, savanna permanent streams and rivers, creeks, and mangroves. The Congo River, the second biggest river in Africa, with its monstrous dimensions drains its water into the Atlantic Ocean through Muanda territory as an estuary. The river transports annually 86 million tonnes of suspended sediment to the ocean.²⁰ The freshwater from River Congo influences the growth of the mangrove by supplying sediment as well as nutrients. In turn, the mangrove act to sieve the sediment or pollutants that come from the hinterland before the water flow into the Ocean. There however observation of the coastland retreating by about 2300 meters since 1980 in some coastal areas through shoreline erosion caused by the harvesting of coastal mangroves and other ocean dynamics.²¹ It has however been reported elsewhere that the presence of mangroves acts as coastal defense.^{22,23}

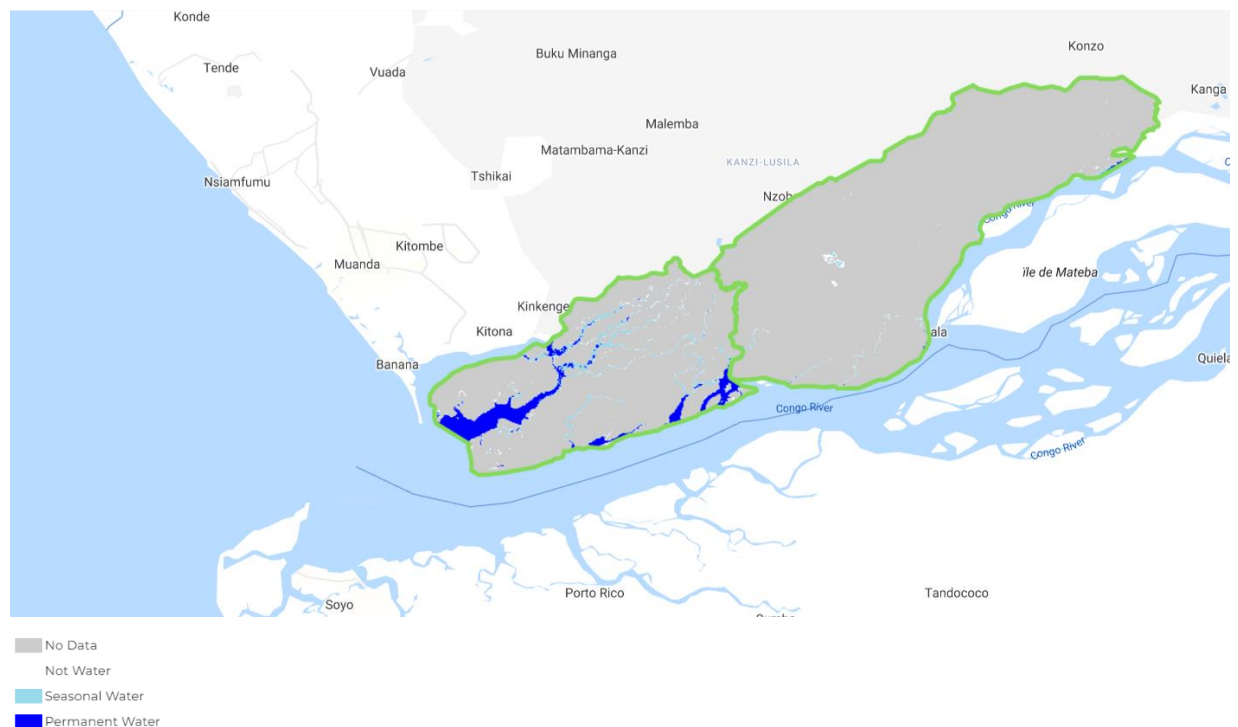


Figure 6: Global Surface Water in Moanda region. Source: Global Surface Water.

²⁰ https://en.wikipedia.org/wiki/Congo_River

²¹ chrome-extension://efaidnbmninnibpcapjpcglclefindmkaj/https://www.adaptation-undp.org/sites/default/files/downloads/drc-ldcf_pif.pdf

²² Mclvor, A., Spencer, T., Möller, I., & Spaldinga, M. (2016). 2| Coastal defense services provided by mangroves. Managing Coasts with Natural Solutions, 24.

²³ Kathiresan, K., & Rajendran, N. (2005). Coastal mangrove forests mitigated tsunami. Estuarine, Coastal and shelf science, 65(3), 601-606.

Ecosystem type:

DRC mangroves are estuarine wetlands found at the mouth of the River Congo, where the input of the river freshwater influences the large growing mangrove trees. Presently, these mangroves are reported to decline at a rate of 116ha/yr. Considering the fact that this marine forest is the smallest in comparison to the country's terrestrial forest, therefore the stress on this forest is unmatched. Furthermore, owing to the many goods and services that it provides both to communities and biodiversity, the degradation compromises their provision, regulating, supporting, and cultural values. The mangrove here is classified as a rare habit in DR Congo and comprises six species including *Acrostichum aureum*, *Avicennia germinans*, *Conocarpus erectus*, *Laguncularia racemosa*, *Rhizophora mangle*, and *Rhizophora racemosa* (FAO, 2001). Other vegetation surrounding the mangrove includes the grassland savanna (*Annona arenaria*) and swamp vegetation (*Canavalia maritima*). Further, the forest harbours biodiverse that is listed as endangered including the manatee and turtle, due to forest degradation. The area contains endemic fish species including *Tylochromis praecox*, *Micralestes halargyreus* and *Oreochromis lepidurus*. Other aquatic fauna includes sharks, barracuda, sole, capitaine, snakes, turtles, crustaceans (shrimp, crab), and oysters (Ramsar 1994) It is a key staging, feeding, and breeding area for migratory waterbirds.

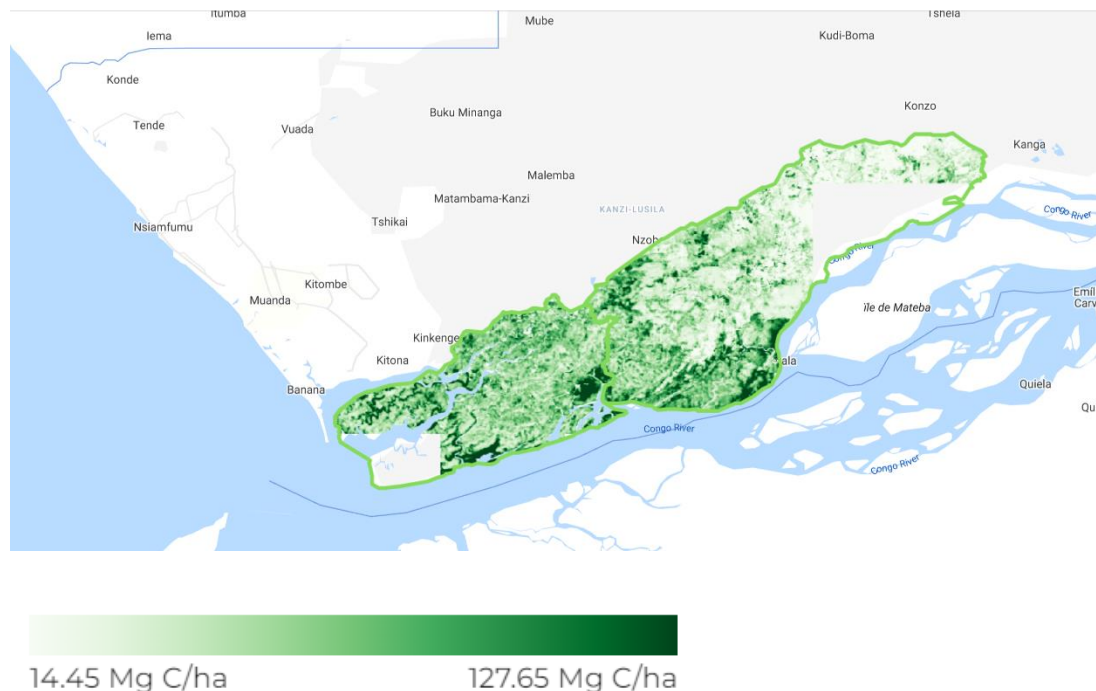


Figure 7: Biomass density of the Moanda region. Source: NASA²⁴

²⁴ https://daac.ornl.gov/cgi-bin/dsvviewer.pl?ds_id=1763

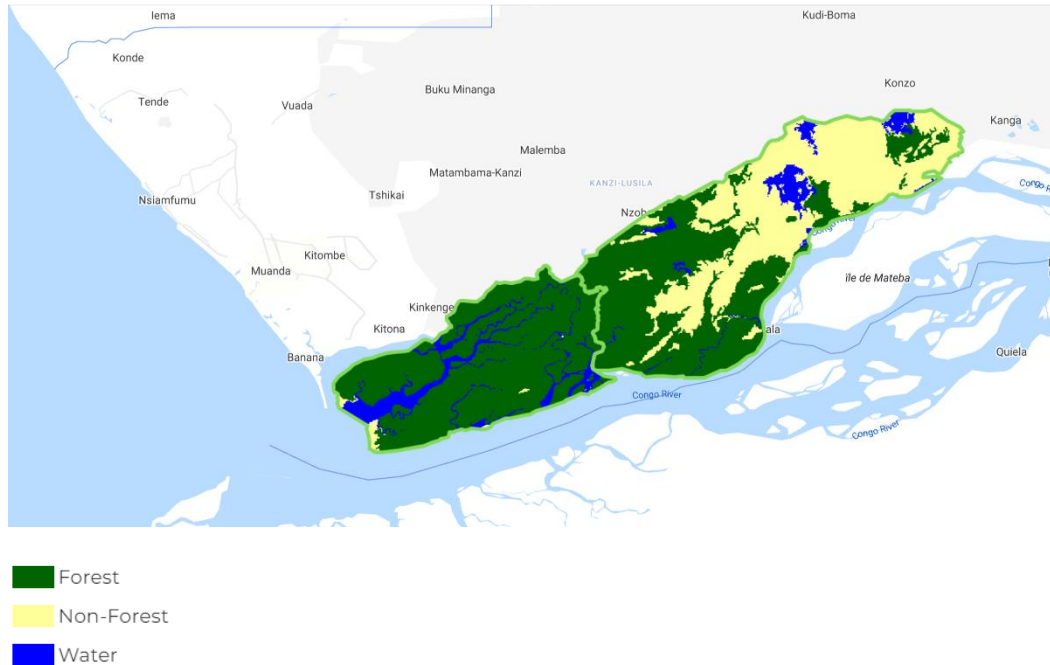


Figure 8: Forest and Non-Forest Classification. Source: ALOS Research and Application Project²⁵



Figure 9: Land type classification. Source: WRI²⁶

Current and historical land use: The main driver of deforestation of the mangrove here are economic development and habitat modification. As the DRC mangrove occurs at the mouth of

²⁵ https://www.eorc.jaxa.jp/ALOS/en/url_change_info_e.htm

²⁶ <https://www.nature.com/articles/s41597-022-01307-4>

the River Congo, they face threats from the human population who prefer the site for the rich agricultural soil and industries due to access to the ocean port. Moanda locality has a population of 90,812²⁷ and reflects striking characteristics of the DR Congo population. Mostly the people based in the rural areas are affected by the prevailing poverty conditions and unemployment because of the in-country conflicts. The communities living around the mangrove forest carry out fishing, and subsistence farming, harvest wood from the forest and collect firewood from the forest. Urban and marine industrial development are also converting some of the mangrove areas to seaways. The oil refining plants also have occasion spilled oil in the area mangroves causing their death.²⁸ Further, the poaching of marine reptiles such as turtles and manatees compromised the mangrove biodiversity.



Figure 10: Historical deforestation in the Project Area. Source: Hansen Global Forest Dataset²⁹

²⁷ https://www.wikiwand.com/en/Moanda,_Democratic_Republic_of_the_Congo

²⁸ Mangroves of western and central Africa. No. 26. UNEP/Earthprint, 2007.

²⁹ <https://glad.earthengine.app/view/global-forest-change#dl=1;old=off;bl=off;lon=20;lat=10;zoom=3;>

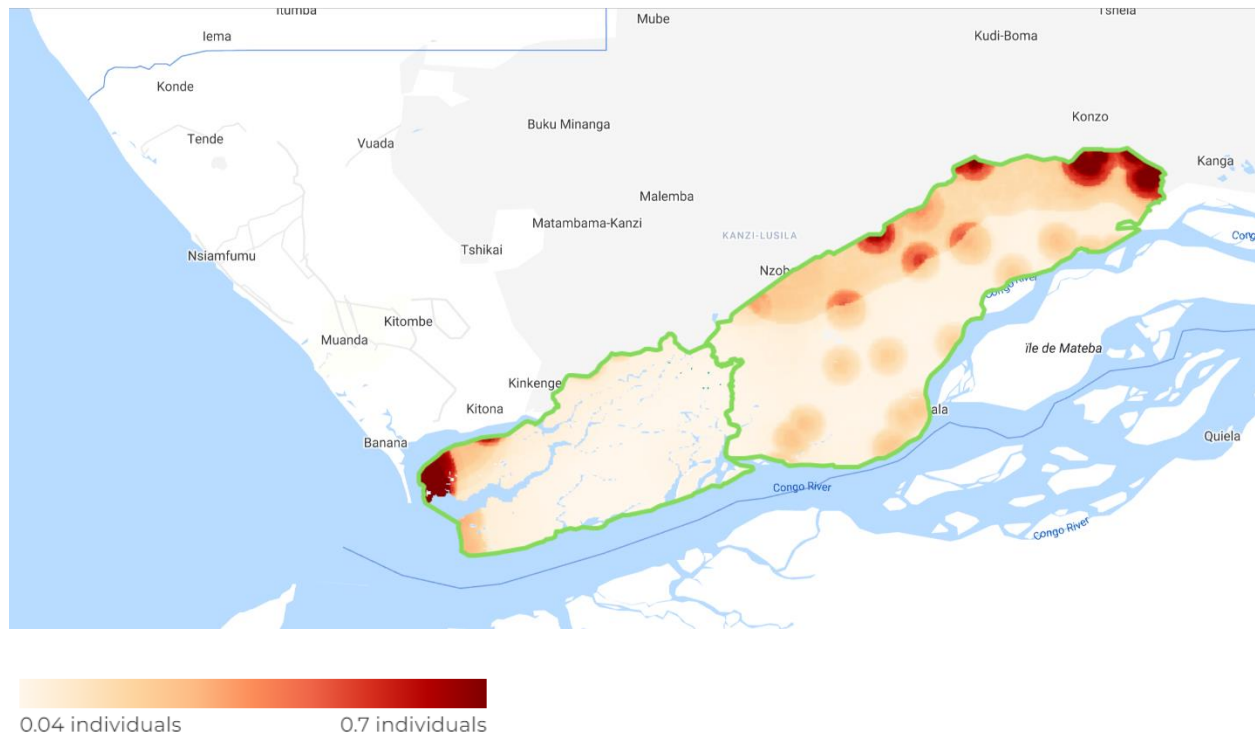


Figure 11: High-res population of each 100mx100m grid. Source: WorldPop³⁰

Has the land been cleared of native ecosystems within 10 years of the project start date?

No

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The standard operating procedure of the project is set to abide by the laws of the land without jeopardising or compromising any section of the law, policy, and regulations in place. As the land under the forest is state own, activities thereof are governed by state laws with an understanding that under the carbon project, the right to sequestered carbon is owned by the project proponent. Key regulations governing activities in the mangrove forest for DR Congo include:

The Land Tenure Law No. 73-021 of July 20, 1973, as amended by the law of 18 July 1980.

This law established that the State is the sole owner of the land and subsequent resource. Article 53 states “The land is the exclusive, inalienable, and imprescriptible property of the State”. Both public and private land domains are subject to land law and only the government can authorise their use and is done through a contract called a ‘land concession. Article 61 of the law defines the land concession as “a contract in which the State recognises the enjoyment right of a community, a natural person or a legal entity under private or public law, under conditions and modalities provided by the law and its application

³⁰ <https://www.worldpop.org/>

provisions". The project proponent recognises that customary rights or concessions that have been provided to the chieftains of Malela and Kinlau. In this project, the communities of Malela and Kinlau have been given the customary rights for the use of the land and the resources. For the development of the carbon project in this forest, the carbon rights have been transferred to the project proponent, ClimeTrek Ltd., and in following these steps, the project thus complies with this law.

Forestry Code, No. 11/2002, 2002.

The code lays down a balanced management system integrating ecological, economic, as well as social factors. The Code aims to: (1) guarantee public consultations prior to the allocation of forestlands; (2) recognize communities' customary rights to forestlands and respect traditional usage rights; (3) conserve and sustainably develop ecosystems; (4) support community forestry; (5) allocate forest concessions transparently; (6) include all stakeholders in forest management; and (7) provide alternative uses of forest resources and spaces including non-extractive forest uses like conservation concessions, carbon sequestration, and bioprospecting rights.³¹ In this regard, the project proponent, following the legal channel conducted Free Prior and informed consent. In their long their short-term project, the community wants to have financial benefits from the forest while their long-term goal is to have a healthy forest that continuously provides for their livelihood for the current and future generations. By ClimeTrek developing a conservation and carbon sequestration project in the mangrove of DR Congo, it will be abiding by the Forest Law.

Environmental Protection Act (EPA), No. 11/009, 2011

The law lays out the principle of sustainable development. Individuals, private or communities are given the right to sustainably utilise the forest resource in a manner that does not compromise the environment. The conservation project as such proposed by ClimeTrek in the mangrove of DR Congo, by following the principle set in this will be achieving the law objectively. In addition, the project proponent will be promoting better living conditions for the population through the revenues from the carbon credits and the maintenance of the forest enables continued provisions of the mangrove goods and services.

National Climate Change Adaptation Plan 2007

The plan establishes the climate risk inventory for the county and outlines mitigation measures to reduce the effects of climate change. One measure is to institute projects that help lower the emission from forest deforestation and degradation and instead enhance carbon sequestration and sinking. ClimeTrek carbon project in the mangrove of DR Congo works in line with this plan by creating the enabling condition for forest conservation under the REDD+ projects. The aim is to reduce emissions from deforestation and degradation of the mangrove forest by offering a payment scheme for a maintained forest ecosystem.

³¹ Debroux, L., Topa, G., Hart, T., Kaimowitz, D., Karsenty, A., Abdon, A., ... & Yambayamba, N. (2007). Forests in post-conflict Democratic Republic of Congo: Analysis of a priority agenda.

United Nations Forum on Forests (UNFF)

A subsidiary body of the United Nations Economic and Social Council, requires all members of UNFF, DRC being a member, to submit a periodic report on the state of forest governance in the country. Because of the huge forest cover in DR Congo, most focus has been on the terrestrial forest and not the mangroves. Yet mangrove is listed as a rare forest in the country. By having a conservation project in this forest, ClimeTrek will be helping DR Congo report on this rare habitat as the monitoring data on health and carbon sequestration will be made available and public for the country to integrate into its health status report of the forest.

Other frameworks the project aims to comply and promote in the country.

- i. 2005 Treaty on the Conservation and Sustainable Management of the Forest Ecosystem of Central Africa.³² The treaty was introduced to govern and consolidate sub-regional cooperation in the forest area and surrounding environment by solidifying the party states associated with the principle of biodiversity conservation and sustainable management of forest ecosystems in Central Africa, and safeguarding the rights of their peoples to rely on forest resources to support their economic and social development efforts; By ClimeTrek partnering with DR Congo mangrove communities, it fosters an economic project with the aim of enabling the realisation of economic use of the forest.
- ii. African Convention on the Conservation of Nature and Natural Resources (1969) was established to undertake measures necessary to ensure the conservation, utilization, and development of soil, water, flora and faunal resources following scientific principles and with due regard to the best interests of the people.³³ The Carbon project by ClimeTrek in the mangrove of DR Congo aims to use scientific principles to conserve soil, water, flora and fauna to improve the ecosystem and benefit the people living around the mangrove zones.
- iii. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention 1971) is an international treaty for the conservation and sustainable use of Ramsar sites (wetlands)³⁴. Mangroves of DR Congo were designated Ramsar sites in 1996, thus ClimeTrek conservation project aims to promote the wetland existence.
- iv. Convention Concerning the Protection of the World Cultural and Natural Heritage 1972 aims to protect the unique ecosystem of importance to man and nature.³⁵ The Mangrove of DR Congo is

³² Treaty on the Conservation and Sustainable Management of Forest Ecosystems in Central Africa and to Establish the Central African Forests Commission (COMIFAC)', 2/1 Law, Environment and Development Journal (2006), p. 145, available at <http://www.lead-journal.org/content/06145.pdf>

³³ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://au.int/sites/default/files/treaties/7763-treaty-0003_-_african_convention_on_the_conservation_of_nature_and_natural_resources_e.pdf

³⁴ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ramsar.org/sites/default/files/documents/library/scan_certified_e.pdf

³⁵ <https://legal.un.org/avl/ha/ccpwcnh/ccpwcnh.html>

the DRC's only marine-oriented national park hence its existence needs to be protected.³⁶ By having a conservation project in these mangroves, ClimeTrek is helping the country achieve its obligation of protecting cultural heritage site

- v. Convention on the Conservation of Migratory Species of Wild Animals (Bonn)1979 was established for the conservation and sustainable use of migratory animals and their habitats. Mangroves of DR Congo are important habitats for migratory birds and marine organisms but are under threat, therefore, this project will preserve the migratory habitat.
- vi. Vienna Convention for the Protection of the Ozone Layer; London and Montreal Protocol
- vii. United Nations Convention on Climate Change 1992 has the ultimate aim of preventing dangerous human interference with the climate system which the 1997 Kyoto Protocol and 2015 Paris Agreement built upon following the Convention.³⁷ ClimeTrek observes human activities are causing deforestation and degradation of the mangrove of DR Congo and there is a need to prevent this from furthering and to halt further climate change effects that are exacerbated by carbon emissions from the degraded forest.
- viii. Convention on Biological Diversity 1992,³⁸ the convention was established to help the state set focus on preserving ecosystems to enhance biodiversity. This project has an element that will elaborate and implement economic incentives promoting forest biological diversity conservation and sustainable use.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project is not registered with another GHG program nor seeking such.

1.15.2 Projects Rejected by Other GHG Programs

The project has never been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

Does the project reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading?

No

³⁶ <https://national-parks.org/congo-dr/mangroves>

³⁷ https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf

³⁸ https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-8&chapter=27

1.16.2 Other Forms of Environmental Credit

Has the project sought or received another form of GHG-related credit, including renewable energy certificates?

No

1.17 Sustainable Development Contributions

This project is designed to have multiple benefits beyond the carbon removal or emission reduction. Mangrove forest have both biodiversity benefits in addition to other services and their continued existing contribute to international commitment such as those outlined in the SDGs under the United Nations Framework Convention on Climate Change. These include:

No poverty (1). The revenue share from sale of carbon through the project to the communities will guarantee livelihood improvement through community projects such as better water systems and improved mangrove tourism.

No hunger (2). A health functioning mangrove forest provide food in terms of high fish catch and mangrove honey. The revenue from the sale of carbon credits can start a feeding program among the communities. Additionally, imparting training on better farming methods that are sustainable would see food security in the project area.

Good health and Well-being (3). Mangrove acts as defence to the coastal community from floods, storms, and other ocean related incidents. In this case, they cushion the communities from the flooding of the River Congo and the effects of sea level rise.

Quality education (4). The project aims to train the local communities on better conservation methods of the forest. As a key environmental component, students from DR Congo schools will use the forest as training as well as Research centre to learn and teach on marine ecosystems. Additionally, the project will create school materials that will be shared in all the learning institutions. Where applicable the project will support scholarship through field- based activities.

Gender Equity (5). For effective implementation, the project will deliberately share the opportunities among all gender: women, men, youth from leadership, business opportunities to training. This will create a collaborative environment that will foster better project implementation as well as achieve the project objective of improving the mangrove cover and health status.

Climate Action (13). By reduce carbon emission from forest deforestation and degradation, the project will be mitigating the effect of climate change.

Life under water (15). The conservation of the mangrove under the project will ensure continues survival of aquatic biodiversity; the manatee, turtle, fish, birds; some of which are endangered and others endemic to this area.

1.18 Additional Information Relevant to the Project

Leakage Management

This will be made available during the validation process.

Commercially Sensitive Information

No commercial information is contained in this document.

Further Information

No relevant further information deemed relevant is provided at this point, but during validation when such is identified, it will be included.

2 SAFEGUARDS

2.1 No Net Harm

The project activities are those of conservation nature hence do not bear negative impacts to the environment nor social economic of the people living within the project site. In case any is identified later on, an adaptive management approach will be taken to remedy them.

2.2 Local Stakeholder Consultation

Information on stakeholder consultation will be made available during the validation and verification phase.

2.3 Environmental Impact

The anticipated activities are not of destructive nature rather conservation including stopping unsustainable harvesting of trees and restoring where degradation and deforestation has happened, hence no need for an environmental Impact assessment.

2.4 Public Comments

The project has not been uploaded to VERRA for comment yet. This will be available during the validation stage.

2.5 AFOLU-Specific Safeguards

This information will be provided during the validation and verification phase.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The project employs VM0007 REDD+ Methodology Framework (REDD+MF), v1.6³⁹. The modules and tools used for estimation reduction under this methodology in this project include:

Carbon pool estimation modules:

VMD0001 Estimation of carbon stocks in the above- and belowground biomass in livetree and non-tree pools (CP-AB) version 1.1

- *VMD0002 Estimation of carbon stocks in the dead-wood pool (CP-D) version 1.0*

Baseline modules

- *VMD0007 Estimation of baseline carbon stock changes and greenhouse gas emissions from unplanned deforestation and unplanned wetland degradation (BL-UP), version 3.*
- *VMD0050 Estimation of baseline soil carbon stock changes and greenhouse gas emissions in tidal wetland restoration and conservation project activities (BL-TW), version 1.0*

Monitoring modules:

- *VMD0015 Methods for monitoring of greenhouse gas emissions and removals (M-REDD), version 2.2*
- *VMD0051 Methods for monitoring carbon stock changes and greenhouse gas emissions and removals in tidal wetland restoration and conservation project activities (M-TW), version 1.0*

Leakage modules:

- *VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation (LK-ASU), version 1.2*
- *VMD0044 Estimation of emissions from ecological leakage (LK-ECO), version 1.1*

Other modules:

- *VMD0017 Estimation of uncertainty for REDD+ project activities (X-UNC), version 2.2*
- *VMD0052 Demonstration of Additionality of Tidal Wetland Restoration and Conservation Project Activities (ADD-AM), version 1.0*

3.2 Applicability of Methodology

The VM0007 version 1.6 methodology is a revised version which is designed to accommodate tidal wetland restoration and conservation activities. It is applicable in forest lands, forested wetlands, and forested peatlands susceptible to deforestation or degradation in the absence of project activities.

³⁹ VM0007 REDD+ Methodology Framework (REDD+MF), v1.6 - Verra

Considering this project's sectoral scope (section 1.2) this methodology is applied for the reduction of emissions from unplanned deforestation and unplanned degradation of intact or partially drained wetlands⁴⁰.

Applicability conditions	Justification for applicability
All land areas registered under the CDM or under any other GHG program (both voluntary and compliance-oriented) must be transparently reported and excluded from the project area. The exclusion of land in the project area from any other GHG program must be monitored over time and reported in the monitoring reports.	To date, there are no other GHG emission reduction programs registered for the area.
Land in the project area has qualified as forest (following the definition used by VCS) at least 10 years before the project start date. Mangrove forests are excluded from any tree height requirement in a forest definition, as they consist of (close to) 100% mangrove species, which often do not reach the same height as other tree species and occupy contiguous areas, and their functioning as a forest is independent of tree height.	As the project is mangrove based, the height requirement is excluded but the forest definition for DR Congo is applied. The project area has been a forest for more than 10years.
If land within the project area is peatland or tidal wetlands and emissions from the soil carbon pool are deemed significant, the relevant WRC modules must be applied alongside other relevant modules.	As the project is developed in tidal, coastal wetlands, the relevant WRC modules are applied, according to the methodology, for the estimation of emission reductions.
Baseline deforestation and forest degradation in the project area fall within one or more of the following categories: - Unplanned deforestation (VCS category AUDD); - Planned deforestation/degradation (VCS category APD);	The processes active in the project area correspond to unplanned deforestation and degradation (AUDD).

⁴⁰ These are part of REDD+ activities under the AFOLU and the categories of Partially Drained wetlands under Wetland Restoration and Conserve (WRC)

Degradation through extraction of wood for fuel (fuelwood and charcoal production) (VCS category AUDD).	
Leakage avoidance activities must not include: - Agricultural lands that are flooded to increase production (e.g., paddy rice) - Intensifying livestock production through use of feed-lots and/or manure lagoons	These options are not included as leakage management activities.
Baseline agents of deforestation must: (i) clear the land for settlements, crop production (agriculturalist) or ranching, where such clearing for crop production or ranching does not amount to large scale industrial agriculture activities; (ii) have no documented and uncontested legal right to deforest the land for these purposes; and (iii) be either resident in the Reference Region for Deforestation or immigrants. Under any other condition this methodology must not be used	The agents of deforestation and degradation in the project area have been identified as small-scale farming and fuel wood harvesting⁴¹ There are no previous concession rights over the mangrove areas of DR Congo, therefore no deforestation activity should be happening in the forest
WRC activities are not eligible under the following conditions: - Project activities lower the water table, unless the project converts open water to tidal wetlands, or improves the hydrological connection to impounded waters. - Changes in hydrology do not result in the accumulation or maintenance of soil carbon stock. - Hydrological connectivity of the project area with adjacent areas leads to a significant	Activities being considered in the wetland conservation in the project area: - do not alter the water level; - are aimed at the conservation and maintenance of carbon stocks in the soil; - do not generate an increase in GHG emissions outside the project area; - do not include organic soil burning activities; - do not consider the application of nitrogenous fertilizers.

⁴¹ Falasi, P. B. (2011). *Characterization of Land use Information for Mangrove Forests Conservation and Rural Farming in Democratic Republic of Congo* (Doctoral dissertation, Egerton University).

increase in GHG emissions outside the project area. • Project activities include the burning of organic soil. • Nitrogen fertilizer(s), such as chemical fertilizer or manure, are applied in the project area during the project crediting period.	
This methodology is applicable to conservation of undrained and partially drained tidal wetland (CUPP) activities on project areas that meet the VCS definition for peatland.	Under the VM0007 methodology, wetlands are defined as "A subset of wetlands under the influence of tidal wetting and drying cycles (e.g., marshes, seagrass beds, tidal forest wetlands and mangroves)".

3.3 Project Boundary

The project area is in the Bas Congo Province, the Moanda territory and is composed of one installation (see section 1.12).

3.4 Baseline Scenario

Without the REDD+ project, the mangrove forest of DR Congo is expected to continue to be deforested and degraded through human wood harvesting, firewood harvesting, small scale farming and clearing for seaways. The lack of sensitivity of the communities living adjacent to the forest about the forest as a sustainable resource will continue. This lack of awareness about the REDD+ framework will lead to further unsustainable exploitation of the mangrove resource (Berk and Lungungu, 2020). The project therefore aims to reduce emission from these activities by implementing a strategy of Avoided Unplanned Deforestation and forest Degradation (AUDD) within the AFOLU classification. By initiating a REDD project within this forest, it will reduce the threats to levels that are not detrimental and, at the same time, earn revenue that will be used to support activities that do not reduce the mangrove forest cover of DRC.

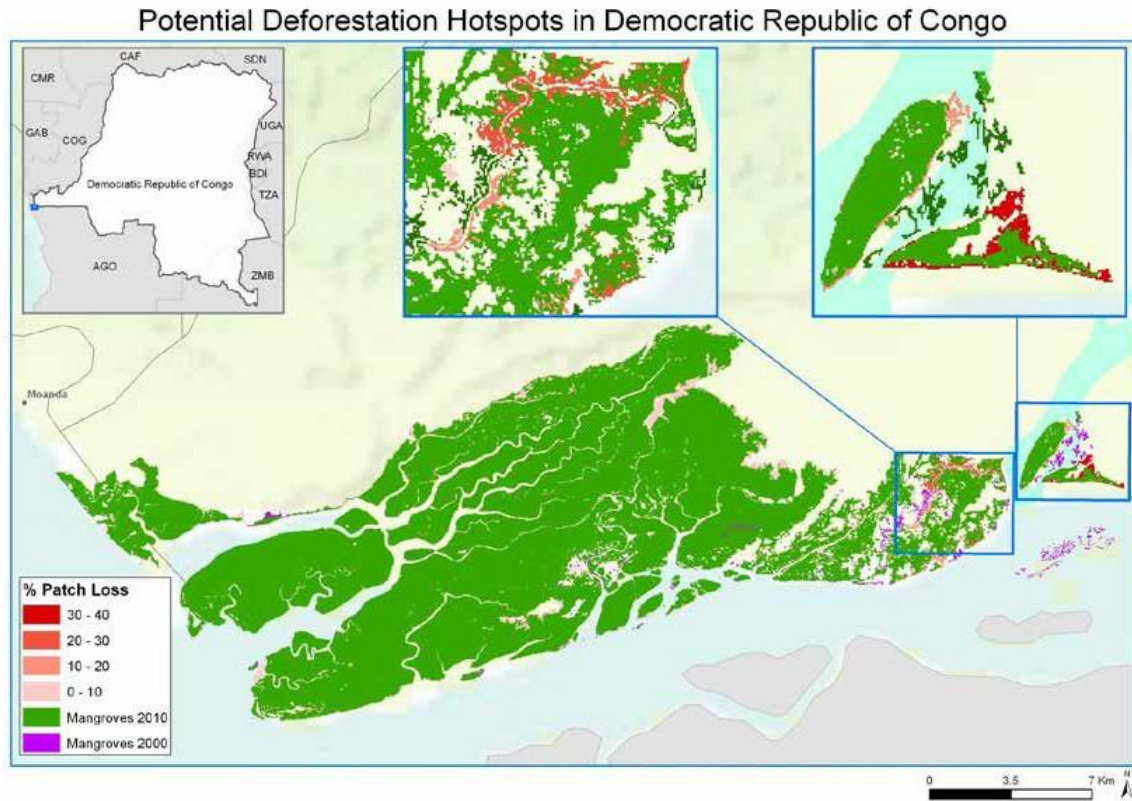


Figure 12: Potential deforestation hotspots in the project area. Source: Ajonina et al 2014

3.5 Additionality

Additionality stemming from the proposed project will be demonstrated through VMD0052 Demonstration of Additionality of Tidal Wetland Restoration and Conservation Project Activities (ADD-AM), version 1.0

3.6 Methodology Deviations

This information will be made available during validation and verification phase of project.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

This information will be made available during validation and verification phase of project.

4.2 Project Emissions

This information will be made available during validation and verification phase of project.

4.3 Leakage

This information will be made available during validation and verification phase of project.

4.4 Net GHG Emission Reductions and Removals

This information will be made available during validation and verification phase of project.

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year A (<u>DD-Month-YYYY-</u> <u>-DD-Month-YYYY</u>)				
Year B				
Year C				
Year...				
Total				

5 MONITORING

5.1 Data and Parameters Available at Validation

This information will be made available during validation and verification phase of project.

Data / Parameter	
Data unit	Indicate the unit of measure
Description	Provide a brief description of the data/parameter
Source of data	Indicate the source(s) of data
Value applied	Provide the value applied
Justification of choice of data or description of measurement methods and procedures applied	Justify the choice of data source, providing references where applicable. Where values are based on measurement, include a description of the measurement methods and procedures applied (e.g., what standards or protocols have been followed), indicate the responsible person/entity that undertook the measurement, the date of the measurement and the measurement results. More detailed information may be provided in an appendix.
Purpose of Data	Indicate one of the following: - Determination of baseline scenario (AFOLU projects only) - Calculation of baseline emissions - Calculation of project emissions - Calculation of leakage
Comments	Provide any additional comments

5.2 Data and Parameters Monitored

This information will be made available during validation and verification phase of project.

Data / Parameter	
Data unit	Indicate the unit of measure
Description	Provide a brief description of the data/parameter
Source of data	Indicate the source(s) of data
Description of measurement methods and procedures to be applied	Specify the measurement methods and procedures, any standards or protocols to be followed, and the person/entity responsible for the measurement. Include any relevant information regarding the accuracy of the measurements (e.g., accuracy associated with meter equipment or laboratory tests).

Frequency of monitoring/recording	<i>Specify measurement and recording frequency</i>
Value applied	<i>Provide an estimated value for the data/parameter</i>
Monitoring equipment	<i>Identify equipment used to monitor the data/parameter including type, accuracy class, and serial number of equipment, as appropriate.</i>
QA/QC procedures to be applied	<i>Describe the quality assurance and quality control (QA/QC) procedures to be applied, including the calibration procedures where applicable.</i>
Purpose of data	<i>Indicate one of the following:</i> <i>Calculation of baseline emissions</i> <i>Calculation of project emissions</i> <i>Calculation of leakage</i>
Calculation method	<i>Where relevant, provide the calculation method, including any equations, used to establish the data/parameter.</i>
Comments	<i>Provide any additional comments</i>

5.3 Monitoring Plan

This information will be made available during validation and verification phase of project.

APPENDIX

Use appendices for supporting information. Delete this appendix (title and instructions) where no appendix is required.