



**Verified Carbon
Standard**

BOOMITRA GRASSLAND RESTORATION IN EAST AFRICA THROUGH SOIL ENRICHMENT



Document Prepared by ConserWater Technologies Inc DBA Boomitra

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1 PROJECT DETAILS

1.1 Summary Description of the Project

This project helps pastoralists in deploying practices that contribute to the sustainable development of the Savanna grasslands of East Africa. The pastoralists of this region have largely resorted to implementing traditional grassland management methods on their lands.

The project area, characterized by arid and semi-arid regions, is prone to frequent drought conditions. The zones categorized as semi-arid are under threat of turning into arid zones, while the arid zones are prone to dryness to the extent that pastoral activities will cease to be feasible in these zones in the foreseeable future¹. There are drastic variations in rainfall and, being a tropical region, the Savanna grasslands are subject to prevailing conditions of low soil carbon. A combination of these factors along with overgrazing results in a highly dynamic environment, and the agricultural sector of the country is often subject to severe disruptions.

The grazing of grasslands by both livestock and wildlife is widely prevalent, and degradation of land due to overgrazing is a prominent issue. Studies have shown that intensive grazing has an adverse impact on soil carbon^{2,3}. Increased grazing can eventually lead to loss of vegetation and grass cover, which in turn affects the carbon and nutrient allocation to soil organic matter. Since grazing is the primary land use activity in the savannas, the soil carbon has been prominently altered and often degraded. Hence, there is a need for equipping the community with modern advancements and technological interventions for better and sustainable grassland management practices. The grasslands of Kenya have gradually degraded in the past few decades: it has been estimated that between 1982 and 2006, 18% of grasslands⁴ have become degraded in Kenya. Decades of unsustainable overgrazing by livestock in the

¹ Kari.org. n.d. *The Major Challenges Of The Agricultural Sector In Kenya*. [online] Available at: <<https://www.kari.org/the-major-challenges/>> [Accessed 21 June 2022].

² M. Abdalla, A. Hastings, D.R. Chadwick, D.L. Jones, C.D. Evans, M.B. Jones, R.M. Rees, P. Smith, Critical review of the impacts of grazing intensity on soil organic carbon storage and other soil quality indicators in extensively managed grasslands, *Agriculture, Ecosystems & Environment*, Volume 253, 2018, Pages 62-81, ISSN 0167-8809, <https://doi.org/10.1016/j.agee.2017.10.023>.
(<https://www.sciencedirect.com/science/article/pii/S0167880917304693>)

³ Rotich, H.K. & Onwonga, Richard & Mbau, Judith & KOECH, Oscar. (2018). Soil organic carbon content and stocks in relation to grazing management in semi-arid grasslands of Kenya. *Journal of Rangeland Science*. 8. 143-155.

⁴ Mulinge, W. et al. (2016). Economics of Land Degradation and Improvement in Kenya. In: Nkonya, E., Mirzabaev, A., von Braun, J. (eds) *Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development*. Springer, Cham.

https://doi.org/10.1007/978-3-319-19168-3_16
<https://library.oapen.org/bitstream/handle/20.500.12657/28110/1001884.pdf?sequence=1#page=482>

region has resulted in excessive soil erosion, loss of Soil Organic Carbon (SOC), biodiversity and ecosystem services⁵. In addition, high livestock stocking rates have also led to vegetation loss and resultant SOC loss^{6,7}.

In this context, the opportunity to introduce improved grassland management practices, including sustainable grazing practices, will significantly help the grasslands of the region and restore carbon to their soils, creating carbon removals while improving overall soil health. The proposed sustainable grassland management activities include rotational grazing and certain grassland management activities such as livestock and water management activities. All these project activities help in improving carbon sequestration, regenerating vegetation and accelerating restoration of soil fertility in degraded grasslands, and thereby improving SOC. This project will improve the livelihoods of the communities directly through the carbon credit payments. In this project, pastoralists will be mobilized to take up a variety of improved grassland management practices. These practices are proven ways to increase soil organic carbon, prevent further degradation of the grasslands, and enable pastoralists to improve their productivity.

In addition to increasing Soil Organic Carbon (SOC) in grasslands, this project is expected to generate several community and biodiversity benefits. The project contributes to the following UN Sustainable Developmental Goals (SDG):

1. SDG Goal 2: Zero Hunger
2. SDG Goal 6: Clean water and sanitation
3. SDG Goal 8: Decent work and economic growth
4. SDG Goal 11: Sustainable cities and communities
5. SDG Goal 13: Climate Action

⁵ Bardgett, Richard & Bullock, James & Lavorel, Sandra & Manning, Pete & Schaffner, Urs & Ostle, Nicholas & Chomel, Mathilde & Durigan, Giselda & Fry, Ellen & Johnson, David & Lavallee, Jocelyn & Le Provost, Gaëtane & Luo, Shan & Png, Kenny & Sankaran, Mahesh & Hou, Xiangyang & Zhou, Huakun & Ma, Li & Ren, Weibo & Shi, Hongxiao. (2021). Combatting global grassland degradation. *Nature Reviews Earth & Environment*. 2. 10.1038/s43017-021-00207-2. (https://www.researchgate.net/profile/Pete-Manning/publication/354411207_Combatting_global_grassland_degradation/links/613881b7a3a397270a8ca560/Combatting-global-grassland-degradation.pdf?origin=publication_detail)

⁶ Mirzabaev, A., J. Wu, J. Evans, F. García-Oliva, I.A.G. Hussein, M.H. Iqbal, J. Kimutai, T. Knowles, F. Meza, D. Nedjraoui, F. Tena, M. Türkeş, R.J. Vázquez, M. Weltz, 2019: Desertification. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D.C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. (page no 15)

⁷ Sheila Wachiye, Petri Pellikka, Janne Rinne, Janne Heiskanen, Sheila Abwanda, Lutz Merbold, Effects of livestock and wildlife grazing intensity on soil carbon dioxide flux in the savanna grassland of Kenya, *Agriculture, Ecosystems & Environment*, Volume 325, 2022, 107713, ISSN 0167-8809, <https://doi.org/10.1016/j.agee.2021.107713>. (<https://www.sciencedirect.com/science/article/pii/S0167880921004175>)

6. SDG Goal 15: Life on Land

This project quantifies only GHG removals from new project activities, by implementing the VM0042 methodology. We estimate an average yearly GHG removal of 200,000 tons of CO₂ from Instance 01 of this project, and the number of grassland areas participating in the project is also estimated to grow over the course of the crediting period through additional instances.

1.2 Sectoral Scope and Project Type

Sectoral Scope	14. Agriculture, Forestry and Other Land Use (AFOLU)
AFOLU Project Category	Agriculture Land Management (ALM)
Project Type	This is a grouped project.
Improved Grassland Management (IGM)	Improved Grassland Management (IGM): This category includes practices that demonstrably reduce net GHG emissions of grassland ecosystems by increasing soil carbon stocks.

1.3 Project Eligibility

The proposed project meets all the requirements set forth in the VCS Standard, VCS program and VCS methodology VM0042 “Methodology for Improved Agricultural Land Management”, Version 2.0, dated 21 December 2021, which is under development⁸.

This is a voluntary project with the objective of promoting improved grazing practices in the project area. Furthermore, to describe and justify how the project is eligible under the scope of the VCS Program, we use the criteria listed in section 2.1.1 of the VCS standard, V4.2, outlined in detail in the table below:

Criterion	Fulfilled (Yes/No)	Justification
The six Kyoto Protocol greenhouse gases.	Yes	The project results in GHG removals through soil carbon sequestration, removing CO ₂ from the atmosphere and storing it as soil carbon through sustainable grassland management practices.
Project activities supported by a methodology approved under the VCS Program through the methodology approval process.	Yes	The project activity is supported by the VCS methodology VM0042: Methodology for Improved Agricultural Land Management (version 2.0) which is under development under the VCS Program through the methodology approval process.

⁸ https://verra.org/wp-content/uploads/2021/12/VM0042_v2.0_FinalDraft_PublicComment.pdf. This methodology is under development and is open for public comment from 23 December 2021 until 5 February 2022.

Criterion	Fulfilled (Yes/No)	Justification
Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval.	Yes	The proposed project activity does not belong to any project categories that are excluded by VCS from being part of the VCS program.
Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements.	Not Applicable	This is not a Jurisdictional REDD+ program, hence this eligibility criterion is not applicable.
Ozone-depleting substances.	Not Applicable	The proposed project activity does not involve any Ozone depleting substances

1.4 Project Design

- ☐ The project includes a single location or installation only
- ☐ The project includes multiple locations or project activity instances, but is not being developed as a grouped project
- ☒ The project is a grouped project

Eligibility Criteria

The following table describes the minimum general eligibility criteria to be satisfied by new instances and evidence for how every criterion is fulfilled as per paragraph 3.5.15 of VCS Standard v4.2.

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
1	Meet the applicability conditions set out in the methodology applied to the project.	As per VM0042 version 2.0, each new project activity instance must demonstrate compliance with the applicability conditions set out in the methodology.	Section 3.2 of the PDD must have all the details pertaining to applicability conditions.

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
2	Use the technologies or measures specified in the project description.	All the new project activities shall implement one of the activities mentioned in the project activity description in Section 1.11 of the PDD	Section 1.11 of the PDD must select one of the project activities listed in section 1.11 of the registered PDD.
3	Apply the technologies or measures in the same manner as specified in the project description.	Each project activity instance shall adhere to the technology specifications (mentioned in methodology / standard) employed by project activity.	Section 1.11 of the PDD must select one of the project activities listed in section 1.11 of the registered PDD and explain in detail how criteria has been met with respect to technology specifications, standard sizes, etc.
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	Each new Project Activity Instance must demonstrate that the baseline scenarios comprise one or more of unsustainable grazing practices such as but not limited to, no clear grazing zone demarcation, lack of water conservation activities, continuous grazing, etc.	Relevant sections of the PDD must clearly define baseline conditions related to unsustainable grazing practices.
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area. For example, the new project activity instances have financial, technical and/or other parameters (such as the size/scale of the instances) consistent with the initial	Each new Project Activity Instance must demonstrate additionality, as per methodology requirements and standard requirements.	VM0042 uses a project method for the demonstration of additionality, which include: 1. Regulatory surplus analysis 2. Demonstration that the adoption of the suite of proposed project activities is not common practice

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
	instances, or face the same investment, technological and/or other barriers as the initial instances.		
6	Where grouped projects include multiple baseline scenarios or demonstrations of additionality, such projects will require at least one set of eligibility criteria for each combination of baseline scenario and demonstration of additionality specified in the project description.	Each new Project Activity Instance must demonstrate which of the baseline scenarios listed in the methodology will be applicable.	At least one of the baseline scenarios must be utilized in the project activity instance, which must further demonstrate compliance with all the set of eligibility criteria for the inclusion of new project activities instances as outlined in this document.

The following table outlines the eligibility criteria for the inclusion of new project activity instances, as per clause 3.5.16 of the VCS Standard, Version 4.2

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
1	Geographical boundaries: all new project activity instances must be located within the boundary of the countries listed in the section 1.12 of the PDD	Each project activity instance included must be within the boundaries of the countries listed in the section 1.12 of the PDD.	Details of the grasslands with geocoordinates and KML files will be part of the evidence
2	Comply with at least one complete set of eligibility criteria for the inclusion of new project activity	New Project Activity Instances must comply with the full set of eligibility	New project instances shall provide all the relevant information with justifications in the relevant sections of the PDD.

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
	instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	criteria for the inclusion of new project activity instances in this section.	
3	Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation / verification body (VVB).	Each new Project Activity Instances must have monitoring plans that define technical, financial, geographic and other relevant information, which enable VVBs to do a third-party audit.	Section 5 and other relevant sections of the PD shall describe all relevant monitoring plans that define technical, financial, geographic and other relevant information with respect to the project activity instance.
4	Be validated at the time of verification against the applicable set of eligibility criteria.	Each new project activity Instance must be validated at the time of verification against the applicable set of eligibility criteria as listed in this section	A new project activity must be explained with all relevant evidence in the relevant section of the PDD.
5	Have evidence of project ownership, for each project activity instance, held by the project proponent from the respective start date of each project activity	New project activity instances must demonstrate ownership by the project participant, from the start date of	Evidence may include, but is not limited to, the following documents: 1. Board resolution / Governing body decision / CEO / Director decision copy that has details on project requirements

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
	instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions).	the project activity instance.	2. Minutes of meetings or stakeholder consultations 3. Purchase details of equipment or materials required for project implementation. 4. Contracts with the pastoralist communities 5. Pastoralist outreach events' recordings, pictures, invitations etc. 6. Conservancy land management plans 7. Periodic (quarterly, annual etc) published organizational reports of activities
6	Have a start date that is the same as or later than the grouped project start date as mentioned in the section 1.8	All the new project instances must provide evidence that the activities started after the group project start date.	Evidence may include, but is not limited to, the following documents: 1. Board resolution/ Governing body decision / CEO / Director decision copy which has details on the project requirement 2. Minutes of meetings or stakeholder consultations 3. Purchase details of equipment or materials required from project implementation 4. Pastoralist Outreach events' recordings, pictures, invitations etc.

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
			5. Conservancy activity attestations 6. Conservancy land management plans 7. Periodic (quarterly, annual etc) published organizational reports of activities
7	Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).	All the new Project Activity Instances must be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).	Evidence may include, but is not limited to, the following documents: 1. Board resolution / Governing body decision / CEO / Director decision copy which has details on the project requirement 2. Minutes of meeting or stakeholder consultations 3. Purchase details of equipment or materials required from project implementation. 4. Pastoralist Outreach events' recordings, pictures, invitations etc. 5. Conservancy activity attestations 6. Conservancy land management plans 7. Periodic (quarterly, annual etc.) published organizational reports of activities All the activities implemented under this project qualify as per methodological requirements.

SL No.	Eligibility Criterion	Description / Required condition	Means of Verification / Supporting evidence for inclusion
8	Where inclusion of a new project activity instance necessitates the addition of a new project proponent to the project, such instances shall be included in the grouped project within two years of the project activity instance start date	The addition of a new project proponent to Project Activity Instances shall be included in the grouped project within two years of the project activity instance start date.	Boomitra will be the project proponent of this project. However, this project may have multiple implementation partners. Contract documents, MoU documents or board meeting documents will be evidence.

1.5 Project Proponent

Organization name	ConserWater Technologies Inc
Contact person	Chethan T. R.
Title	Carbon Projects Development Lead
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Email	info@boomitra.com

1.6 Other Entities Involved in the Project

Organization name	Earthacre Incorporated
Role in the project	Implementation and Monitoring Partner
Contact person	Viraj Sikand
Title	CEO

Address	114 Western Ave Apt 3R Cambridge, MA 02139 USA
Telephone	+1 646 244 0686
Email	info@earthacre.com

1.7 Ownership

Land Ownership

This grouped project includes both community owned and privately owned grasslands of Kenya, Tanzania and Uganda.

Instance 01

Kenya grasslands under this project are under both private ownership and community ownership. Private grassland owners have clear property title deeds issued by the competence authority in the country. In Kenya, land ownership falls under three categories: Private land, community land, and government land. The constitution of Kenya specifically states that none of the land ownership models are superior, thus the law is applied uniformly on community land as it is on private and government land. There are four main laws that cover land rights in Kenya, namely:

1. The Land Act 2012⁹
2. The Land Registration Act 2012¹⁰
3. The National Land Commission Act 2012¹¹
4. Community Land Act of 2016¹²

All the lands included in this project are free from any litigation on land ownership and tenure issues.

Credit Ownership

The individuals or entities enrolling their lands irrevocably assign the right, title and interest to the Greenhouse Gas Reductions and Removals thus generated on their lands during the project to

9 Kenya Law. (n.d.). Act Title: LAND. Retrieved from <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=No.%206%20of%202012>

10 Kenya Law. (n.d.). Act Title: LAND REGISTRATION. Retrieved from <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=No.%203%20of%202012>

11 Kenya Law. (n.d.). Act Title: NATIONAL LAND COMMISSION. Retrieved from <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=No.%205%20of%202012>

12 Kenya Law. (n.d.). Act Title: COMMUNITY LAND. Retrieved from <http://kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=No.%2027%20of%202016>

ConserWater Technologies Inc (doing business as Boomitra). The individuals or entities enrolling their lands disclaim all right, title and interest to any Carbon Credits that may arise from the Land. This is covered by legal agreements with the individuals and/or entities enrolling their lands.

1.8 Project Start Date

Project Start Date: 1st August 2018

The project start date is August 1, 2018, the approximate time of adoption of the project activities by the first pastoralists and conservancies participating in the program, under the educational guidance of ground staff. This start date is substantiated by activity records and conservancy engagement records dating from the start date. This is substantiated through signed attestations by the relevant land managers of their previous practices (or lack thereof), their gradual improvements in their practices from the start, and their transition timings.

1.9 Project Crediting Period

The duration of the VCS project crediting period is initially 20 years with a possibility for renewal four times. The present project crediting period starts on August1, 2018 and ends on July 31, 2038. The project longevity is 100 years, in line with the requirements of the VCS AFOLU Non-Permanence Risk Tool, v4.0.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

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

- ☐ <20,000 tCO₂e/year
- ☐ 20,000 – 100,000 tCO₂e/year
- ☒ 100,001 – 1,000,000 tCO₂e/year
- ☐ >1,000,000 tCO₂e/year

Project Scale	
Project	✓
Large project	

The estimated greenhouse gas emission reductions for the first Project Activity Instance (Instance 01) are summarized in the following table.

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 2019	200,000
Year 2020	200,000
Year 2021	200,000
Year 2022	200,000
Year 2023	200,000
Year 2024	200,000
Year 2025	200,000
Year 2026	200,000
Year 2027	200,000
Year 2028	200,000
Year 2029	200,000
Year 2030	200,000
Year 2031	200,000
Year 2032	200,000
Year 2033	200,000
Year 2034	200,000
Year 2035	200,000
Year 2036	200,000
Year 2037	200,000
Year 2038	200,000
Total estimated ERs	4,000,000
Total number of crediting years	20
Average annual ERs	200,000

1.11 Description of the Project Activity

This is a grouped project. This project promotes sustainable grazing practices in the grasslands of Kenya, Tanzania and Uganda. All new project activity instances, including instance 01 of the grouped project, follow the below mentioned project activities. The activities listed below are non-exhaustive but are the main activities promoted across all the project locations.

1. Rotational grazing
2. Livestock management
3. Water management
4. Promotion of capacity building programs
5. Conservation of grassland biodiversity

Rotational Grazing

The principal project activity is the implementation of rotational grazing. We work with individual landowners or local pastoralist communities, educating and enabling their transition from conventional grazing to rotational grazing for their livestock (cattle, sheep, goats etc.). This is not just a discrete transition, as we continue to work with the pastoralists throughout the lifetime of the project to help them continually improve their practices.

Here are the general principles or activities of rotational grazing, as implemented in this project.

- 1) The grassland ownership unit is divided into organized grazing zones roughly similar in livestock carrying capacity. (Having the same livestock carrying capacity is not always synonymous with having the same area. When there are significant differences in vegetation between different parts of a region, they can be very different.)
- 2) Livestock cycle between different grazing zones and will spend anywhere from a single day to several months in a single grazing zone, to prevent overuse of any single grazing zone
- 3) Livestock will not return to the same grazing zone more than once or twice a year
- 4) Some grazing zones may be rested for more than one year to allow recovery

Some of the major advantages of rotational grazing are:

- ✓ Increased soil fertility
- ✓ Decreased wastage of forage
- ✓ Increased quality of forage production
- ✓ Increase water infiltration and soil water holding capacity

Rotational grazing of livestock provides time for the vegetation to regrow following a grazing event and for the vegetation itself to reproduce and propagate further. Rotational grazing practices in this project will change the current grazing practices from continuous grazing to rotational grazing which includes removing livestock from continuous grazing in areas near settlements, thereby reducing grazing pressure on forage in these areas. To reduce negative environmental effects and provide quality pastures, rotational grazing is an alternative solution to continuous grazing. This will help ensure the availability of quality feed for animals while conserving the environment¹³. Herds undergoing rotational grazing lead to a uniform impact of foraging across different plant species, reducing the chance of promoting potentially invasive plant species that increase in the presence of continuous grazing. Herds confined to a grazing zone also produce concentrated hoof impacts on the soils within the grazing zone, breaking up harmful surface crusts that promote sheet erosion and decrease rainfall infiltration. This enhances the soil structure and environment, making it more amenable to both plant growth and the storage of carbon. Altogether, the decomposition of the roots of the regenerated vegetation over time, combined with the return of carbon to the soil from livestock manure, lead to increases in soil carbon levels, effectively sequestering CO₂.

Livestock management

It is extremely important to have proper livestock management plans for grasslands. To have sustainable grasslands, the livestock carrying capacity needs to first be assessed and livestock stocking rates adjusted accordingly. Environmental outcomes are largely dependent on better animal stocking rates in the grasslands^{14,15}. In this project, proper livestock management plans are developed with exhaustive consultations with local experts and local pastoralists.

Water management

Water management activities includes development and distribution of water resources in grassland ecosystems, which regulate soil erosion through flooding, protect water quality and quantity, reduce the impacts of drought, improve infiltration of water, etc. small ponds and water points are the few water management activities promoted in this project. All these activities lead to greater water accumulation, which aid in gradual infiltration of water into the soil¹⁶. The improved soil moisture allows grass to grow better in these areas than in others. These features are usually made using tractors or with livestock.

13 Kipnetich Rotich, H., Symbua Mbau, J., Onwonga, R., Kipchirchir Koech, O. (2018). Vegetation Dynamics in Relation to Grazing Management Practices in Semi-arid Grazing Lands of Makueni County, Kenya. *Journal of Rangeland Science*, 8(3), 227-239. https://profiles.uonbi.ac.ke/sites/default/files/jmbau/files/hillary_et_al_2018.pdf

14 Kemp, David & Michalk, D.. (2007). Sustainable grassland and livestock management. Review. *J Agric Sci. The Journal of Agricultural Science*. 145. 543 - 564. 10.1017/S0021859607007253.

15M. Boval, R.M. Dixon, The importance of grasslands for animal production and other functions: a review on management and methodological progress in the tropics, *Animal*, Volume 6, Issue 5, 2012, Pages 748-762, ISSN 1751-7311, <https://doi.org/10.1017/S1751731112000304>.(<https://www.sciencedirect.com/science/article/pii/S1751731112000304>)

16 Sui, Yuanyuan & Ou, Yang & Yan, Baixing & Xu, Xiaohong & Rousseau, Alain & Zhang, Yu. (2016). Assessment of Micro-Basin Tillage as a Soil and Water Conservation Practice in the Black Soil Region of Northeast China. *PloS one*. 11. e0152313. 10.1371/journal.pone.0152313

Water management practices are decided with exhaustive consultations with local experts, based on the grassland topography and water availability.



Figure 1: Water points inside the grasslands

Capacity building programs and trainings

Effective implementation of project activities is possible only when proper awareness has been created among the project participants. Without capacity building activities and trainings, the overall objective of the project cannot be achieved. Hence, with the help of local experts in the region, various trainings are arranged with the local pastoralist communities to sensitize them about the project activities and their advantages.

Conservation of flora and fauna biodiversity

Recent research has shown that having diversified livestock system results in further biodiversity, both in terms of the species of plants that thrive on the land and in the composition of the soil microbiome, because different livestock species exhibit distinctive feeding modes and preferences, placing a varied grazing pressure on the environment¹⁷. In the context of African savannas, recent ecological research has also shown the importance of wildlife in the carbon cycle, highlighting how feedback loops among plants, animals, and diseases have a significant influence upon carbon sequestration and storage. These “zoogeochemical” effects of wildlife are responsible for 10-1100% of ecosystem carbon fluxes and

¹⁷ The Proceedings of the National Academy of Sciences (PNAS). (2019). *Diversifying livestock promotes multidiversity and multifunctionality in managed grasslands*. Retrieved from <https://www.pnas.org/doi/pdf/10.1073/pnas.1807354116>

storage, depending on the type of ecosystem¹⁸. The project intends to promote livestock and wildlife diversity in the region through conservation efforts, which will ultimately lead to a positive impact on SOC content in the area. Management plans will be prepared as a part of conservation activities and implemented through continuous stakeholder engagements. These plans recognize that degradation of a conservancy's natural resources, through declining wildlife populations and lessening of livestock grazing quality, must be reversed through various ways including restocking, reintroduction, habitat management, land-use planning, enhanced security and a scientific livestock grazing plan that leaves room for abundant wildlife.

¹⁸ Schmitz, O. J., Wilmers, C. C., Leroux, S. J., Doughty, C. E., Atwood, T. B., Galetti, M., Davies, A. B., & Goetz, S. J. (2018). Animals and the zoogeochemistry of the carbon cycle. In *Science* (Vol. 362, Issue 6419). American Association for the Advancement of Science. <https://doi.org/10.1126/science.aar3213>

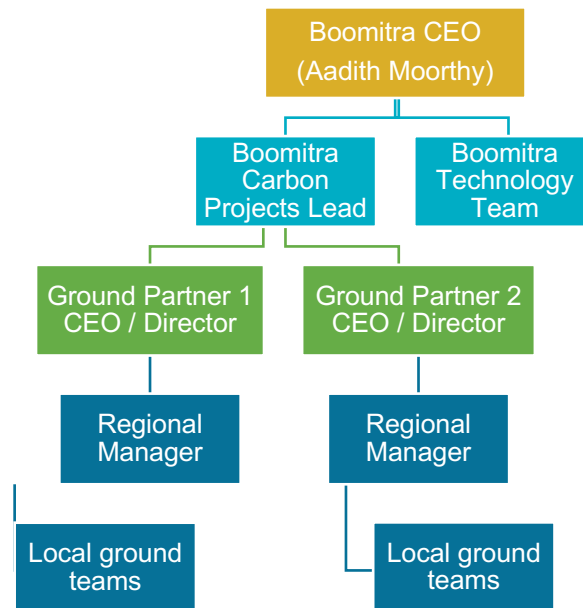


Figure 2: Community Awareness Creation programs

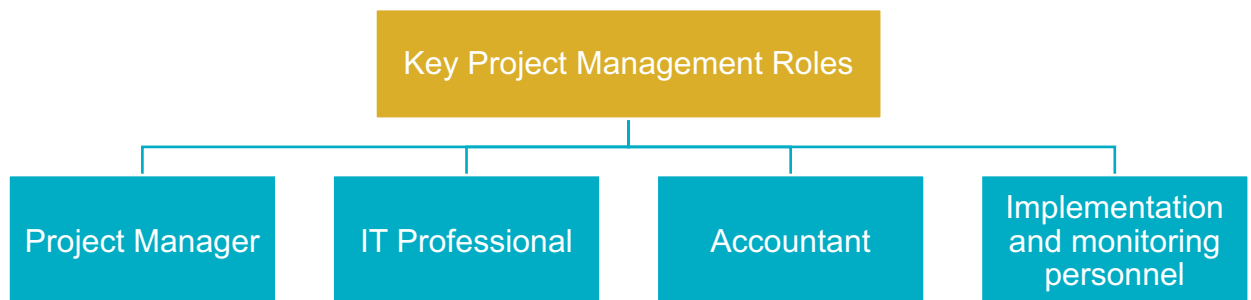
1.11.1 Project organizational setup

The project will operate under the guidance of the Boomitra carbon projects team and technology team, along with our local partners. All technical support will be provided by Boomitra, and ground-level project activities will be executed by our partners in conjunction with Boomitra. Agreements have been made

between Boomitra and local partners, clearly explaining the roles and responsibilities of both parties. The following organizational setup has been planned for this project's implementation and monitoring.



Our local ground partners have been working with pastoralists for many years to promote improved land management practices. Boomitra has developed the key technology components required for the project, including the measurement of soil carbon to 30 cm depth and the tools and interfaces for pastoralist enrollment, implementation, and MRV activities.



1.11.2 Jurisdictional REDD+ Programs

This project activity and location are not covered by any jurisdictional REDD+ program.

1.12 Project Location

This is a grouped project encompassing the following countries.

Countries: Kenya, Tanzania and Uganda

This grouped project includes all types of grasslands in Kenya, Tanzania and Uganda.

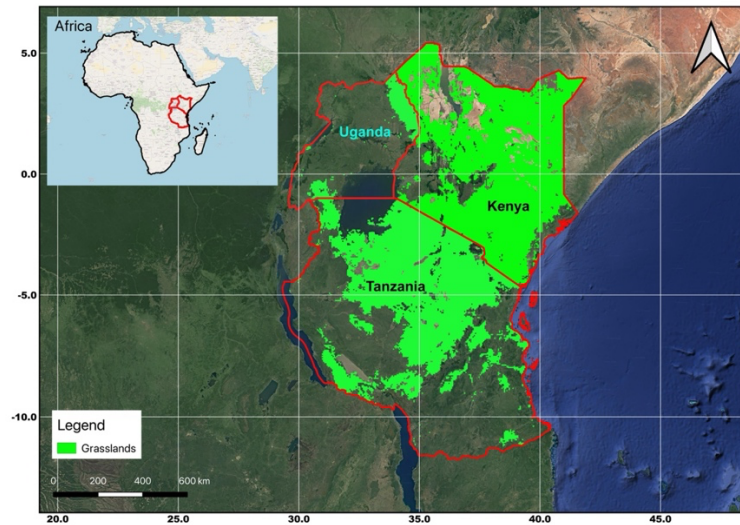


Figure 3: Grouped Project Boundary

Instance 01 of this grouped project includes the grasslands of the Republic of Kenya.

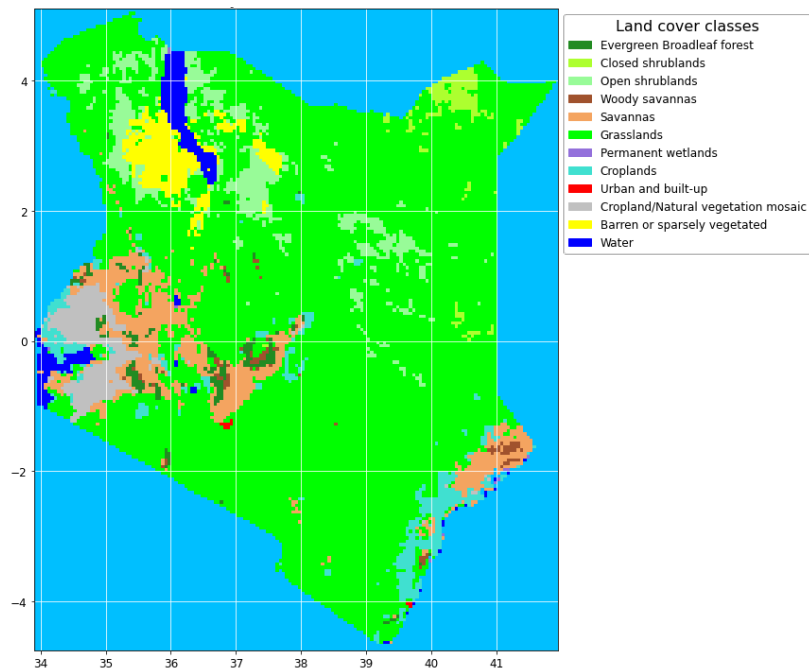


Figure 4: Kenya Grassland Map

A GeoJSON with a more detailed set of coordinates is available separately for validation and verification.

1.13 Conditions Prior to Project Initiation

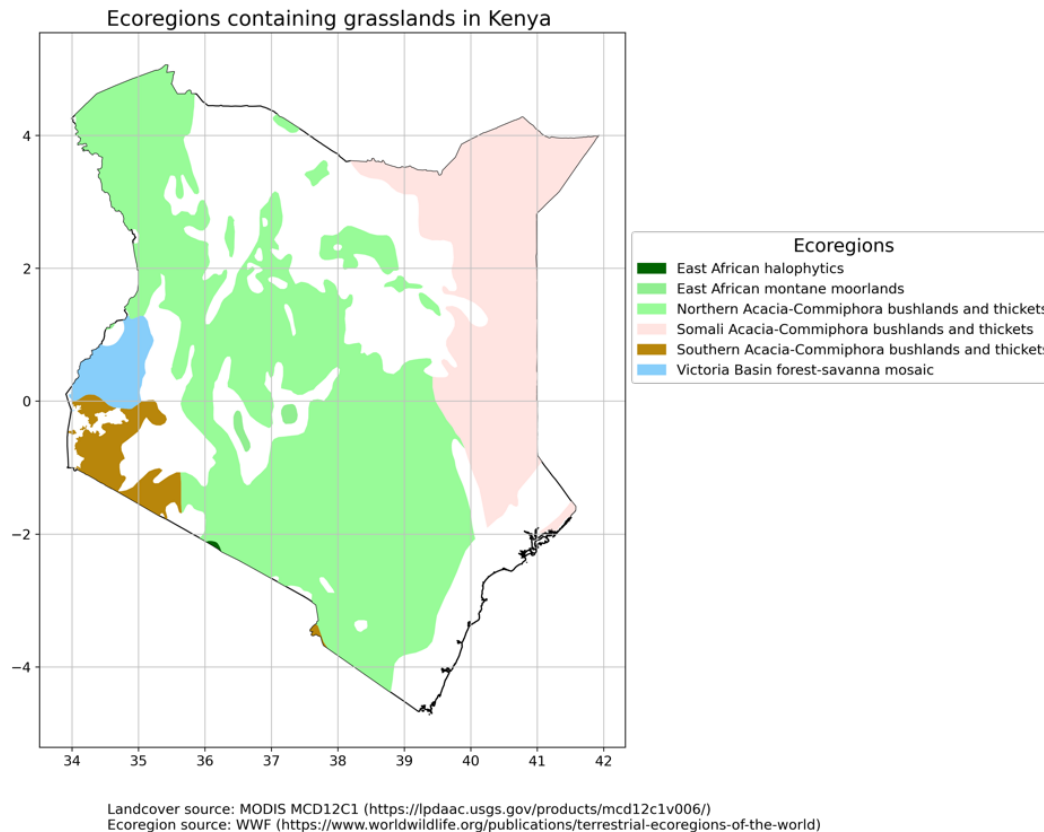
The conditions prior to project initiation are the same as the baseline scenario. This project does not have negative impacts on environmental conditions, including climate, hydrology, topography, soils, vegetation, ecosystems etc., so the present and prior environmental conditions of this project are the same. The paragraphs below give a general description of the existing environmental conditions of the region where the project takes place, which covers both the expansion region and the area of the first instance.

- **Ecosystem type**

Kenya is a country with very rich diversified ecological zones and habitats. There are different types of ecosystems, including lowland and mountain forests, wooded and open grasslands, semi-arid scrubland, dry woodlands, inland aquatic, as well as coastal and marine ecosystems¹⁹. Nearly 25,000 species of animals and 7,000 species of plants have been identified and recorded in the region²⁰. The first instance of the grouped project lies in the grasslands of Kenya, classified as Masai Xeric Grasslands and Shrublands.

¹⁹ Convention on Biological Diversity. (n.d.). Biodiversity Facts - Kenya. Retrieved from <https://www.cbd.int/countries/profile/?country=ke#:~:text=Kenya%20has%20a%20large%20diversity,as%20coastal%20and%20marine%20ecosystems>.

²⁰ Kenya Wildlife Service. (n.d.). Priority Ecosystems and Species. Retrieved from <http://www.kws.go.ke/content/priority-ecosystems-and-species>



- **Current and historical land-use**

The current land use scenario includes overgrazing and higher livestock stocking rates than the lands can handle in the region. Instance 01 of this grouped project is in Kenya, and consists of native grasslands. These native grasslands were once fertile and home for various flora and fauna species but are now facing serious threats due to overgrazing and high animal stocking rates. Pastoralist communities in the region do not have enough capabilities to implement sustainable grazing practices on their own. As discussed in section 1.1, the grassland soils have degraded due to unsustainable grazing management practices in the region. Through this project, Boomitra is trying to contain further degradation and improve overall soil fertility of grasslands.

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

☐ Yes

☒ No

The native ecosystems have not been cleared within 10 years from the project start date.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The proposed project is in full compliance of all applicable legal and regulatory requirements imposed by local, state, national and international policies. Further to this, there are no rules or regulations mandating the adoption or avoidance of any of the project activities in an enforceable manner.

The proposed project activity adheres to the following laws:

Kenya

Relevant Law and its Description	Project Compliance
Article 42 of the Constitution of the Republic of Kenya stipulates the right of individuals to a clean and healthy environment. It further enforces the right to protection of environment for present and future generations. ²¹	The project does not jeopardize the health of the environment or its communities. Contrary through the implementation of proposed project activities, land degradation will be mitigated, promoting better development of the environment. The continued adoption of sustainable practices will prove beneficial for generations to come.
Under Article 69 of the Constitution of the Republic of Kenya, the following is stated ²² – 1. Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits 2. encourage public participation in the management, protection and conservation of the environment 3. eliminate processes and activities that are likely to endanger the environment	The project activity ensures the sustainable development of land and environment. In mobilizing the pastoralists to adopt controlled grazing, the pastoral communities are actively involved in conservation efforts. This in turn leads to a decline in overgrazing, and thus an elimination of detrimental activities is made possible.

²¹ Kenya Law. (n.d.). Constitution of Kenya. Retrieved from <http://www.kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=Const2010>

²² Kenya Law. (n.d.). Constitution of Kenya. Retrieved from <http://www.kenyalaw.org:8181/exist/kenyalex/actview.xql?actid=Const2010>

Relevant Law and its Description	Project Compliance
Kenya's Climate Change Act of 2016 promotes a framework of action in line with low carbon and developing an economy with reduced emissions of greenhouse gases. ²³	The project activity will facilitate sequestration of carbon in the soil, resulting in reduced emissions in the atmosphere.
Convention on Biological Diversity (CBD), 1992: The CBD's goals include the conservation of biodiversity, sustainable use of biological resources and equitable sharing of benefits arising from their sustainable use. Kenya ratified this convention in 1994. ²⁴	The project complies with this convention by promoting sustainable management of grasslands and their resources, thus improving the livelihood of dependent communities.
Kenya is a signatory state to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The convention regulates the international trade of endangered species of wildlife in the region. ²⁵	The project activity has no negative impact on any wild fauna and flora. The project will pave way for improved grasslands through carbon sequestration, which will also prove beneficial for the grazing of wildlife. It will thereby contribute to the overall biodiversity of the region.
The International Convention on the Elimination of All Forms of Racial Discrimination works for the protection and enforcement of the right against racial discrimination. ²⁶ This was ratified by Kenya in 2001. ²⁷	The project activity does not violate the mandates of the convention.
The Stockholm Declaration of the United Nations Conference in Human Environment	The project activity is in compliance with the convention. The reduction of carbon

23 Kenya Gazette Supplement. (2016). The Climate Change Act. Retrieved from <http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/ClimateChangeActNo11of2016.pdf>

24 Mita Manek. (2001). The Implementation of Biodiversity-Related Conventions. Retrieved from [https://www.cbd.int/doc/nbsap/legislation/Kenya\(Legal\).pdf](https://www.cbd.int/doc/nbsap/legislation/Kenya(Legal).pdf)

25 Kenya Wildlife Service. (n.d.). Cites Implementation Department. Retrieved from <http://www.kws.go.ke/content/cites-implementation-department>

26 Audiovisual Library of International Law. (n.d.). International Convention on the Elimination of All Forms of Racial Discrimination. Retrieved from <https://legal.un.org/avl/ha/cerd/cerd.html#:~:text=The%20Convention-,The%20International%20Convention%20on%20the%20Elimination%20of%20All%20Forms%20of,of%20private%20and%20public%20life.>

27 UN Treaty Body Database. (n.d.). Ratification Status for Kenya. Retrieved from https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=90&Lang=EN

Relevant Law and its Description	Project Compliance
(1972), mandates creating development plans that incorporate science and technology to reduce environmental degradation. ²⁸ Kenya is one of the parties in the convention.	emissions into the atmosphere and subsequent sequestration in the soil will significantly decrease environmental degradation.

Uganda

Relevant Law and its Description	Project Compliance
Article 39 of the Constitution of the Republic of Uganda stipulates the right of every Ugandan to a clean and healthy environment ²⁹ .	The project activity is in compliance with this article of the constitution.
Article 245 of the Constitution of the Republic of Uganda enforces the protection and preservation of the environment, and measures for sustainable development of the environment. It also encourages the promotion of environmental awareness ³⁰ .	Through the implementation of proposed project activities, land degradation will be mitigated, promoting better development of the environment. Further, awareness will be spread among the communities regarding environmental preservation, in line with the article.
The National Environment (Minimum Standards for Management of Soil Quality) Regulation, 2001: The regulation mandates conservation activities that will prevent degradation and enhance the quality of soil and environment ³¹ .	The project complies with this convention by promoting sustainable practices of grassland management, thus improving soil quality and health.
The National Environment Management Policy, 1995: The policy addresses environmental issues like soil degradation,	The project activity does not violate the terms of the policy, and further promotes practices that are in line with the terms of the policy.

28 United Nations Environment Programme. (n.d.). Environmental Law Guidelines and Principles - Stockholm Declaration. Retrieved from <https://wedocs.unep.org/bitstream/handle/20.500.11822/29567/ELGP1StockD.pdf?sequence=1&isAllowed=y>

29 International Labour Organization. (n.d.). *Constitution of Uganda*. Retrieved from <https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/44038/90491/F206329993/UGA44038.pdf>

30 International Labour Organization. (n.d.). *Constitution of Uganda*. Retrieved from <https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/44038/90491/F206329993/UGA44038.pdf>

31 National Environment Management Authority. (2001). *The National Environment (Minimum Standards For Management Of Soil Quality) Regulations, 2001*. Retrieved from http://nema.go.ug/sites/all/themes/nema/docs/minimum_standards_for%20management_of_soil.pdf

Relevant Law and its Description	Project Compliance
loss of biodiversity, increased pollution etc. and work towards mitigating them ³² .	
Convention on Biological Diversity (CBD), 1992: The CBD's goals include the conservation of biodiversity, sustainable use of biological resources and equitable sharing of benefits arising from their sustainable use. Uganda ratified this convention in 1993 ³³ .	The project complies with this convention by promoting sustainable management of grasslands and their resources, thus improving the livelihood of dependent communities.
Uganda is a signatory state to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The convention regulates the international trade of endangered species of wildlife in the region ³⁴ .	The project activity has no negative impact on any wild fauna and flora. The project will lead to improved grasslands through carbon sequestration, which will also prove beneficial for the grazing of wildlife. It will thereby contribute to the overall biodiversity of the region.
The International Convention on the Elimination of All Forms of Racial Discrimination works for the protection and enforcement of the right against racial discrimination. It was ratified by Uganda in 1980 ³⁵ .	The project activity does not violate the mandates of the convention.
As per Uganda's Nationally Determined Contribution (NDC), the country aims to implement a low-carbon development pathway, in order to reduce the vulnerability of the population, environment and its	The project activity does not violate the terms of the policy, and further promotes practices that are in line with the objectives of the NDC.

³² Grantham Research Institute on Climate Change and the Environment. (n.d.). National Environment Management Policy (NEMP). Retrieved from <https://climate-laws.org/geographies/uganda/policies/national-environment-management-policy-nemp>

³³ African Wildlife Foundation. (2021). AWF Partners with Ugandan Environmental Agencies to Mark International Day for Biological Diversity. Retrieved from <https://www.awf.org/pressroom/awf-partners-ugandan-environmental-agencies-mark-international-day-biological-diversity#:~:text=Uganda%20ratified%20the%20Convention%20on,the%20biggest%20number%20of%20Parties>

³⁴ Department of Wildlife Conservation, & National Environment Management Authority (NEMA). (2008). *Uganda Wildlife Trade Review*. Retrieved from <https://cites.org/sites/default/files/common/prog/policy/UGReportAug2008.pdf>

³⁵ United Nations Treaty Collection. (n.d.). *International Convention on the Elimination of All Forms of Racial Discrimination*. Retrieved from https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=IV-2&chapter=4&clang=_en

Relevant Law and its Description	Project Compliance
economy to the impacts of climate change ³⁶ .	
The United Nations Convention to Combat Desertification advocates for mitigation measures to reduce the effects of drought, and thereby prevent desertification. This was ratified by Uganda in 1997 ³⁷ .	The project activity does not violate the terms of the convention, and further promotes practices that mitigates desertification.

Tanzania

Relevant Law and its Description	Project Compliance
The Environmental Management Act (EMA), ratified by the United Republic of Tanzania, includes the following terms³⁸– 1. Right to clean, safe and healthy environment for all people of Tanzania 2. Sustainable management of the environment and natural resources	The project activity is in compliance with the EMA. The project further complies with act through the promotion of sustainable practices of grassland management.
Convention on Biological Diversity (CBD), 1992: The CBD's goals include the conservation of biodiversity, sustainable use of biological resources and equitable sharing of benefits arising from their sustainable use. Tanzania ratified this convention in 1996³⁹.	The project complies with this convention by promoting sustainable management of grasslands and their resources, thus improving the livelihood of dependent communities. Project activity will also aid preservation of biodiversity.
The United Nations Convention to Combat Desertification (UNCCD) advocates for mitigation measures to reduce the effects	The project activity does not violate the terms of the convention, and further promotes practices that mitigates desertification.

³⁶ United Nations Development Programme. (n.d.). *NDC Support Programme - Uganda*. Retrieved from <https://www.ndcs.undp.org/content/ndc-support-programme/en/home/our-work/geographic/africa/Uganda.html>

³⁷ Ministry of Agriculture, Animal Industry and Fisheries - Entebbe. (1999). *Framework for the National Action Programme to Combat Desertification and Drought in Uganda*. Retrieved from <https://www.unccd.int/sites/default/files/naps/uganda-eng2000.pdf>

³⁸ The National Environment Management Council. (2004). *The Environmental Management Act, 2004*. Retrieved from <https://www.nemc.or.tz/uploads/publications/sw-1576228517-ema%20act2004.pdf>

³⁹ Environmental Law in Tanzania; How Far Have We Gone? (2007). *LEAD Journal (Law, Environment and Development Journal)*. <https://doi.org/https://lead-journal.org/content/07026.pdf>

Relevant Law and its Description	Project Compliance
of drought, and thereby prevent desertification. This was ratified by Tanzania in 1997 ⁴⁰ .	
The United Nations Framework Convention on Climate Change (UNFCCC) was ratified by Tanzania in 1996 ⁴¹ . It aims to mitigate climate change brought about by anthropogenic activities ⁴² .	The project activity will facilitate sequestration of carbon in the soil, resulting in reduced emissions in the atmosphere.
Tanzania's Nationally Determined Contribution (NDC) advocates for climate-smart agricultural measures, in order to increase productivity in a sustainable manner ⁴³ .	The project activity does not violate the terms of the policy, and further promotes practices that are in line with the objectives of the NDC.
The International Convention on the Elimination of All Forms of Racial Discrimination works for the protection and enforcement of the right against racial discrimination. It was ratified by Tanzania in 1972 ⁴⁴ .	The project activity does not violate the mandates of the convention.
Tanzania's National Environmental Policy (2021) advocates the sound management of land resources, strengthening the conservation of wildlife and biodiversity,	Through the implementation of proposed project activities, land degradation will be mitigated. Further, awareness will be spread among the

40 United Nations Convention to Combat Desertification. (2018). Land Degradation Neutrality Target Setting Programme Report. Retrieved from https://www.unccd.int/sites/default/files/ldn_targets/2018-11/Tanzania%20LDN%20TSP%20Country%20Report.pdf

41 Environmental Law in Tanzania; How Far Have We Gone? (2007). LEAD Journal (Law, Environment and Development Journal). <https://doi.org/https://lead-journal.org/content/07026.pdf>

42 United Nations Climate Change. What is the United Nations Framework Convention on Climate Change? Retrieved from <https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change>

43 The United Republic of Tanzania Vice President's Office. (2021). *Nationally Determined Contribution*. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/TANZANIA_NDC_SUBMISSION_30%20JULY%202021.pdf

44 UN Treaty Body Database. Ratification Status for United Republic of Tanzania. Retrieved from https://tbineternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=186&Lang=EN

Relevant Law and its Description	Project Compliance
and increasing the national capacity for implementing climate action ⁴⁵ .	communities regarding environmental preservation, in line with the terms of the policy.

Apart from the above, the project complies with all international laws regarding child labor, corruption and human rights. No activity in the project violates the above-mentioned laws.

1.15 Participation under Other GHG Programs

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

This is a grouped project. This grouped project is neither registered in any other GHG program nor going to register or participate in any other GHG Programs other than VCS. All new project instances to be added to this grouped project are required to demonstrate whether the project was part of any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been submitted to any other GHG Programs and has not been rejected by any other GHG programs.

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?

☐ Yes

☒ No

The project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program

1.16.2 Other Forms of Environmental Credit

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

☐ Yes

☒ No

⁴⁵ The United Republic of Tanzania Vice President's Office. (2021). *National Environment Policy, 2021*. Retrieved from <https://www.vpo.go.tz/uploads/publications/en-1644923087-NATIONAL%20%20ENVIRONMENTAL%20POLICY%202021%20new.pdf>

This project neither has nor intends to seek or receive another form of GHG related environmental credit including renewable energy certificates or any other environmental credits.

1.17 Sustainable Development Contributions

The grouped project contributes to the following SDGs. The below table explains the parameter selected from each of the goals and the project's impact on that particular goal.

SDG Goal	Chosen Parameter	Project Impact
	2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.	The project activity improves soil quality by increasing Soil Organic Carbon (SOC). Higher SOC content leads to better productivity and improved soil fertility, making agricultural/grassland production more climate resilient.
	6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	Increases in soil organic matter improve soil aggregates and structural stability, which help water infiltration into the soil by increasing soil aeration. This reduces excess runoff.
	8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training	The project provides employment to local communities during the implementation and monitoring process.

SDG Goal	Chosen Parameter	Project Impact
	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	The project promotes sustainable grassland management practices in the project area, thereby removing CO2 from the atmosphere.
	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	Through rotational grazing practices, vegetation is allowed to grow and stay on the ground for more time, thereby allowing for degraded grasslands to be gradually restored, and reversing desertification.

Table 1: Sustainable Developmental Goals identified for this project

1.18 Additional Information Relevant to the Project

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

2 SAFEGUARDS

2.1 No Net Harm

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

2.2 Local Stakeholder Consultation

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

2.3 Environmental Impact

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

2.4 Public Comments

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

2.5 AFOLU-Specific Safeguards

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The details of the methodology and tools applied for the grouped project are given below:

Title	Improved Agricultural Land Management
Version	2.0 (under development ⁸)
Reference	VCS Methodology VM0042
Version date	21 December 2021
Sectoral Scope	14
Tools Applied	AFOLU Non-Permanence Risk Tool to estimate buffer credits as per VCS standard requirement.

Table 2: Details of the methodology and tools applied

3.2 Applicability of Methodology

Grouped Project

All new activities must meet applicability conditions listed in Table 3 below and be demonstrated with justification in the project document.

The following table provides details of how each project Instance is eligible under Section 4 of the VM0042 methodology:

Applicability Condition	Justification
Projects must introduce or implement one or more new changes to pre-existing agricultural management practices.	The project activities are new activities implemented by the landowners relative to the baseline scenario. The current baseline scenario is continuous unsustainable grazing on community-owned and privately-owned

Applicability Condition	Justification
	grasslands. The proposed project activity introduces and expands new sustainable improved grassland management practices.
Project activities must be implemented on land that is either cropland or grassland at the project start date and remains cropland or grassland throughout the project crediting period.	The project is implemented on grasslands. The land has remained grasslands prior to the project and after the start of the project. This is the natural state of the land which is verified by satellite images over the past 10 years. As per the methodology, land use change is allowed under certain scenarios. However, this project does not promote or allow any land use change during the crediting period.
The project area must not have been cleared of native ecosystems within the 10-year period prior to the project start date.	The grassland areas have not been cleared of native ecosystems – native ecosystems still exist, and this is verified by satellite images over the past 10 years. Analysis of these satellite images confirms that these lands have remained grasslands and are not converted or cleared of any native ecosystems.
The project activity is not expected to result in a sustained reduction of greater than 5% in productivity, as demonstrated by peer-reviewed and/or published studies on the activity in the region or a comparable region.	The project will not result in a sustained reduction of greater than 5% in productivity. This will be demonstrated at the validation stage.
The project activity cannot occur on a wetland. Note that this condition does not exclude crops subject to artificial flooding where it can be demonstrated that crop cultivation does not impact the hydrology of any nearby wetlands.	All activities will only be taken up on grasslands, which are neither wetlands nor croplands. This will be substantiated with maps and KML files.
The project activity cannot include application of biochar as a soil amendment.	This is not applicable for this project since none of the project activities promotes biochar as a soil amendment.
Use of any model in estimating stock change/emissions	The project does not use a model to estimate stock change/emissions, so the stock change/emissions estimation model's applicability conditions are not required.

Table 3: Applicability Criteria

3.3 Project Boundary

Grouped Project

The Grouped Project and each new project instance will define a project boundary as per the VM0042 V2.0 methodology.

The carbon pool included in Instance 01 is outlined in the table below:

Carbon Pool	Included?	Justification/ Explanation of Choice
Aboveground tree biomass	No	Project does not promote agroforestry as one of the project activities.
Aboveground non-tree biomass	No	As per VCS rules this has been excluded. (VM0042, table 2)
Belowground biomass	No	Project does not promote agroforestry as one of the project activities.
Dead wood	No	As per VCS rules this has been excluded. (VM0042, table 2)
Litter	No	As per VCS rules this has been excluded. (VM0042, table 2)
Soil Organic Carbon	Yes	Included as per VCS AFOLU Requirements as the landcover under the baseline scenario is comprised of grasslands. The proposed project activity increases this pool in the project scenario.
Wood Products	No	As per VCS rules this has been excluded. (VM0042, table 2)

Table 4: Carbon pool included in this project

The project boundary of Instance 01 is outlined in the following table.

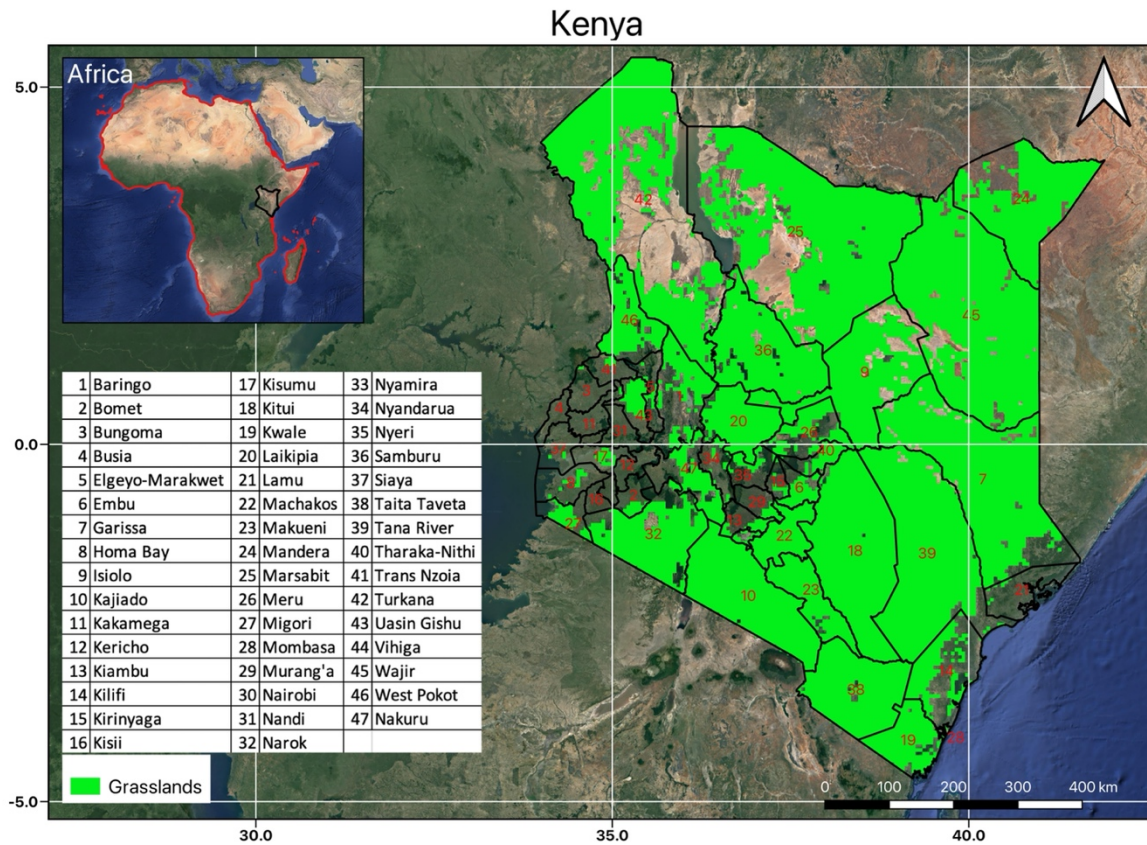
	Source	Gas	Included?	Justification/Explanation
Baseline	Soil Organic Carbon	CO ₂	Yes	Primary stock changing due to improved grassland management activities
Project	Soil Organic Carbon	CO ₂	Yes	Primary stock changing due to improved grassland management activities

Table 5: Project Boundary

Project activities are taking place throughout the project area, and primarily affect soil carbon. All other stock or pool changes are deemed de minimis relative to the total net anthropogenic GHG reductions and removals. Insignificant emission sources are excluded according to the VCS rules.

There is no statistically significant leakage because livestock numbers are not changing (decreasing) in a statistically significant manner, at least as seen for the initial crediting period – as measured through continuous pastoralist-attested livestock counts, which will be presented in the monitoring report.

Furthermore, the methodology explicitly requires that decreases in livestock emissions due to a reduction in livestock numbers not be accounted for credit. Hence, livestock-associated enteric emission changes are not included, as they are also considered de minimis.



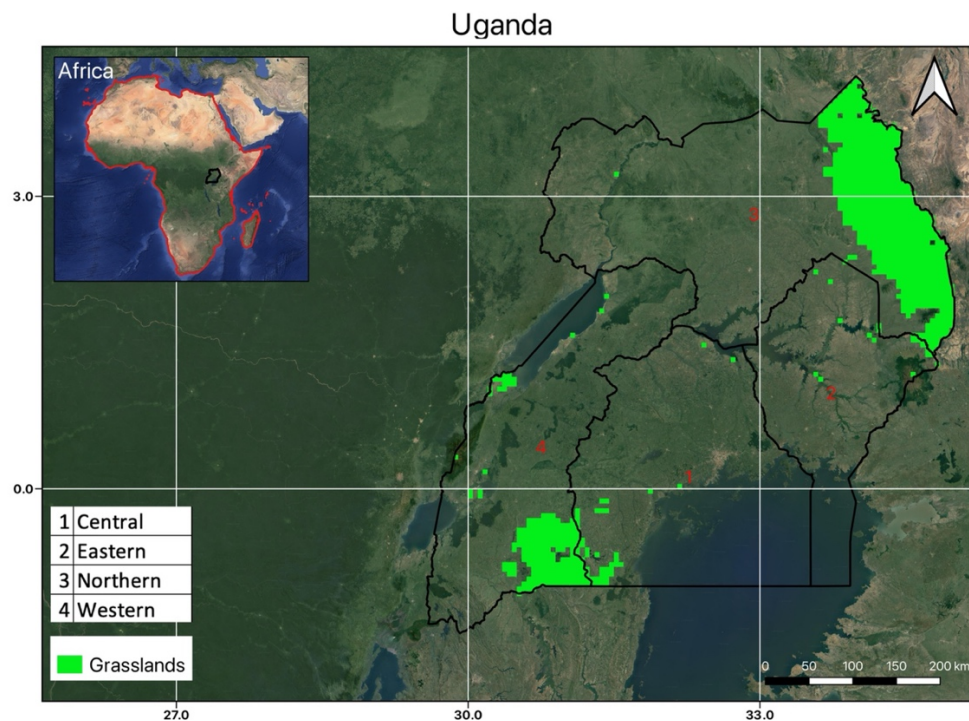
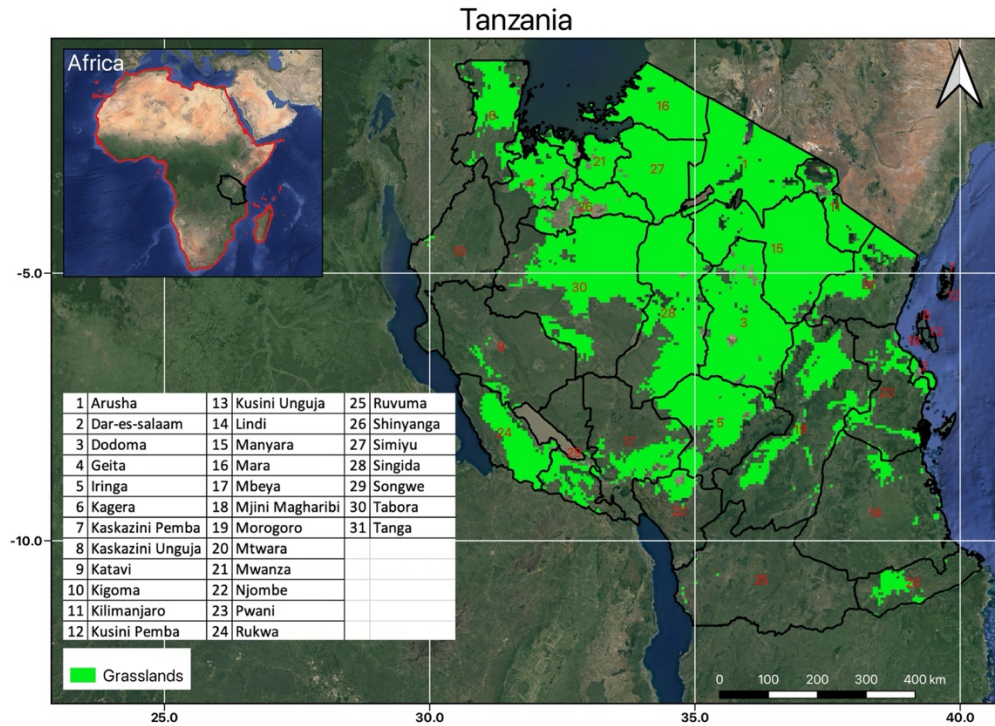


Figure 5: Project location counties (having grasslands) where project activities implemented in this project.

Spatial Boundaries

The spatial boundaries of the project area consist of the grasslands located in the areas listed in section 1.12 of the PDD. The geo-fenced boundaries of individual project areas will be clearly demarked as per Section 5 of the methodology and will be available at any point when new areas are added. The digital files of individual grassland areas will be submitted in Keyhole Markup Language (KML) file format as required by the VCS Standard.

At the current time, approximately 170,000 acres are covered by this project, and the acreage is projected to expand over time to cover more Pastoralists in the region.

Details of the complete project areas will be provided as a GeoJSON or KML file for validation and verification.

3.4 Baseline Scenario

As per the methodology, “For each sample unit, a schedule of activities in the baseline scenario will be determined by assessment of practices implemented during the period prior to the project start date. The interval over which practices are assessed, x years, must be a minimum of 3 years and include at least one complete crop rotation, where applicable. Where a crop rotation is not implemented in the baseline, x= 3 years”.

According to VM0042, the baseline scenario is the continuation of the pre-project management activities.

The baseline scenario is identified as unsustainable grazing practices that have led to grassland degradation to a large extent. In the absence of this project activity, pastoralists will continue unsustainable grazing, which further degrades grasslands.

The current baseline practice of unsustainable grazing is enforced due to several factors. While both wildlife and livestock are responsible for the overgrazing of grasslands, policies enforced during the colonial period, and schemes enacted by national and international bodies causing lifestyle changes in pastoral communities, have been instrumental in accelerating grasslands degradation.

History of pastoral practices in Kenya

Pastoralism in Kenya can be traced back to the third millennium BC. Communities engaged in small-scale cattle herding, fishing and hunting settled in southern and central regions of Kenya, leading to the development of pastoral lifestyles. Pastoralism soon asserted dominance over the Savanna regions and rearing of cattle became a primary source of income. Due to abundance of pasture in the rainy season, the grazing of livestock proved relatively easier than in the dry season. During the dry season, permanently watered areas such as swamps, streams etc. were heavily depended on for grazing activities. Thus, grazing practices alternated between wet and dry season grazing areas. This alternation was made possible due to communally-held land, under the leadership of a council of elders who mandated resource allocation. Membership in these communities ensured that herders had access to

grazing areas and resources requisite for their livestock. Access to pastures were regulated by the elders, allowing pastoralists, livestock and wildlife equitable usage of the landscape. Within the communities, a common language and social norms devised by the elders, comprising managed grazing practices, helped prevent land degradation and promote regeneration. The success of traditional pastoral activity can be attributed to this structure of governance, along with indigenous systems of knowledge that fostered land conservation practices. Over the course of the Scramble for Africa and the resulting colonization of these territories, these structures and traditional knowledge systems were considered inferior and western practices were implemented in their place. With the onset of the British colonial regime, ethnic communities, such as the Maasai, were restricted to relatively arid areas in the southern part of the country, while the fertile grasslands of the Rift Valley were occupied by British settler farmers. The British encouraged sedentarization, or the settling down of pastoralists, leading to different uses of land altogether. Land was divided and private, individually-owned farms and commercial grasslands were set up in place of earlier community-owned lands. With this division, there was greater pressure for access to pastures, leading to overgrazing of available land and a subsequent reduction in livestock numbers. Without in-depth indigenous know-how around land management, degradation accelerated under British practices and policies. This was further exacerbated by obscure government strategies that followed Kenya's independence in 1963. Programs and schemes initiated in line with British policies continued to enforce subdivision into group grasslands over which local herders had little to no autonomy, affecting pastoral lifestyles. A shifting trend that was focused more on small-scale commercial agriculture came to be, causing permanent settlements requisite for agropastoralism. The division into group grasslands jeopardized the ecological integrity of the group grassland resources, as increased human settlements led to increased permanent utilization of land with no resting period. Unsustainable agricultural and grassland techniques compromised livestock productivity and reduced biodiversity in these arid grasslands. Kenyan grasslands that had supported pastoralism for several decades now face overwhelming resource demands in terms of water and vegetation due to this enforced shift toward agriculture. The restricted local control over resources, limited mobility, rising human populations, and changing climate patterns are major impediments to the diminishing pastoral communities of the region⁴⁶.

Kenyan grasslands are known as Savanna grasslands, which have a wide range of vegetation types with and without shrubs, and cover about 69.7% of the land area of Kenya. Thus they are the predominant land use type in the country. As discussed in section 1.1, overgrazing and high livestock stocking rates have degraded the soils in the project area. This has led to reduction in vegetation cover thereby reducing above- and belowground carbon concentrations in the region⁴⁷. At present, pastoralist communities in the region follow unsustainable grazing practices. Climate change and anthropogenic activities play a major role in grassland degradation, thereby reducing SOC concentrations in the region. At the same

46 Yurco, K. M. (2011). Pastoral Movements and Movements in Pastoralism: Shifting Traditions and Institutions of Modern Management Strategies in Laikipia, Kenya.

47 Sheila Wachiye, Petri Pellikka, Janne Rinne, Janne Heiskanen, Sheila Abwanda, Lutz Merbold, Effects of livestock and wildlife grazing intensity on soil carbon dioxide flux in the savanna grassland of Kenya, Agriculture, Ecosystems & Environment, Volume 325, 2022, 107713, ISSN 0167-8809, <https://doi.org/10.1016/j.agee.2021.107713>. (<https://www.sciencedirect.com/science/article/pii/S0167880921004175>)

time, water infiltration has dropped by more than 25% in certain parts of the grassland region, alongside a 30% increase in bulk density and silt content⁴⁸. In addition, a growing population with rising per-capita income has increased the need for food. This increase in food demand has resulted in expansion of agriculture lands into the grassland regions. This phenomenon is the main cause for land degradation in the region. The following figure illustrates the areas that are vulnerable to degradation.

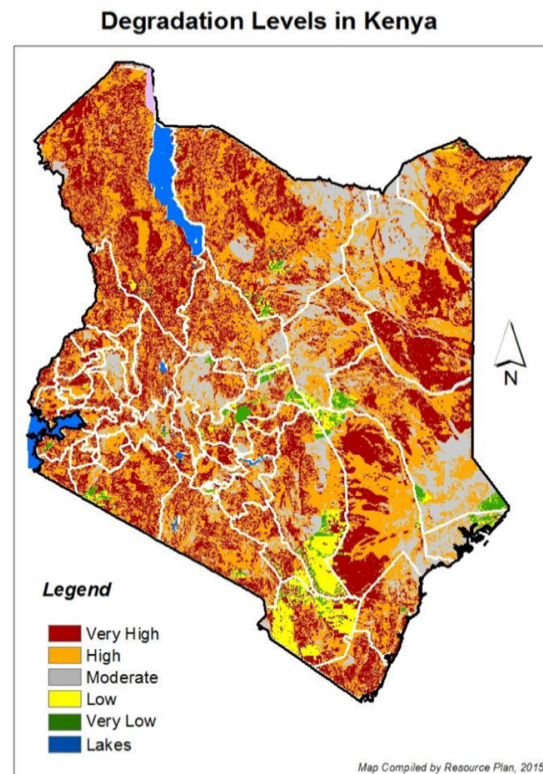


Figure 6: Severity of erosion risk in Kenya based on RS/GIS mapping⁴⁹

48 C.T. Omuto, Assessment of soil physical degradation in Eastern Kenya by use of a sequential soil testing protocol, Agriculture, Ecosystems & Environment, Volume 128, Issue 4, 2008, Pages 199-211, ISSN 0167-8809, <https://doi.org/10.1016/j.agee.2008.06.006>.

49 LAND DEGRADATION ASSESSMENT (LADA) IN KENYA, Ministry of Environment and Natural Resources. March 2016. <http://www.environment.go.ke/wp-content/uploads/2018/08/LADA-Land-Degradation-Assessment-in-Kenya-March-2016.pdf>



Figure 7: Degraded grasslands

According to a recent report, almost all the counties in Kenya suffer from some form of land degradation⁴⁹. In another report, the same type of assessment was carried out in the overall sub-Saharan Africa region, in which overgrazing and extensive agriculture practices have led to land degradation. The below table tabulates the reason, type and countries where land degradation is quite evident:

Type of land degradation	Affected land (% of total)	Affected population (% of total)	Countries affected	Main cause(s)
Water erosion	46	97	All countries in eastern Africa (Kenya, Tanzania, Ethiopia, Malawi, Zambia)	Deforestation, overgrazing, agric. practices
Wind erosion	38	18	Botswana, Chad, Djibouti, Eritrea, Mali, Niger, South Africa and Sudan	Overgrazing, deforestation
Salinization			Severe in Kenya (30%), Tanzania (27%)	Water management
Soil fertility and nutrient depletion	Approx. 100	Approx. 100	All countries	Agric. practices, overgrazing, deforestation,
Loss of habitat (deforestation)	0.7% of annual change of forest and woodland area in east and southern Africa		Hotspots: Burundi (– 5.2%), Comoros (– 7%), Nigeria (– 3.3%), Togo (– 4.5%), Uganda (– 2.2%), Zimbabwe (– 1.7%)	Deforestation, overgrazing, agricultural practices

Table 6: Land degradation types and extent in sub-Saharan Africa⁵⁰

Hence there is an urgent need to contain further land degradation in the region. This project helps to restore degraded lands with the help of good and sustainable grassland management practices.

⁵⁰ Kirui, O.K., Mirzabaev, A. & von Braun, J. Assessment of land degradation ‘on the ground’ and from ‘above’. SN Appl. Sci. 3, 318 (2021). <https://doi.org/10.1007/s42452-021-04314-z>



Figure 8: Livestock grazing in Kenyan grasslands

Baseline Control Sites

Since there are no performance benchmarks available, the baseline scenario is measured and remeasured directly at a baseline control site linked to one or more sample units. All control sites will comply with the criteria listed in table 7 of the VM0042 methodology. Control sites will be large enough to ensure that any changes in SOC stocks are driven by baseline management practices, i.e., edge effects should be eliminated. As per methodology requirements, at least two control sites are required.

Details of the control sites (place, conditions, etc.) will be provided in each verification stage.

3.5 Additionality

As per the latest VCS methodology requirements v4.1, section 3.5.3 and methodology (VM0042) requirements, the additionality of this project is demonstrated in the section below.

Regulatory Surplus

The proposed project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. This project is a voluntary activity undertaken by Boomitra.

In addition to the demonstration of regulatory surplus, as per the VM0042 methodology, additionality is determined by a project method. We follow the 2-step process outlined in the methodology.

Step 1: Identify barriers that would prevent the implementation of a change in pre-existing agricultural management practices

There are several barriers that prevent implementation of the change in practices⁵¹:

1. The proposed project activities require significant amounts of initial investment to adopt at scale. The pastoralists in the project area do not have such capabilities to invest upfront. For a long time, most of the developmental policies and funds allocated by the government of Kenya have been directed towards what are considered more productive agricultural avenues of the country. The arid areas inhabited by the pastoralists did not fall within their scope. Though a national policy to enable development in arid and semi-arid regions has since been adopted, additional revenues from the sale of carbon credits are essential to overcome investment barriers.
2. The information and knowledge required to adopt the proposed activities requires significant levels of capacity building through training and workshops. At the same time, the required information and knowledge are not easily accessible to every pastoralist. The many socio-economic and cultural barriers in the region hinder the adoption of new practices. Through this project, Boomitra is trying to institutionalize all the components required to implement this project at large scale through local partners. This would only happen with carbon credit revenues.
3. The nomadic nature of the pastoralist lifestyle obstructs continued access to formal education. The traditional system of schooling is inherently incompatible with pastoralist practices and lifestyle. This can pose a barrier, preventing the implementation of sustainable knowledge systems in grazing and grazing-related activities. With added carbon credits revenue, pastoralists may be incentivized to adopt these sustainable practices at scale.
4. Most pastoralist areas in Kenya are poverty-ridden, with a large proportion of the population falling under the national poverty line. Increasing instances of droughts and floods have grossly affected livelihoods that are largely dependent on climate-fed activities. With implementation of sustainable grassland practices (such as rotational grazing) and the added source of revenue derived from carbon credits, a two-fold advantage is accorded to the community.⁵²

Step 2: Demonstrate that the adoption of the suite of proposed project activities is not common practice

The proposed project activities are not common in the project area. As per VM0042, it will be demonstrated that the activities are not common, and that adoption is less than the 20% threshold.

Equations available in VM0042 will be used to demonstrate the same.

⁵¹ Siedenbun, Jules. (2021). Perils facing Kenyan pastoralists, livelihood innovations and wider impacts: learning from project experience.

⁵² Oxfam International. (2008). Survival of the fittest: Pastoralism and climate change in East Africa.

3.6 Methodology Deviations

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

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4.2 Project Emissions

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

4.3 Leakage

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)

4.4 Net GHG Emission Reductions and Removals

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5 MONITORING

5.1 Data and Parameters Available at Validation

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5.2 Data and Parameters Monitored

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5.3 Monitoring Plan

Left blank intentionally as per Section 3.1.3 of the VCS Procedural Document; Registration and Issuance Process: (Version 4.1)