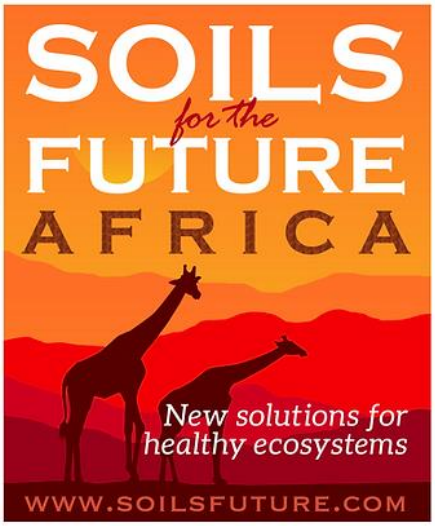
KAJIADO RANGELANDS CARBON PROJECT



carbon
New solutions for healthy ecosystems
SOLVE

Project title	Kajiado Rangelands Carbon Project
Project ID	4714
Crediting period	1 October 2023 – 30 September 2063
Project lifetime	1 October 2023 – 30 September 2063; 40-year project lifetime
(CCB) GHG accounting period	1 October 2023 – 30 September 2063; 40-year accounting period
Original date of issue	04 August 2025 (to be updated after validation audit completion)
Most recent date of issue	04 August 2025 (to be updated after validation audit completion)
Version	1.2
VCS Standard version	4.7
CCB Standards version	3.1
Project location	Republic of Kenya, Kajiado County

Project proponent(s)	Soils for the Future Africa Ltd Timothy H. Tear, Ph.D. | +1-518-898-8545 | ttear.carbonsolve@gmail.com
Validation/verification body	Aster Global Environmental Solutions Matt Campbell | +1-330.294.1242 Ext. 115|mcampbell@asterglobal.com
History of CCB status	No history of CCB status
Gold Level criteria	Exceptional Climate Adaptation Benefits: Activities include restoring perennial grasses to improve soil carbon storage and water retention, enhancing rangeland resilience to climate change. Exceptional Community Benefits: The project improves livelihoods by strengthening grazing cooperatives, increasing income from sustainable livestock management, and supporting education through carbon revenue reinvestment. Exceptional Biodiversity Benefits: Conservation initiatives focus on maintaining habitat connectivity for wildlife, reducing human-wildlife conflicts, and protecting key species like elephants, giraffes, and vultures.
Expected verification schedule	Initial verification expected June 2025 through December 2025, and yearly thereafter
Prepared by	Mark E. Ritchie, Ph.D. Director – Soils for the Future Africa Ltd; Director – CarbonSolve, LLC

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1 SUMMARY OF PROJECT BENEFITS

1.1 Unique Project Benefits

The following unique project benefits are distinct from the standardized benefit metrics in Section 1.2. Each benefit directly links to key project outcomes and impacts outlined in the Theory of Change (Section 2.1.17) and is substantiated with supporting references.

Outcome or impact estimated by the end of project lifetime	Section reference
1) Community-Led Implementation of Rapid Rotational Grazing: Participating Maasai communities in Kajiado County will implement a version of High Density-Short Duration (HDSD)[1] rotational grazing practices that we refer to generically as "rapid rotational grazing." Rapid rotational grazing (RRG) will be accomplished with the help of locally hired grazing coordinators from the participating communities. Rapid rotational grazing practices are centered on short duration (i.e., rapid) grazing episodes that are shifted from location to location (i.e., rotational) within both wet and dry season grazing areas (i.e., a new grazing practice because it occurs within grazing areas during each grazing season). This new activity (RRG) would not occur without significant carbon revenues to organize rotational grazing plans and oversee grazing plan implementation. Once implemented, RRG will stimulate the restoration of perennial grasses and grassland plant diversity, providing a cascade of benefits to climate, community, and biodiversity, including the increase of soil organic carbon stocks[2].	2.1.1
2) Soil Organic Carbon Sequestration & Long-Term CO_2 Removals: Through growing soil organic carbon stocks, the project will yield significant removal of CO_2 from the atmosphere. RRG implementation – verified by measurements of altered grazing intensities, records of the time, timing and number of livestock grazers using different portions of the project area, and vegetation change across 1 million hectares of rangelands – will drive the increases in soil organic carbon. The project is expected to remove, after subtracting leakage, over 1.2 million tons CO_2e a year on average for a total removal of more than 48 million tons CO_2e over the project	2.1.13

[1] Vincent Chaplot, Phesheya Dlamini, and Pauline Chivenge, "Potential of Grassland Rehabilitation through High Density-Short Duration Grazing to Sequester Atmospheric Carbon," *Geoderma* 271 (June 2016): 10–17, https://doi.org/10.1016/j.geoderma.2016.02.010.
[2] Cornelia Rumpel et al., "The Role of Soil Carbon Sequestration in Enhancing Human Resilience in Tackling Global Crises Including Pandemics," *Soil Security* 8 (September 2022): 100069, https://doi.org/10.1016/j.soisec.2022.100069.

lifetime of 40 years. This benefit differs from the net estimated removals metric in Section 1.2, as it highlights the project's specific contribution to long-term landscape-scale carbon storage.	
3) Revitalization of Traditional Pastoral Mobility to Restore Rangeland Productivity: Since the mid-20th Century, many societal changes have incentivized pastoral communities to abandon their historic nomadic lifestyles[3]. The ecological consequences have been dire, including the loss of perennial forage, increased bare ground and resultant soil and wind erosion, disruption of surface and ground water availability, and the loss of productive soil organic layers[4,5]. The consequences for pastoral communities that are directly linked to the productivity of these systems have been equally devastating, resulting in a persistent decline in rangeland productivity, increased competition among wildlife and livestock, and an overall impoverishment of human livelihoods[6,7,8]. Multiple communities will participate in an annual regional grazing plan within Kajiado County that allows livestock to move over long distances and efficiently use wet and dry season range. This coordination among communities has been shown in similar projects to provide unprecedented rest and opportunity for recovery of vegetation and assimilation of carbon from the atmosphere into roots and soil organic matter[9]. This investment in establishing RRG within local Maasai communities is needed as pastoralism in this region is also threatened by sedentarization, environmental degradation changing weather patterns, and increased conflict with other land uses	2.2.1

[3] C.P. Peacock, "Herd Movement on a Maasai Group Ranch in Relation to Traditional Organisation and Livestock Development," *Agricultural Administration and Extension* 27, no. 2 (1987): 61–74, https://doi.org/10.1016/0269-7475(87)90018-3.
[4] A. Savory and J. Butterfield, "The Holistic Management Framework: Ensuring Social, Environmental, and Economically Sound Development," in *Sustainable Development* (CRC Press, 2010), 175–202.
[5] Steven I. Apfelbaum et al., "Vegetation, Water Infiltration, and Soil Carbon Response to Adaptive Multi-Paddock and Conventional Grazing in Southeastern USA Ranches," *Journal of Environmental Management* 308 (April 2022): 114576, https://doi.org/10.1016/j.jenvman.2022.114576.
[6] Shauna B. BurnSilver, Jeffrey Worden, and Randall B. Boone, "Processes of Fragmentation in the Amboseli Ecosystem, Southern Kajiado District, Kenya," in *Fragmentation in Semi-Arid and Arid Landscapes*, ed. Kathleen A. Galvin et al. (Dordrecht: Springer Netherlands, 2008), 225–53, https://doi.org/10.1007/978-1-4020-4906-4_10.
[7] Truman P. Young, Todd M. Palmer, and Michelle E. Gadd, "Competition and Compensation among Cattle, Zebras, and Elephants in a Semi-Arid Savanna in Laikipia, Kenya," *Biological Conservation* 122, no. 2 (March 2005): 351–59, https://doi.org/10.1016/j.biocon.2004.08.007.
[8] David Western, Rosemary Groom, and Jeffrey Worden, "The Impact of Subdivision and Sedentarization of Pastoral Lands on Wildlife in an African Savanna Ecosystem," *Biological Conservation* 142, no. 11 (November 2009): 2538–46, https://doi.org/10.1016/j.biocon.2009.05.025.
[9] Mark E. Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," *agriRxiv* 2024 (February 20, 2024): 20240070662, https://doi.org/10.31220/agriRxiv.2024.00233.

similar to larger scale regional and continental trends[10]. A study in nearby Chyulu Hills National Park[11] identified the need for training of communities adjacent to national parks to better manage grazing areas and stocking rates to reduce grazing intensity on the forage resources and minimizing illegal park incursions that support investment in capacity building for HDSD grazing. Another study from the project area concluded that it is critical to *maintain mobile, large-scale herd movements* to avoid the heavy impact on grasslands associated with sedentarization of pastoral settlement and herds that further supports the need for HDSD grazing system implementation[12].	
4) Strengthening Livestock & Community Resilience to Climate Extremes: Implementation of RRG is expected to result in an increase in perennial grasses and grassland plant productivity and diversity, providing a cascade of benefits to climate, community, and biodiversity, including a lower likelihood of catastrophic livestock loss during drought, sustained meat and milk production through the dry season, and heavier livestock that are more valuable economically[13]. The long-term benefit of improved soil organic matter will help increase rainfall infiltration, water retention in the soil, and the length of time water is available for people and livestock[14]. Payments to communities will also be used to fund their development priorities – which, based on anecdotal discussions with community members and initial community benefits shared to date, is likely to focus on health care and bursaries that provide benefits to the poorest community members. In the short term, we anticipate that grazing plans will lead to a stronger perception of community connection to land and reduced conflicts over grazing. Furthermore, the project should reduce the risk of private land holdings that emerged from Group Ranch subdivision being sold for development, and thus lost from traditional communal grazing lands[15,16]. These benefits to financial, social and natural capital at the level of communities and individuals may help to reduce tensions between members of	4.2.1

[10] Simon K. Ole Seno and Salaton Tome, "Socioeconomic and Ecological Viability of Pastoralism in Loitokitok District, Southern Kenya," *Nomadic Peoples* 17, no. 1 (June 2013): 66–86, https://doi.org/10.3167/np.2013.170104.
[11] F K Waweru and J O Owino, "Ecological Response of Chloris Roxburghiana to Livestock and Wildlife Grazing in Chyulu Hills National Park and Environs, Kenya," *International Journal of Engineering Research* 2, no. 12 (2013).
[12] Western, Groom, and Worden, "The Impact of Subdivision and Sedentarization of Pastoral Lands on Wildlife in an African Savanna Ecosystem."
[13] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[14] D. A. Bossio et al., "The Role of Soil Carbon in Natural Climate Solutions," *Nature Sustainability* 3, no. 5 (March 16, 2020): 391–98, https://doi.org/10.1038/s41893-020-0491-z.
[15] Shauna BurnSilver and Esther Mwangi, "Beyond Group Ranch Subdivision: Collective Action for Livestock Mobility, Ecological Viability, and Livelihoods" (International Food Policy Research Institute, 2007), https://doi.org/10.2499/CAPRiWP66.
[16] Randall B. Boone et al., "Large-Scale Movements of Large Herbivores Livestock Following Changes in Seasonal Forage Supply," in *Resource Ecology*, ed. Herbert H. T. Prins and Frank Van Langevelde (Dordrecht: Springer Netherlands, 2008), 187–206, https://doi.org/10.1007/978-1-4020-6850-8_16.

younger age groups who are less interested in pastoralism and members of older age groups who see pastoralism as the central pillar of Maasai culture[17].	
5) Enhancing Biodiversity & Wildlife Connectivity: The status of wildlife outside of protected areas in Kenya has been declining for decades[18,19,20]. We anticipate that ecological changes in vegetation and soil from the project implementation will help to maintain or enhance nearby biodiversity High Conservation Values, especially for many declining migratory savanna herbivores and birds in the project area due to the project's biogeographical position connecting species from the Serengeti/Mara and Rift Valley ecosystems and protected areas to the west with the Chyulu Hills/Amboseli/Kilimanjaro ecosystems and protected areas to the east. A number of wildlife corridors have been identified in the project area that help sustain connectivity among these protected areas[21]. Improving rangeland health should also help increase wildlife numbers, which can also add to carbon stocks[22]. For example, there was a 15% increase in the carbon stored in the Serengeti ecosystem for every 100,000 wildebeest that were added as the population recovered following a rinderpest outbreak[23]. While it is known that wild animals can have an outsized influence (from 15-250%) on the amount of carbon in an ecosystem in comparison to when they are absent[24], there is actually very little information on enhancing carbon capture and storage in savanna habitats[25] (see Figure 1 of this reference). Similarly, while negative global relationships exist between biodiversity loss and carbon storage, there are few examples of project activities that clearly link benefits to carbon storage also directly benefiting	5.2.1

[17] Emily Woodhouse and J. Terrence McCabe, "Well-Being and Conservation: Diversity and Change in Visions of a Good Life among the Maasai of Northern Tanzania," *Ecology and Society* 23, no. 1 (2018): art43, https://doi.org/10.5751/ES-09986-230143.
[18] David Western, Samantha Russell, and Innes Cuthill, "The Status of Wildlife in Protected Areas Compared to Non-Protected Areas of Kenya," ed. Michael Somers, *PLoS ONE* 4, no. 7 (July 8, 2009): e6140, https://doi.org/10.1371/journal.pone.0006140.
[19] Joseph O. Ogutu et al., "Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes?," ed. Samuel Rezende Paiva, *PLOS ONE* 11, no. 9 (September 27, 2016): e0163249, https://doi.org/10.1371/journal.pone.0163249.
[20] Darcy Ogada et al., "Evidence of Widespread Declines in Kenya's Raptor Populations over a 40-Year Period," *Biological Conservation* 266 (February 2022): 109361, https://doi.org/10.1016/j.biocon.2021.109361.
[21] Gordon O. Ojwang et al., "Wildlife Migratory Corridors and Dispersal Areas: Kenya Rangelands and Coastal Terrestrial Ecosystems" (Ministry of Environment and Natural Resources, 2017).
[22] Oswald J. Schmitz et al., "Trophic Rewilding Can Expand Natural Climate Solutions," *Nature Climate Change* 13, no. 4 (April 2023): 324–33, https://doi.org/10.1038/s41558-023-01631-6.
[23]Holdo, R. M., Sinclair, A. R., Dobson, A. P., Metzger, K. L., Bolker, B. M., Ritchie, M. E., & Holt, R. D. (2009). A disease-mediated trophic cascade in the Serengeti and its implications for ecosystem C. *PLoS biology*, *7*(9), e1000210)
[24] Oswald J. Schmitz and Shawn J. Leroux, "Food Webs and Ecosystems: Linking Species Interactions to the Carbon Cycle," *Annual Review of Ecology, Evolution, and Systematics* 51, no. 1 (November 2, 2020): 271–95, https://doi.org/10.1146/annurev-ecolsys-011720-104730.
[25] Schmitz et al., "Trophic Rewilding Can Expand Natural Climate Solutions."

biodiversity at the site level[26]. Therefore, linking food webs and species interactions to the carbon cycle has emerged as a critical area of important research[27], creating an exceptional opportunity for this project to closely monitor changes in savanna food web dynamics in relationship to changes in grazing management.

Creating a theory of change for how project activities (i.e., changes in grazing management) are anticipated to influence multiple taxa at different trophic levels should help to better understand these complex relationships. We will test the assumption that project activities should in the near-term improve species diversity across a number of lower trophic level groups of key biodiversity indicator taxa, including plants (particularly grasses and herbs), birds (especially grassland species), and key insect groups, such as grasshoppers (Orthoptera) and dung beetles (Coleoptera: Scarabeidae). Furthermore, we anticipate that longer-term changes in higher trophic level indicators – such as many of the trigger species – will be linked to changes in their food base. We anticipate that this information will support other evidence that enhancing wild animals in their myriad functional roles can also increase carbon sequestration in savanna ecosystems[28].

[26] Sarah R. Weiskopf et al., "Biodiversity Loss Reduces Global Terrestrial Carbon Storage," *Nature Communications* 15, no. 1 (May 22, 2024): 4354, https://doi.org/10.1038/s41467-024-47872-7.
[27] Schmitz and Leroux, "Food Webs and Ecosystems."
[28] Ricardo M. Holdo et al., "A Disease-Mediated Trophic Cascade in the Serengeti and Its Implications for Ecosystem C," ed. Georgina M. Mace, *PLoS Biology* 7, no. 9 (September 29, 2009): e1000210, https://doi.org/10.1371/journal.pbio.1000210.

1.2 Standardized Benefit Metrics

Category	Metric	Estimated by the end of project lifetime	Section reference
GHG emission reductions or carbon dioxide removals	*Net estimated removals in the project area, measured against the without-project scenario*	69,550,943 metric tons CO_2e	2.1.1, 3.2.4
	Net estimated reductions in the project area, measured against the without-project scenario	0	3.1.3
Forest[29] cover	*For REDD[30] projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario*	Not applicable	N/A
	For ARR[31] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	Not applicable	N/A
Improved land management	*Number of hectares of existing production forest land in which IFM[32] practices are expected to occur as a result of project activities, measured against the without-project scenario*	Not applicable	N/A
	Number of hectares of non-forest land in which improved land management practices are expected to occur as a result of project activities, measured against the without-project scenario	1 million	2.1.1, 2.1.15

[29] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO, or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (VCS Program Definitions)
[30] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (VCS Program Definitions)
[31] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (VCS Program Definitions)
[32] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood, and fuelwood (VCS Program Definitions)

Training	*Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities*	234,239[33]	2.1.15, 2.3.7
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	114,968[34]	2.1.15, 2.3.7
Employment	*Total number of people expected to be employed in project activities[35], expressed as number of full-time employees[36]*	55	2.3.15, 2.3.7
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	10	2.3.15, 2.3.7
Livelihoods	*Total number of people expected to have improved livelihoods[37] or income generated as a result of project activities*	511,496[38]	2.1.15, 2.3.7
	Number of women expected to have improved livelihoods or income generated as a result of project activities	247,104[39]	2.1.15, 2.3.7
Health	*Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario*	511,496[40]	2.1.15, 2.3.7

[33] Estimated as 46% of the adult population of Maasai pastoralists according to household surveys.
[34] Estimated as 22.5% of the adult population of Maasai pastoralists according to household surveys.
[35] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.
[36] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])
[37] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. The Sustainable Livelihood Approach to Poverty Reduction. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.
[38] Estimated as the total rural population of Kajiado County.
[39] Estimated as 48% of the total rural population of Kajiado County based on household surveys.
[40] Estimated as the total rural population of Kajiado County.

	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	247,104[41]	2.1.15, 2.3.7
Education	*Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario*	277,256[42]	2.1.15, 2.3.7
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	132,779[43]	2.1.15, 2.3.7
Water	*Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario*	511,496[44]	2.1.15, 2.3.7
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	247,104[45]	2.1.15, 2.3.7
Well-being	*Total number of community members whose well-being[46] is expected to improve as a result of project activities*	511,496[47]	2.1.15, 2.3.7

[41] Estimated as 48% of the total rural population of Kajiado County based on household surveys.
[42] Estimated as 54% of the total rural population of Kajiado County based on household surveys. This is the proportion that is under the age of 18.
[43] Estimated as 26% of the total rural population of Kajiado County based on household surveys. This accounts for the female population under the age of 18.
[44] Estimated as the total rural population of Kajiado County.
[45] Estimated as 48% of the total rural population of Kajiado County based on household surveys.
[46] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.
[47] Estimated as the total rural population of Kajiado County.

	Number of women whose well-being is expected to improve as a result of project activities	247,104[48]	2.1.15, 2.3.7
Biodiversity conservation	*Expected change in the number of hectares managed significantly better by the project for biodiversity conservation[49], measured against the without-project scenario*	1,000,000	2.1.1, 2.1.15
	Expected number of globally Critically Endangered or Endangered species[50] benefiting from reduced threats as a result of project activities[51], measured against the without-project scenario	At least 8	5.1.1, 5.2.1

[48] Estimated as 48% of the total rural population of Kajiado County based on household surveys.
[49] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species
[50] Per IUCN's Red List of Threatened Species
[51] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 PROJECT DETAILS

2.1 Project Goals, Design and Long-Term Viability

2.1.1 Summary Description of the Project (VCS, 3.2, 3.6, 3.10, 3.11, 3.13, 3.14; CCB, G1.2)

The Kajiado Rangelands Carbon Project (KRCP), developed by Soils for the Future Africa (SftFA) in partnership with CarbonSolve, LLC, is an approximately 1.0-million-hectare soil carbon project in Kajiado County, Kenya, along the central part of the southern border with Tanzania. Importantly, it uses the same methodology as the validated Verra VCS-CCB Northern Kenya Grassland Carbon Project (#1082), the VM0032 methodology authored by Soils for the Future, LLC. As with the Northern Kenya project, the KRCP involves a two-tiered approach to monitoring project activities and resultant impacts by 1) tracking on-the-ground movements of livestock via grazing coordinators, and 2) remotely measuring the impacts of grazing on vegetation via satellite imagery.

Prior to the development of the KRCP, local pastoral Maasai were increasingly succumbing to the pressures of modern life that promotes sedentarization, often leading to reduced livestock mobility[52] and the decline in rangeland health due to overgrazing[53]. The project proponent will engage with local communities[54] to implement rapid rotational grazing (RRG)[55] practices that actively restore the production of perennial grasses, remove carbon dioxide (CO_2) from the atmosphere to soil organic carbon (SOC), and enhance biodiversity through restored rangeland health. The KRCP is expected to generate removals of 1.2 tons per hectare CO_2-e, which projected over an eventual ~1 million hectares gives an annual average of 1,203,728 tons CO_2-e and a total of 48,149,114 tons CO_2-e over 40 years (accounting for leakage).

The KRCP is also expected to accrue exceptional benefits in community adaptation to climate change, improved community well-being (in the form of pastoralists improving their lands to secure pastoral livelihoods), and increased biodiversity benefits (in the form of restored rangeland health and attendant benefits to IUCN Red List critically endangered or endangered species), similar to the outcomes

[52] Peacock, "Herd Movement on a Maasai Group Ranch in Relation to Traditional Organisation and Livestock Development."
[53] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[54] Local communities are either "registered communities" under the Kenya Community Lands Act of 2016, or aggregations of private landholders with title deeds to their land, such as privatized former Group Ranch lands organized as livestock "cooperatives" under the Kenya Co-operatives Act, Cap. 490 of 2005.
[55] Chaplot, Dlamini, and Chivenge, "Potential of Grassland Rehabilitation through High Density-Short Duration Grazing to Sequester Atmospheric Carbon."

documented in Northern Kenya[56,57]. The prolonged practice of RRG is expected to restore perennial grasses and other livestock forage, which will provide buffers against variable rainfall and reduce the need for long and risky migrations during droughts[58,59]. Access to deep-rooted perennial grasses and abundant soil carbon will increase the climate adaptability of local communities because soils with more carbon store more water and sustain greater forage production via improved nutrient cycling, which is especially important during dry periods[60]. Water retained in soils will have the added benefit of improving surface water availability and making intermittent water sources more reliable and longer-lasting, and protecting perennial water sources from vulnerability to extreme drought[61,62,63].

In addition, the project location straddles the crossroads between world-famous High Conservation Value protected areas: four Kenyan National Parks (Amboseli, Chyulu Hills, Tsavo, and Nairobi); one National Reserve (Maasai Mara); and four Tanzanian National Parks (Kilimanjaro, Arusha, Tarangire, and Serengeti). Restoration of perennial grasses and soil water storage capacity is also expected to bring important biodiversity benefits, particularly to herbivores negatively impacted by declining rangeland health. The KRCP is home to multiple species listed as Endangered or Critically Endangered by the International Union for Conservation of Nature (IUCN), including iconic African large herbivores such as the savanna elephant (*Loxodonta africana*) and the Masai giraffe (*Giraffa tippelskirchi*), as well as declining raptor species such as the Bateleur (*Terathopius ecaudatus*) and Rüppell's Vulture (*Gyps rueppellii*).

Threatened by the encroachment of crop agriculture, the Maasai rangelands that will be restored via the project activities are at the center of this project's theory of change. The more productive and sustainable the Maasai's grazing practices prove, the fewer the incentives to convert Maasai rangelands to other uses. The project is not located in a jurisdiction covered by a jurisdictional REDD+ program.

2.1.2 Audit History (VCS, 4.1)

Audit type	Period	Program	Validation/verification body name	Number of years

[56] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[57] Ritchie et al.; Mark E. Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12" (Verra Monitoring Report: CCB Version 3, VCS Version 3, August 29, 2023), https://registry.verra.org/app/projectDetail/VCS/1468.
[58] Apfelbaum et al., "Vegetation, Water Infiltration, and Soil Carbon Response to Adaptive Multi-Paddock and Conventional Grazing in Southeastern USA Ranches."
[59] Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12."
[60] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[61] Bossio et al., "The Role of Soil Carbon in Natural Climate Solutions."
[62] Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12."
[63] Mark E. Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," *agriRxiv* 2024 (February 20, 2024): 20240070662, https://doi.org/10.31220/agriRxiv.2024.00233.

Validation	(17-September-2024-- 04-August-2025)	VCS-CCB	Aster Global Environmental Solutions	One year

2.1.3 Sectoral Scope and Project Type (VCS, 3.2)

Sectoral scope	14: Agriculture, Forestry and Other Land Use
AFOLU project category [64]	Agricultural Land Management (ALM)
Project activity type	Grouped

2.1.4 Project Eligibility (VCS, 3.1, 3.6, 3.8, 3.18, 4.1; CCB Program Rules, 4.2.4, 4.6.4)

The project is eligible under the scope of the VCS and CCB Programs. This section provides the following information to describe and justify the project's eligibility:

- *VCS Scope*: The project activities are included under VCS Scope 14, affecting Kyoto Protocol greenhouse gases (GHGs) and reporting on changes in carbon dioxide, nitrous oxide and methane due to the project activity. Improved grazing management practices will increase the amount of organic carbon sequestered within soil. Thus, the project activity is Improved Grassland Management (IGM), an eligible Agriculture, Forestry, or Other Land Use (AFOLU) project category under Scope 14, Grassland and Rangeland Management (GRM).
- *Public comment*: The project underwent public comment 09 August 2024 – 08 September 2024 for the VCS pipeline listing (under validation) and CCB validation of the Kajiado Rangelands Carbon Project (project ID 4714). The opening meeting with the VVB was held on 12 September 2024.
- *Deadlines*: The project meets requirements related to all relevant deadlines. The project was listed as Under Development in the VCS pipeline within six months of the project start date. Validation will be completed within five years of the start date. The public comment period is described in the previous bullet.
- *Methodology*: The project uses approved a Verra VCS methodology (VM0032) to report these changes, as demonstrated in section 3.
- *Other eligibility*: The project area has not been cleared of indigenous vegetation within the decade prior to the start date. The project will not be implemented in wetlands or peatlands.

2.1.5 Transfer Project Eligibility (VCS, 3.23, Appendix 2)

The project is not a transfer project.

2.1.6 Project Design (VCS, 3.6)

Indicate if the project has been designed as:

[64] See Appendix 1 of the VCS Standard

☐ Single location or installation

☐ Multiple locations or project activity instances (but not a grouped project)

☒ Grouped project

2.1.6.1 Eligibility Criteria for Grouped Projects (VCS, 3.6; CCB, G1.14)

For the grouped project, eligibility is based on the project's design to only allow new project instances that:

- Apply the technologies or measures specified in the project description; in this case, new project instances will adopt and apply RRG grazing practices. The specifics of the RRG plans will be decided by communities through their traditional grazing management governance procedures (evaluation and recommendation by grazing committees) as has occurred in the initial project instances. Monitoring of RRG implementation will occur as outlined in the project description.
- Meet the applicability conditions set out in the methodology. For example, the addition of Project Area Instances (PAIs) will not cause the project to expand beyond the prescribed limits for project size, will not include land engaged in cultivation or fertilization, will not increase large areas (e.g. feedlots) with high deposition of dung and urine, and have governance mechanisms to discourage movement of livestock outside the project area.
- Feature the same baseline scenario; in this case, the baseline scenario across the project area is sedentary livestock behavior and continuous use of pastures for entire seasons, due to privatization and subdivision of rangelands. New project area instances will be demonstrated to share the same baseline scenario of continuous and uncoordinated livestock grazing as outlined in the project description.
- Would not shift to RRG without the project, as was the case for the initial instances for the project in the project geographic area. New PAIs will share characteristics with respect to additionality consistent with the initial instances; namely, financial and technical barriers that would make transition to RRG unfeasible without incentives from community revenue and training for grazing coordinators.
- Are subject to the same processes for stakeholder engagement, respect for rights to lands, territories and resources including free, prior, and informed consent (FPIC) described in the project document for the initial instances of the project.
- Agree to similar plans for monitoring livestock numbers and movement, changes in soil and vegetation, changes in biodiversity, and changes in human well-being.
- Occur within one of the designated geographic areas specified in the project description.

The process of expanding the group project is to engage with potential new PAIs in a full FPIC process, which is described fully below in Section 2.5.7 and can be briefly summarized as introductory meetings and consultation, signing of a Memorandum of Understanding, signing of Carbon Rights Transfer and Benefit-Sharing Agreements at a public meeting with a majority of the community, development of RRG Plans, and implementation of the plans.

New project instances will be included in the monitoring report with sufficient technical, financial, geographic, and other relevant information such that conformance with the eligibility criteria can be verified. Evidence verifying the date upon which project activity began will be documented, and will be demonstrated to begin not earlier than the grouped project start date. New project instances will not be enrolled in another VCS program, and will adhere to the clustering and capacity limit requirements as described in sections 3.6.8-3.6.9 of the VCS Standard.

Scalability limits are defined in the latest version of the CCB standards as the scale beyond which, if new project activities are added, the project may not generate net positive climate, community or biodiversity benefits, such as capacity limits, economic and managerial constraints, and thresholds for project expansion beyond which there may be negative impacts on communities and/or biodiversity. To the degree that scalability limits are applicable to this grouped project, the above six bullet points for project eligibility effectively determine the maximum scale to which the project could grow to pastoralist communities in Kenya (same baseline scenario, same traditional governance structures over grazing, applicability conditions of the methodology).

2.1.7 Project Proponent (VCS, 3.7; CCB, G1.1)

Organization name	Soils for the Future Africa Ltd
Contact person	Timothy H. Tear, Ph.D.
Title	Director
Address	276 Canco Rd., Suite 2, Portland, ME 04103, USA
Telephone	+1-518-898-8545
Email	info@sftfa.co.ke

2.1.8 Other Entities Involved in the Project

Organization name	CarbonSolve, LLC
Role in the project	Technical lead, climate benefits
Contact person	Mark Ritchie, Ph.D.
Title	Director
Address	23 Meadows Circle, Preston ID 83263 USA
Telephone	+1-315-447-1612
Email	mark.ritchie@carbonsolve.world

Organization name	Climate Asset Management as Portfolio Manager for the Nature Based Carbon Fund (NBCF) (Fund)
Role in the project	Investor
Contact person	Marthe Tollenaar
Title	Senior Asset Manager
Address	Hill House, 1 Little New Street, London, EC4A 3TR, United Kingdom
Telephone	+31 683 792 828
Email	marthe.tollenaar@climateassetmanagement.com

Organization name	Converge
Role in the project	Technical lead, community benefits
Contact person	Deepali Gohil
Title	Executive Director
Address	Westlands, Nairobi, Kenya
Telephone	+254 702 788 055
Email	gohil@convergecatalysts.com

Organization name	Biodiversity Research Institute
Role in the project	Technical lead, biodiversity benefits
Contact person	David Evers, Ph.D.
Title	Executive Director
Address	276 Canco Rd Portland, ME 04103 USA
Telephone	+1-207-653-7378
Email	david.evers@briwildlife.org

Initial Project Area Instances

The initial project area instances (PAIs) include Olgulului Trust, Eselenkei Cooperative, Shombole, Olkeri and Olkiramatian registered communities and the collection of 10 conservancies called RAMAT East that occupy lands of the former Mailua Group Ranch. While RAMAT East originally intended to join the project as a cooperative, community leaders followed a series of community meetings and produced an RRG plan in October 2023, which was then implemented in the various grazing zones of the Mailua Group Ranch. In 2024, the communities decided to organize instead into 10 conservancies, each corresponding approximately with the previous grazing zones. Though not all the 10 conservancies have signed benefit sharing agreements with the project yet, all of them have been implementing project activities since November 2023. Hence the RAMAT East Conservancies are collectively considered to be participating in the project, with four of the ten (Elesai, Murtuna, Oltepesi, and Osewan) considered as part of the initial PAIs of the project whose activities will be monitored and reported in the initial verification of carbon credit issuance.

Organization name	Olgulului Conservation and Development Company
Role in the project	Participating community
Contact person	Daniel Kiria Leturesh
Title	Chairman
Address	P.O. Box 388, Loitokitok, Kenya
Telephone	+254 721 392 296
Email	danielleturesh@gmail.com

Organization name	Eselenkei Group Ranch Cooperative Society
Role in the project	Participating community
Contact person	Jackson Lemomo Mereesi
Title	Chairman
Address	P.O. Box 399-90132, Sultan-Hamud, Kenya
Telephone	+254 726 078 085
Email	mereesi@yahoo.com

Organization name	Olkiramatian Community

Role in the project	Participating community
Contact person	Paul Koileken Senteu
Title	Chairman
Address	P.O. Box 20, Magadi, Kenya
Telephone	+254 724 957 742
Email	smartpkoileken@gmail.com

Organization name	Shompole Community
Role in the project	Participating community
Contact person	Joel Karori Sapiyaya
Title	Chairman
Address	P.O. Box 32, Magadi, Kenya
Telephone	+254 721 134 428
Email	Karorijoel93@gmail.com

Organization name	Olkeri Community
Role in the project	Participating community
Contact person	Thomas Kunumpe Metian
Title	Chairman
Address	P.O. Box 29, Magadi
Telephone	+254 719 470 665
Email	tometian@gmail.com

Organization name	RAMAT East Conservancies

Role in the project	Participating community
Contact person	Jacinta Kirisja
Title	Chairman
Address	Neighbours Initiative Alliance Building, Off Namanga Highway, Kajiado Town.
Telephone	0711654145
Email	jacintakirisia@gmail.com

2.1.9 Project Ownership (VCS, 3.2, 3.7, 3.10; CCB, G5.8)

Project ownership is established with those entities that have legal ownership and/or management authority over the land where RRG activities are being implemented to produce carbon credits. These entities include:

- Community Lands Act of 2016 – registered lands where communities hold collective legal ownership.
- Communities that have formed legal entities (e.g., cooperatives, businesses, trusts, or conservancies) if they did not register under the Community Land Act.
- Private individuals holding title deeds that document ownership of land not held by a collective.

Cooperative agreements are established between the project proponent and the participating communities and individuals who own the interest in the land and hold grazing management and carbon rights. These agreements are formalized through the following legal documents:

- Memorandum of Understanding (MOUs) between the project proponent and participating communities.
- Benefit Sharing and Transfer of Carbon Rights Agreements between the local communities and Soils for the Future Africa.

These documents serve as proof of project ownership, ensuring compliance with VCS specifications. Together with the property rights of the local communities and individuals, these agreements constitute:

“An enforceable and irrevocable agreement with the holder of the statutory, property, or contractual right in the land, vegetation, or conservational or management process that generates GHG emission reductions or removals which vests project ownership in the project proponent.”
-VCS Standard Version 4.7, Section 3.7.1

Initial Participating Areas (PAIs) Under Validation

The initial PAIs under validation include the following communities and conservancies:

- Olgulului Conservation and Development Company (hereafter referred to as Olgulului)

- Eselenkei Group Ranch Cooperative Society (hereafter referred to as Eselenkei)
- Shombole Community (hereafter referred to as Shombole)
- Olkeri Community (hereafter referred to as Olkeri)
- Olkiramatian Community (hereafter referred to as Olkiramatian)
- Four of the ten RAMAT East conservancies (Elesai, Murtuna, Oltepesi, and Osewan)

Evidence of Community & Biodiversity Benefits

In addition to project ownership, the project proponent is required to demonstrate that the project will or did generate the expected community and biodiversity benefits in conformance with CCB program requirements. This is supported by:

- Community & Biodiversity Monitoring Plans, which outline key metrics, methods, and results documenting how project activities contribute to community development and biodiversity conservation.
- Data from stakeholder interviews, participatory workshops, and independent field monitoring, which provide further validation of benefits generated by the project.

2.1.10 Project Start Date (VCS, 3.8)

Project start date	01 October 2023
Justification	As set out in the latest version of the VCS Standard, the project start date of an AFOLU project is the date on which activities that lead to the generation of reductions or removals are implemented. For this project, the project start date is defined by commencement of RRG activities in the initial PAIs, each of which signed a separate Rapid Rotational Grazing Plan on separate dates within 11 days (before or after) of 01 October 2023, which is selected as the representative start date for the initial PAIs as a group. The RRG for Olkeri Community is dated 25 September 2023, the RRG for Shombole Community is dated 25 September 2023, the RRG for Olkirimatian Community is dated 2 October 2023, the RRG for Olgulului Conservation and Development Company is dated 5 October 2023, and the RRG for Eselenkei Group Ranch Co-operative Society is dated 11 October 2023. The RRG for Mailua Group Ranch, which later became the RAMAT East conservancies, is dated 09 October 2023.

2.1.11 Benefits Assessment and Project Crediting Period (VCS, 3.9; CCB, G1.9)

Crediting period	40 years

Start date of first or fixed crediting period	01-October-2023 to 30-September-2063
CCB benefits assessment period	01-October-2023 to 30-September-2063

2.1.12 Differences in Assessment/Project Crediting Periods (CCB, G1.9)

There are no differences between the assessment periods for GHG emissions accounting, climate adaptive capacity and resilience, community, and biodiversity.

2.1.13 Project Scale and Estimated Reductions or Removals (VCS, 3.10)

☐ < 300,000 tCO_2e/year (project)

☒ ≥ 300,000 tCO_2e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO_2e)
Year 2024	465,189
Year 2025	741,137
Year 2026	1,401,140
Year 2027	1,809,283
Year 2028	1,809,283
Year 2029	1,809,283
Year 2030	1,809,283
Year 2031	1,809,283
Year 2032	1,809,283
Year 2033	1,809,283
Year 2034	1,809,283
Year 2035	1,809,283

Year 2036	1,809,283
Year 2037	1,809,283
Year 2038	1,809,283
Year 2039	1,809,283
Year 2040	1,809,283
Year 2041	1,809,283
Year 2042	1,809,283
Year 2043	1,809,283
Year 2044	1,809,283
Year 2045	1,809,283
Year 2046	1,809,283
Year 2047	1,809,283
Year 2048	1,809,283
Year 2049	1,809,283
Year 2050	1,809,283
Year 2051	1,809,283
Year 2052	1,809,283
Year 2053	1,809,283
Year 2054	1,809,283
Year 2055	1,809,283
Year 2056	1,809,283
Year 2057	1,809,283
Year 2058	1,809,283
Year 2059	1,809,283
Year 2060	1,809,283
Year 2061	1,809,283

Year 2062	1,809,283
Year 2063	1,809,283
Total estimated ERRs during the first or fixed crediting period	69,550,943
Total number of years	40
Average annual ERRs	1,738,773

2.1.14 Physical Parameters (CCB, G1.3)

The ecosystem type is arid to semiarid savanna grassland. The current and historical land use is mostly livestock grazing on open rangelands, with some protected areas where wildlife conservation and tourism are also practiced. Hunting is against the law in Kenya.

Topography:

The Great Rift Valley cuts north-south through the western half of Kajiado County and is occupied by lowland plains roughly 500 meters above sea level (asl) at its lowest points. The lowlands are notably broken by the Shompole volcano which rises above 1,500 meters asl near the Tanzanian border and Lake Natron. West of the Great Rift Valley, the highlands of the Nguruman Escarpment form the western boundary with neighboring Narok County, roughly 1,400 meters asl. In the north, the Ngong Hills top is 2,400 meters and descends to the Kitengela Plain on the outskirts of Nairobi and the border with Nairobi County. In the east lie the expansive Amboseli plains at roughly 1,200 meters asl, bounded by the Chyulu Hills which rise to 2000 meters asl at the eastern border with Makueni County. To the south the plains slope gently upward toward Kilimanjaro, reaching 2,000 meters asl at the Tanzanian border. The other southern topographic feature to note is the Namanga Hills which rise above 2,500 meters asl.

Soils:

The Kajiado County Government Spatial Plan[65] provides a general overview of soils in the project geographical area, while soil sampling data collected for this project provides detailed information on soil texture. Kajiado County and the project geographical area consist of four major types of soil: 1) Reddish-brown sandy loam soils are found in parts of the project area on the sub-Miocene volcanics and at the base of hills; these are comprised of 50-60% sand content and clay content varying from 15-35% based on this project's field measurements. In areas northwest of Mt. Kilimanjaro these soils have higher silt content from volcanic tephra deposits and feature substantial gullying and other evidence of water erosion. 2) Elsewhere the project area features lava plateaus, particularly east of Lake Magadi and west of the Nairobi-Namanga highway. These soils have a characteristically high proportion of rocks, are dark in color and have a relatively high (40-50%) clay content based on this project's field measurements, traits characteristic of relatively recent lava flows (< 3 million years old) in the process of degradation to soil. Their location can be seen on the geologic map of Kajiado County presented in

the Kajiado County Spatial Plan. 3) Much older lava flows in the eastern portion of the project area have poorly developed, shallow black cotton soils (vertisols) with high clay content that can be waterlogged during wet seasons. These black cotton soils comprise most of Kajiado County and are commonly formed on Basement rocks and older lava flows at the surface in the eastern parts 4) In Amboseli National Park itself, saline-sodic soils predominate in the low points of the endorheic (evaporative) basin.

Climate:

Most of Kajiado County is semi-arid, with mean annual rainfall ranging from 300 mm to 800 mm, with the wettest areas at higher elevations to the north. Most rainfall occurs during the two rainy seasons, the short rains in October-December and the long rains in March-May. Mean annual temperature also varies across the project area, from 18^{o}C in the higher elevations in the northern and central part of the project area, to nearly 24^{o}C in the Lake Magadi and Amboseli basins.

Hydrology:

The Kajiado County Spatial Plan provides a general overview of hydrological features in the project geographical area as well as information on hydrogeology. Major rivers include: the Tsavo River, which rises at the foot of Kilimanjaro and flows east into Taita-Taveta County; the Uasa Nyiro River, which flows south along the western side of the Rift Valley; and the Athi and Kitengela Rivers, which flow north into Machakos County. All other streams may be considered intermittent and lack year-round water; insufficient water during droughts can be devastating particularly to rural livestock herders in Kajiado County. Many borehole wells have been drilled to access groundwater, especially in central Kajiado County and in the southeast in the Kilimanjaro foothills; there are reliable year-round surface springs on the volcanic plains (Kajiado County Spatial Plan). The area's hills receive the most precipitation and are the major zones of river flow and of groundwater recharge, which is mostly to fractured bedrock aquifers – the biotite gneisses of the Basement rocks and the contact between the Basement rocks and volcanics (Kajiado County Spatial Plan). The Amboseli and Magadi endorheic basins are the dominant open water features of the Kajiado landscape.

Types of vegetation:

The climate and the alkaline volcanic-influenced soils support classic Vachellia (formerly Acacia) and Commiphora wooded savanna across the project area. Different taxa are dominant on different soils, with *Vachellia tortilis* dominant on more clayey sandy loam soils, *Commiphora trothae* on more sandy loams, *Vachellia senegal* on lava plateaus, and mixtures of *Vachellia seyal* and *Vachellia drepanolobium* on water-logged black cotton soils. Typical C4 savanna grass species assemblages (e.g., *Cenchrus ciliaris, Chloris gayana, Enteropogon macrostachyus, Eragrostis superba*) are found throughout the area.

The Kajiado County Spatial Plan[65] estimates that about 1.99 million hectares or 90% of Kajiado is under natural forage used for grazing. Forest area is only roughly 17,000 hectares or slightly under 1% of the total County area. Open grasslands are predominant around the Amboseli area and the Kitengela Plain in the north, while bush and woodland (woody cover 20-40%) predominate on the higher

elevations, with transitional wooded grasslands in between[65]. Only 7,117 hectares of the County (less than 1%) is in agricultural production. Of that, 6,000 hectares is irrigation-fed by river and groundwater sources; the rest is rain-fed[65].

2.1.15 Social Parameters (VCS, 3.18; CCB, G1.3)

County-level information on social parameters from the Kajiado County Spatial Plan is presented here to provide context for the project geographical area, and information on social parameters specific to the project geographical area is provided where available (and noted where not available).

In 2019, per Kenya census data, Kajiado County had a population of 1.1 million (see table below). Of these, 606,344 people lived in major towns in the county such as Ngong, Ongata Rongai, Kitengela, Kiserian (all in the Nairobi outskirts), Kajiado, Oloitokitok, and Namanga. The county is divided into sub-counties that differ significantly in population size (range 64,214-306,596). Exact figures for the population of the project geographical area are not available, but most of the rural area of Kajiado County is included within the project geographical area; furthermore, residents of larger towns are necessarily excluded, and the protected areas do not have permanent residents; therefore, the rural population of 511,496 from the Kajiado County Spatial Plan[65] is taken as the best available figure for the population of the project geographical area.

Table 2-1: Kajiado County population estimates.[65]

Sub-county	Population	Division	Location	Sub Location
Isinya	210,473	2	9	18
Kajiado Central	161,862	5	35	69
Kajiado North	306,596	4	30	72
Kajiado West	82,849	n/a	n/a	n/a
Loitokitok	191,846	4	16	34
Mashuuru	64,214	2	11	19
Total	1,117,840	17	101	212

The Kajiado County population follows a global average of 51% female (560,704), but in household surveys for this project (respondents in the initial PAIs), the population was 48% female. At the County level, there are an estimated 316,179 households with an average size of 3.5 person per household and a population density of 51 people per square kilometer. Household surveys of initial PAIs indicate virtually all respondents identify as Maasai. Almost 18% of the Kajiado County population has never been to school, with 11% dropping out of school at some stage. 38% of the population are currently in

[65] Munene, Evans (4 November 2019). "2019 Kenya Population and Housing Census Results". Kenya National Bureau of Statistics. Retrieved 27 May 2020. Available at https://www.knbs.or.ke/?p=5621.

school and 31% have completed some level of education (mostly primary school). The household survey data from this project indicates that the literacy rate among project communities is 35.5%.

Health facilities in Kajiado County are still lagging behind international standards, with a doctor to population ratio of 1:26,094, a public health staff ratio of 1:7,619, and a nurse ratio of 1:1,068[66]. Health statistics are not available specific to the project geographical area. As for health care facilities, government facilities are far exceeded by private institutions (see table below). Health facility information specific to the project geographical area is not available at this time.

Table 2-2: Health facilities in Kajiado County by ownership[67].

	Government	FBO	Private	NGO	TOTAL
Hospitals	4	1	10	16	41
Health centers	16	6	20	3	45
Dispensaries	74	13	4	2	93
Clinics	1	2	149	7	159
Total	95	22	183	28	338

The poverty level in Kajiado was estimated to be 11.6%, well below the national average of 45.9%[68]. Access to nutrition was measured in household surveys in the initial PAIs using indicators of whether respondents have had access to meat in their households in the past week (44% had not) or access to milk in their households in the past 24 hours (59% had not).

The 2019 Kajiado County Spatial Plan[69] estimates that about 1,989,200 ha (90% of the County) is under natural forage and is used for extensive livestock production in group and individual ranches. It also identifies Maasai pastoralism as the main source of livelihoods in the county's rural areas. The largest conservation area is Amboseli National Park, which is entirely contained within Kajiado County and borders the project geographical area. Numerous private conservancies also provide a degree of open space protection and conservation planning, such as the Amboseli Ecosystem Trust which encompasses 17 conservancies around Amboseli National Park (which are included within the project geographical area). These conservancies are grazed by livestock and inhabited by dispersed rural population but are less threatened by development and land use change than if they were not designated as conservancies.

This area supports 70% of the rural human population estimated at 224,560 people, nearly all the wildlife in the district and an estimated 513,633 stock units. At the time of the Kajiado County Spatial

[66] "Kajiado County Integrated Development Plan CIDP 2018-2022". *Kajiado County Government*. Retrieved 27 May 2020.
[67] Education, Vocational Training, Youth and Sports – County Government of Kajiado". Retrieved 27 May 2020
[68] Wikipedia https://en.wikipedia.org/wiki/Kajiado_County#cite_note-:2-12
[69] "2019-2029 Kajiado County Spatial Plan" (County Government of Kajiado, October 2019), https://www.kajiado.go.ke/download/kajiado-county-spatial-plan-2019-2029/.

Plan's[65] publication there were 51 group ranches (though the group ranches are in stages of devolution) and over 375 individual ranches. The group ranches occupy 1,520,917 ha (68.8%) of the grazing land and individual ranches occupy 468,283 ha (21.20%) of the grazing land area.

2.1.16 Project Zone Map and Project Location (VCS, 3.11, 3.18; CCB, G1.4-7, G1.13, CM1.2, B1.2)

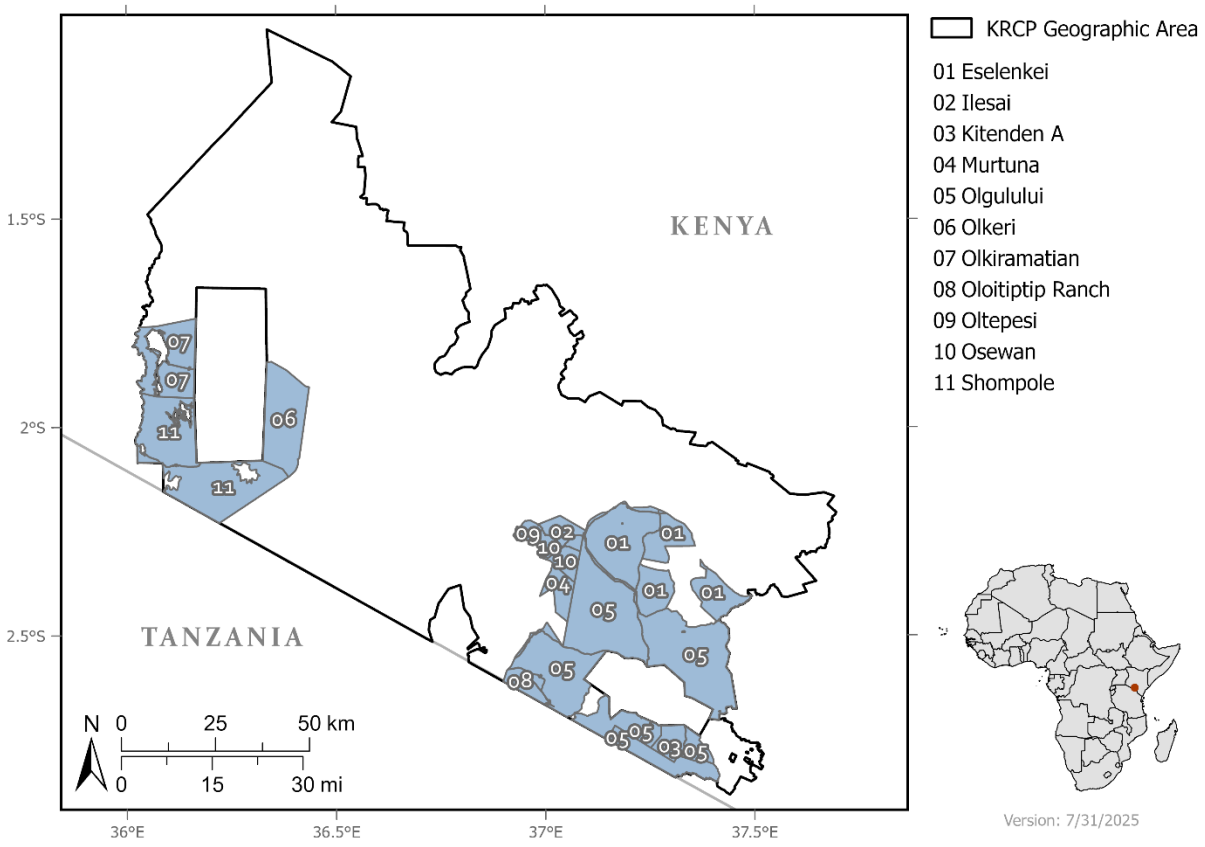


Figure 2.1: Map of the Kajiado Rangelands Carbon Project (KRCP) Project Geographical Area and anticipated participating communities (arrows and labels), depicting initial and expected future project area instances and the year in which we expect their first verification of activities.

The project will occur in Kajiado County, Kenya, in all the districts (or divisions) in the county, including Namanga, Central, Magadi, Loitokitok, Mashuru, and Ngong. As indicated in Figure 2-1, communities are expected to join the project over the years 2023 – 2026, with corresponding first verification years 2024 – 2027. The **project geographical area**, from which these communities will enlist in the project, entails 1,612,213 ha.

Spatially identifiable high conservation values (HCVs) are shown in Figure 2-2 below. The project zone has no identifiable boundaries, as historically, livestock have ranged south into Tanzania and used protected areas in Kenya such as Amboseli, Chyulu Hills and Tsavo national Parks during extreme

droughts. Protected areas in both Kenya and Tanzania are sources of wildlife that support tourism activities.

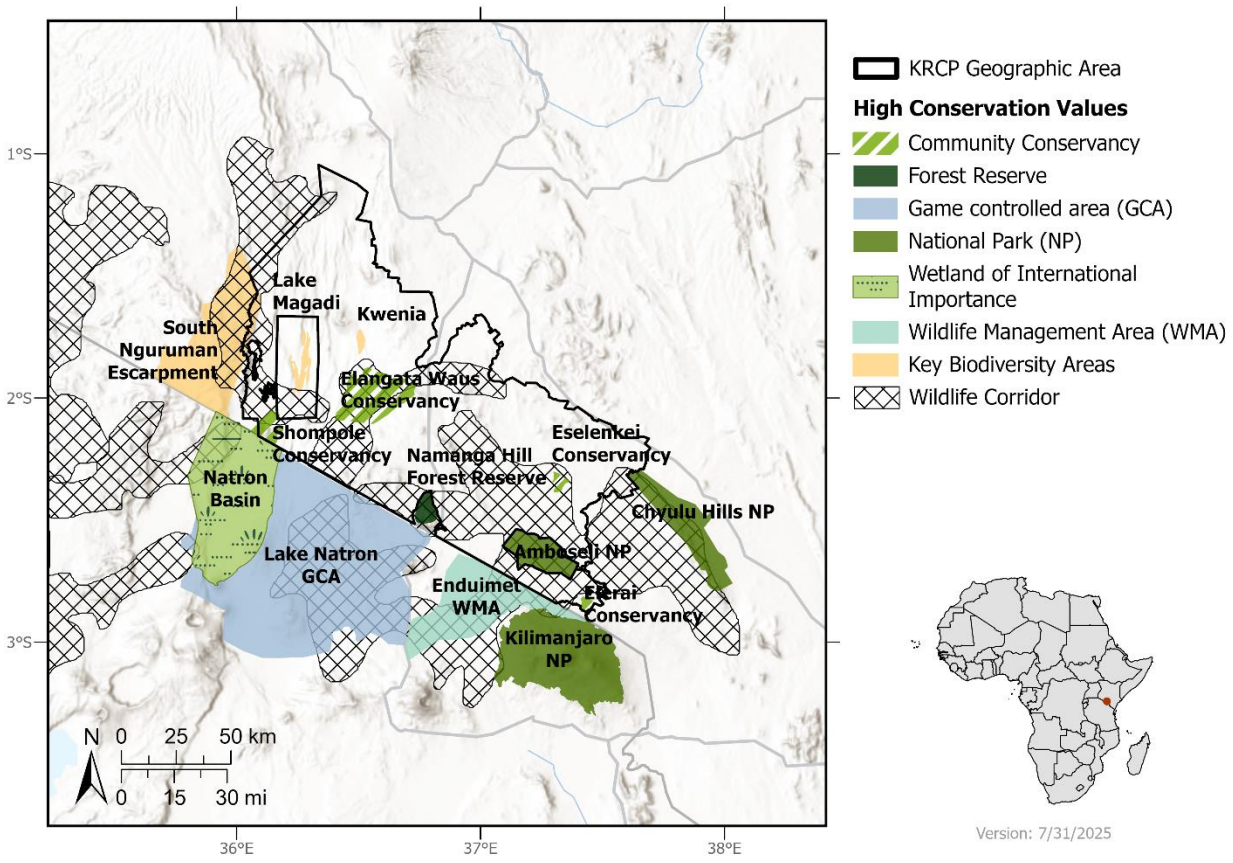


Figure 2-2: The project geographical area with spatially identifiable high conservation values (HCVs; see Sections 4.1.3 and 5.1.2). The entire project geographical area is conterminous with Community HCV 1, which represents open, connected grasslands supporting Maasai pastoralism. This HCV is essential for sustaining traditional grazing systems, which in turn support water access by maintaining functional rangelands and reducing the need for over-extraction from key water sources. Community HCV 2 is depicted by Amboseli NP and the wildlife corridors connecting Amboseli to other nearby protected areas, which provide critical habitat for wildlife and support community livelihoods through tourism-related income. Biodiversity HCVs are also located on the map. These spatially identified HCVs align with the project's efforts to enhance both pastoral and conservation objectives.

2.1.17 Project Activities and Theory of Change (VCS, 3.6; CCB, G1.8)

The principal project activity is a widespread implementation of RRG[70] of livestock in the participating communities (former Group Ranches) in Kajiado County. Under coordinated grazing plans, livestock will be grouped and moved subject to local day-to-day movement decisions by herders within constraints that follow this set of concepts from rest-rotation grazing and holistic management:

1. Animals will be actively herded and moved to new forage throughout a day and from day to day.

[70] Chaplot, Dlamini, and Chivenge, "Potential of Grassland Rehabilitation through High Density-Short Duration Grazing to Sequester Atmospheric Carbon."

2. Animals will not graze the same location more than once within a wet season or once within a dry season.

3. Animals will be moved to a new site once available forage has been grazed to an average height of ~5 cm (also approximated as the length of your thumb, width of four fingers or your palm).

4. Animal herds will be moved across the landscape to avoid over-use of areas near settlements or water points.

5. Some areas will be rested for one year to allow recovery from past grazing or to provide grass banks during the dry season or droughts, but different areas will be rested each year to provide animal impacts and re-establishment of a diverse plant assemblage in all areas.

6. Herders follow agreed-upon plans for the livestock movement from grazing committees headed by community elders. Grazing coordinators employed by the project will monitor and advise herders in the field.

The theory of change (see Figure 2-3 and Appendix 2 for the full table) that guides the KRCP and other CarbonSolve rangelands carbon projects is that restoring rangelands via RRG is the most effective way to restore soil organic matter content, increase the productive capacity of land, and lift water tables. These improvements enhance the viability of Maasai pastoralist culture, traditional knowledge, and land use practices, reduce land conversion pressures, and increase rangelands' economic value by improving vegetation conditions and forage availability.

To ensure consistency in the identification of community-related HCVs, Figure 2-2 presents a spatial representation of the project geographical area, illustrating the boundaries of Community HCV 1 (Open, Connected Grasslands that Support Maasai Pastoralism) and Community HCV 2 (Amboseli Ecosystem for Wildlife Conservation and Tourism Income). The entire project area is conterminous with Community HCV 1, which encompasses the critical rangelands supporting Maasai pastoralism. These lands provide essential ecosystem services, including forage availability and improved water access as a secondary benefit of sustainable rangeland management. Community HCV 2 is represented by Amboseli National Park and its associated wildlife corridors, which provide vital habitat for wildlife and serve as the foundation for community-based tourism income.

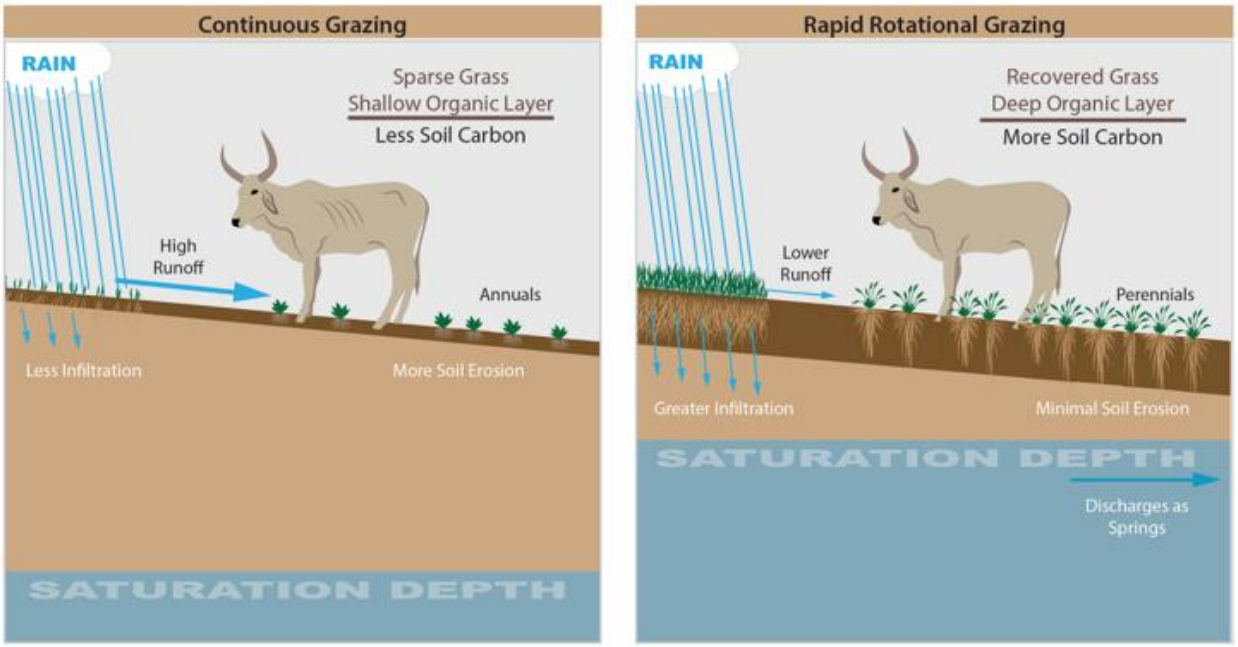


Figure 2-2: CarbonSolve's conceptual diagram of the ecological benefits of shifting from continuous grazing (left panel) to rotational grazing (right panel).

Keeping rangelands healthy and productive will strengthen local communities and cultures while enhancing ecosystem services, including GHG removals, biodiversity conservation, and community resilience. Carbon revenue is only one form of monetizing these improved ecosystem services, but it serves as a critical catalyst by removing significant barriers to implementing RRG.

2.1.18 Sustainable Development Contributions (VCS, 3.17)

Kenya is a signatory to the UN Sustainable Development Goals. Through implementation of RRG, carbon revenues from the project activities will be generated and used by participating communities for their own self-determined priorities with anticipated reduction in poverty and hunger, and increased community health, gender equity, climate action, ecological integrity, and peace. The benefits of project activities address SDGs 1,2, 5, 13, 15, and 16, with SDG 2 (eradicating hunger) and SDG 16 (inclusive growth) directly addressing Kenya's BETA priorities [71]. There are no provisions for monitoring and reporting Kenya's BETA priorities.

UN Sustainable Development Goal	Project Contributions to Goal
1 No Poverty	The project will contribute to reducing poverty in local communities. RRG will enhance livestock production and animal health, which will augment an existing revenue stream from livestock production on local rangelands.
2 Zero Hunger	The project will promote sustainable agriculture through implementation of RRG, which will strengthen food security by decreasing the likelihood of

[71] https://hlpf.un.org/sites/default/files/vnrs/2024/VNR%202024%20Kenya%20Report.pdf

	livestock loss during drought and providing sustained meat and milk production through the dry season.
5 Gender Equality	Through progress related to the other sustainable development goals, including food security, education, and health care, opportunities for women and girls will be expanded and gender equality will be improved. The project will closely follow the expectations for Free, Prior, and Informed Consent (FPIC) in Kenya law, which specify that two thirds of community members approve (via signature following a community meeting) the conduct and financial agreements of the project, and of these at least one third of which must be by women. The project will also employ women in various roles and will engage women in local grazing plans for small livestock kept at home to feed family members.
13 Climate Action	This project takes urgent action to combat climate change by implementing RRG, which will allow recovery of perennial grasses and restore soil organic carbon while sequestering CO_2e from the atmosphere through resulting increases in soil carbon sequestration.
15 Life on Land	RRG implemented by this project will protect, restore, and promote sustainable use of terrestrial ecosystems in local communities by facilitating vegetation and soil changes. These activities will result in increasing the productivity of degraded rangelands and support greater livestock production and wildlife/biodiversity resources. Collectively, this will enhance this region's role as a High Conservation Value Area for various declining migratory savannah species such as wildebeest, zebra, Masai giraffe, and savannah elephant as well as large carnivores such as lion, cheetah, leopard, wild dog, spotted and striped hyaena.
16 Peace, Justice and Strong Institutions	RRG will necessitate and foster collaboration across local communities, promoting peaceful and inclusive societies for sustainable development. Regional grazing plans will be developed in close collaboration with village councils and other local community members. Similar grazing plans in other projects have reduced tensions between political entities and ethnic groups and fostered better collaboration among neighboring communities.

2.1.19 Implementation Schedule (CCB, G1.9)

Date	Milestone(s) in the project's development and implementation
12 December 2021	Introductory meetings (MOU signings) begin with initial PAIs
1 October 2023	Project start date for initial PAIs and start date for GHG accounting period
March-October 2023	Project baseline data collected

25 September 2023 to 11 October 2023	Initial implementation of planned grazing
April-May 2023	Baseline biodiversity monitoring
Jan-June 2023	Baseline community monitoring
July 2024	Submission of PD for initial Validation
October 2024	Validation First Site Review
April 2025	Submission of PD for initial verification
May 2025	Site visit for initial verification
Quarterly beginning Q4 2023	Project-wide Grazing Planning Process and Grazing Implementation Report (project activity monitoring)
Annually beginning 2025	Annual verification
Annually beginning 2025	Monitoring Report for climate, community, and biodiversity at verification
30 September 2063	End date for project activities and GHG accounting period

2.1.20 Risks to the Project (CCB, G1.10)

Identified Risk	Potential impact of risk on climate, community and/or biodiversity benefits	Actions needed and designed to mitigate the risk
Nature risk: severe drought	Decreased perennial grass growth/forage production, decreased available water for livestock. Large-scale movement of livestock to areas outside the project area.	Rapidly build areas of restored perennial grasses that are resilient to drought and provide a forage base even in the case of severe drought.
Nature risk: increased fire	Occurrence of wildfire is expected to increase as vegetation conditions improve and the amount of standing herbaceous biomass increases. The risk to climate benefits is that this factor goes unmonitored.	Fire monitoring in the baseline and project scenario is treated extensively in the monitoring plan. Fire occurrence can be accurately measured from satellite imagery and incorporated into future re-baselining of the net removals calculation.

Community participation risk	Widespread dropout from RRG, blunting the restorative impact of the planned implementation.	Ensure that the economic benefits of the carbon revenues and better forage quality of restored grasslands are effectively communicated.
Political risk	Increased lack of support for communal grazing areas necessary for sustaining the livelihood of pastoral communities.	Continue to engage with officials at the County and national levels to educate and advocate for how the KRCP goals and objectives align with long-term development goals as stated in current planning and policy documents (Kajiado County Spatial Plan and UN SDGs), and for continued future alignment.

2.1.21 Benefit Permanence (CCB, G1.11)

The project is designed to ensure the long-term sustainability of climate, community, and biodiversity benefits even after the formal project period ends. To achieve this, the project has implemented specific measures that will maintain and enhance these benefits independently of carbon revenues.

1. **Climate Benefits & Land Productivity Enhancement**
    a. The restoration of perennial grasses and improved soil carbon sequestration will create self-sustaining ecological systems that increase land productivity and reduce soil degradation beyond the project lifetime.
    b. The project has implemented a long-term training and capacity-building program to institutionalize RRG practices among pastoralist communities. These training programs ensure that RRG is embedded as a standard land management practice, rather than being dependent on project-driven interventions.
    c. To further secure these benefits, the project collaborates with local and regional government agencies to integrate sustainable grazing practices into land-use policies and community conservation frameworks.

2. **Community Benefits & Sustainable Livelihoods**
    a. Strengthened traditional pastoral governance structures: The project is enhancing the capacity of grazing communities and integrating them into registered communities and livestock cooperatives to ensure that they continue functioning as independent governance bodies beyond the project's duration.
    b. Livelihood diversification strategies have been incorporated to reduce dependency on carbon revenue, including:
        i. Improved livestock health programs, enabling communities to maximize the benefits of increased rangeland productivity.

ii. Strengthening market access for sustainably managed livestock, supporting economic resilience for herders.
iii. Training programs in sustainable tourism management, allowing communities to benefit from expanding wildlife-based income opportunities.

c. A Community-Led Grazing Management Plan has been developed to serve as a long-term guide for grazing committee decisions, ensuring that best practices persist beyond the project's lifetime.

3. **Biodiversity & Conservation Benefits**
   a. The restoration of rangelands enhances wildlife habitats, increasing biodiversity resilience. The project has introduced wildlife-friendly land-use planning strategies that communities have formally adopted, securing conservation gains for the long term.
   b. The expansion of Wildlife Conservancies and structured partnerships with tourism operators will continue to provide sustained financial incentives for conservation activities beyond the project's operational period.
   c. The project has supported legal recognition and documentation of community conservation areas, ensuring that conservation land-use commitments remain enforceable after the project ends.
   d. The project has initiated a biodiversity monitoring framework that can be maintained by local conservation groups, ensuring continued tracking of key species and habitat conditions beyond the project's lifetime.

2.1.22 Financial Sustainability (CCB, G1.12)

Project funding is established through an emissions reduction purchase agreement (ERPA) with **the Fund** (see Section 2.1.8, other entities involved in the project). An ERPA is a legally binding contract that entails delivery of verified carbon credits from one party (in this case, the project proponent), to another (the Fund). The ERPA is for 15 years. The project is expected to be self-sustainable after year 4. The ERPA includes benefit sharing mechanisms with participating group ranches and communities to encourage participation. The project has provided a confidential financial model to the validator that demonstrates that the financial mechanisms adopted provide an adequate actual and projected flow of funds for project implementation and to achieve the project's climate, community, and biodiversity benefits, and also demonstrates projected revenues from carbon dioxide removals that substantiate the projection of self-sustainability after year 4.

2.2 Without-project Land Use Scenario and Additionality

2.2.1 Conditions Prior to Project Initiation and Land Use Scenarios without the Project (VCS, 3.13; CCB, G2.1)

In southern Kenya, traditional nomadic movements of family groups prior to 1960 have been gradually replaced by sedentary grazing practices, where communities continuously graze surrounding rangeland. This shift has contributed to widespread land degradation, including large areas of bare

ground, soil erosion, diminished forage availability, and declining livestock productivity. Changes to Kenya's land tenure system, particularly the Community Lands Act of 2016 (CLA), have further promoted privatization of formerly communal grazing lands. Land ownership, combined with food insecurity resulting from severe droughts in 2017-18 and 2021-23[72,73], has encouraged the sale of private parcels, further eroding the capacity of Maasai communities to sustain pastoralism, their traditional lifestyle. Without the project, rangeland degradation is expected to continue due to a combination of overgrazing, population growth, restricted access to grazing lands, and land fragmentation[74,75,76]. Overgrazing in the region has depleted soil organic matter, reduced perennial vegetation cover, and increased bare ground, which in turn diminishes forage availability and disrupts the rangeland ecosystem[77,78]. This process contributes to greenhouse gas emissions and the loss of soil carbon, a common pattern across semiarid rangelands worldwide[79].

The project area is characterized by arid to semiarid savanna grassland with a distinct dry and wet season. The region experiences bimodal rainfall, with long rains occurring between March and May and short rains between October and December. However, rainfall is highly variable and unpredictable, leading to frequent droughts that exacerbate land degradation and reduce forage availability. Annual precipitation ranges between 300-800 mm and evapotranspiration rates exceed precipitation, contributing to persistent water scarcity. Hydrologically, water sources in the project area include seasonal rivers, ephemeral streams, and groundwater wells, with surface water availability largely dependent on rainfall. Limited water access is a major constraint for pastoralist communities, particularly during the dry season.

Topographically, the landscape consists of low-lying plains interspersed with hills and volcanic formations, with elevations ranging from 1,000 to 2,5000 meters above sea level. This terrain influences water retention, grazing distribution, and soil erosion rates. The region's soils are predominantly sandy loams and clay-rich vertisols, which have low organic matter content due to continuous overgrazing and the loss of vegetative cover. Soil compaction and erosion are common, further reducing the ability of the land to retain moisture and support plant growth. The dominant vegetation consists of Acacia-dominated savanna, perennial and annual grasses, and shrubs. However, overgrazing and land degradation have led to the encroachment of unpalatable species and a shift from perennial to annual vegetation, which further destabilizes the ecosystem and reduces rangeland productivity.

Without intervention, land degradation is projected to worsen due to increased grazing pressure, land tenure changes, and climate variability. Continued land fragmentation and privatization will reduce available communal grazing areas, forcing pastoralists to overgraze remaining lands. Declining soil health and vegetation cover will further reduce forage availability, leading to weakened livestock productivity and economic hardship. The increasing frequency and intensity of droughts will exacerbate

[72] Government of the Republic of Kenya, "National Climate Change Action Plan 2018-2022" (Ministry of Environment and Forestry, Nairobi, 2018), https://rise.esmap.org/data/files/library/kenya/Clean%20Cooking/Kenya_NCCAP_2018-2022.pdf.
[73] J Kimutai et al., "Human-Induced Climate Change Increased Drought Severity in Horn of Africa" (Imperial College London, April 26, 2023), https://doi.org/10.25561/103482.

food insecurity and increase the likelihood of forced land sales and shifts toward non-pastoral livelihoods. The baseline scenario remains consistent with the conditions observed prior to project implementation. For additional details on current land use and baseline conditions, refer to Section 3.1.4 (Baseline Scenario).

2.2.2 Most-Likely Scenario Justification (CCB, G2.1)

In accordance with the VM0032 methodology, the baseline scenario for these rangelands in the project area is simply the existing or recent historical grazing and fire (or lack thereof) regime, under the assumption that this grazing and fire regime would continue in the absence of this project. This assumption is justified in the barriers analysis in Section 3.1.5.2. Briefly, there are high barriers to change for all scenarios that do not continue business as usual, and these barriers are what make the existing land use management the most likely to continue without this carbon project.

The baseline scenario of continuous, uncoordinated grazing is expected to continue in the absence of a carbon project across two alternative land tenure pathways inclusive of all project area instances. The project area is situated in a key rangeland zone in which former communal lands have been privatized, livestock are increasingly less mobile, and grasslands and savannas are being converted to croplands [79]. Kenyan government policy has encouraged the subdivision and privatization of communal grazing lands, and privatization occurred in some former Group Ranches as long ago as the 1980s. A common effect of subdivision is that livestock are managed on small parcels, each of which is vulnerable to the high spatial variation in annual rainfall characteristic of African savanna regions[74,75,76]. High livestock mortality during drought that results from the inability to migrate to water and pasture may compel landowners to sell their parcels or convert their land use to crop agriculture[77,78]. These trends have only been amplified by passage of the Kenya Community Lands Act of 2016, which has spurred formerly communal Group Ranches to subdivide and privatize under the common perception that registering lands under the Act will make land ownership uncertain and subject to government control[79].

[74] Romina Martin et al., "How Much Climate Change Can Pastoral Livelihoods Tolerate? Modelling Rangeland Use and Evaluating Risk," *Global Environmental Change* 24 (January 2014): 183–92, https://doi.org/10.1016/j.gloenvcha.2013.09.009.
[75] Matthew D. Turner, John G. McPeak, and Augustine Ayantunde, "The Role of Livestock Mobility in the Livelihood Strategies of Rural Peoples in Semi-Arid West Africa," *Human Ecology* 42, no. 2 (April 2014): 231–47, https://doi.org/10.1007/s10745-013-9636-2.
[76] Leif Brottem et al., "Biophysical Variability and Pastoral Rights to Resources: West African Transhumance Revisited," *Human Ecology* 42, no. 3 (June 2014): 351–65, https://doi.org/10.1007/s10745-014-9640-1.
[77] Virginia Ng'endo Kinuthia and Raphael Githaiga Wahome, "Attitudes on Land-Use Systems and Social Mindset Transformations after Group Ranch Subdivision in Kenya," *Land Use Policy* 87 (September 2019): 104004, https://doi.org/10.1016/j.landusepol.2019.05.023.
[78] Randall B. Boone et al., "Quantifying Declines in Livestock Due to Land Subdivision," *Rangeland Ecology and Management* 58, no. 5 (September 2005): 523–32, https://doi.org/10.2111/1551-5028(2005)58[523:QDILDT]2.0.CO;2.
[79] Rahma Hassan, Iben Nathan, and Karuti Kanyinga, "Will Community Rights Secure Pastoralists' Access to Land? The Community Land Act in Kenya and Its Implications for Samburu Pastoralists," *The*

For lands registered as communities under the Kenya Community Lands Act of 2016, communal grazing is the business-as-usual scenarioOrganizing livestock into smaller, denser aggregations to implement RRG is, as described by a community leader in one of the initial participating communities, "beyond our ability to achieve without the incentives of community revenues and the training from project personnel (grazing coordinators)." For privatized former Group Ranches that have formed livestock cooperatives, the most likely scenario is that pastoral rangelands will decrease as individual parcels are sold off over time to non-pastoralists for conversion to farmland. Livestock-keeping in remaining parcels will be focused on grazing in small parcels that are easily overgrazed. In the case of both communal grazing within communities, wherein livestock are moved short distances from permanent residences, and grazing within livestock cooperatives, wherein grazing is constrained to small parcels, the result is continuous and uncoordinated grazing.

Under continuous, uncoordinated grazing, productive capacity of land and use for wildlife conservation and livestock-keeping is expected to decrease, as suggested by analysis of trends in a satellite-based index, Normalized Difference Vegetation Index (NDVI), a metric commonly used to assess "greenness" from the density of chlorophyll present in live plants across large landscapes every 16 days.

Evidence that the current land use scenario of seasonal or continuous grazing from mostly permanent settlements will lead to further degradation is presented in Figure 2-3. As expected, NDVI was positively correlated with annual rainfall (Panel A), and rainfall-corrected NDVI (the residual of the regression in Panel A) declined nearly significantly (P = 0.11) with year during the pre-project period (Panel B). This negative trend occurred despite an increasing trend in annual rainfall during the pre-project period (Panel C), implying that the negative trend in the residuals was not driven by decreases in annual rainfall during the pre-project period.

Journal of Peasant Studies 50, no. 5 (July 29, 2023): 1735–56, https://doi.org/10.1080/03066150.2022.2119847.

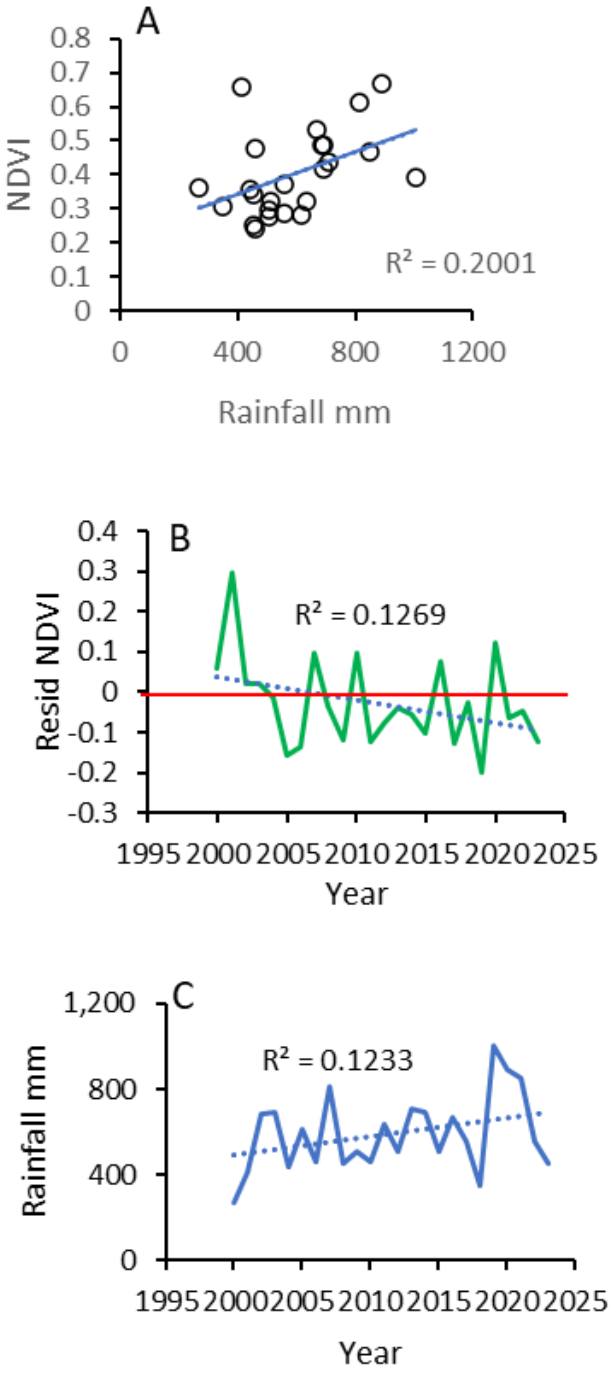


Figure 2-3. NDVI in the KRCP Geographical Area over the 22 years prior to project start. **A.** January NDVI, an index of the amount of green vegetation/area derived from satellite reflectance data, is significantly, though weakly correlated with rainfall in the previous year. **B.** The residual of the regression in A, "Resid NDVI" shows that NDVI measures shifted significantly from greater than that expected from rainfall to less than that expected from rainfall over the pre-project period. This negative trend in rainfall-corrected NDVI occurred despite **C.** an increasing trend in average annual rainfall during the pre-project period.

Against this backdrop of ongoing rangeland degradation associated with land tenure and land use change, the project activities offer a clear departure from baseline practices and livelihood vulnerabilities. Thus, the project provides additionality to both soil carbon and change in the organization and conduct of livestock management, the trend in land productivity, and the likelihood of broadly distributed benefits in access to education, health care and livestock markets. We expect registered community lands to become organized in the movements of their livestock and more efficiently use the larger communal rangelands they have registered. We expect privatized former group ranches to aggregate access to their private lands through participation in livestock cooperatives, which also provides a mechanism to aggregate and transfer their carbon rights collectively. Such aggregation partially restores the communal nature of livestock management associated with pre-independence traditional practices while working within the new land tenure structure of privatized smallholdings.

2.2.3 Community and Biodiversity Additionality (CCB, G2.2)

The community and biodiversity benefits of the project derive from the same ecological changes that provide the climate benefit – the restoration of deep-rooted perennial grasses and soil carbon brought about by RRG. Under the baseline scenario, the rangelands will continue to degrade and the risk of conversion to other land uses will rise, furthering risk to the persistence of Maasai culture, degraded habitats, and barriers to migrating herbivores upon which the biodiversity of the project area depends (see Section 2.2.2 for details).

Ongoing degradation also threatens biodiversity of both large "trigger" wildlife species, such as raptors (including vultures), and large mammalian herbivores and carnivores, as well as other associated fauna, such as grasshoppers, dung beetles and Passerine birds. The functional outcomes of RRG will produce additional benefits for biodiversity by (1) restoring wildlife habitats or (2) provide funding for direct intervention in the form of programs that address both human-wildlife conflict and collateral damage to non-targeted species. For example, we intend to support programs that offer alternative predator control strategies to poisoning that increase survival of multiple mammalian carnivore and vulture species[80],[81].

Additionality Justification

While some conservancies and community-led grass banks exist within the initial PAIs, these efforts are limited in scale, coverage, and sustainability due to financial, technical, and governance barriers. Existing initiatives typically rely on short-term funding, lack integrated management strategies, and are not sufficiently coordinated across the landscape to achieve large-scale ecological restoration. The KRCP provides an additional layer of structured and long-term funding, enabling a landscape-scale approach to conservation and sustainable grazing practices that would not otherwise be achievable.

[80] Sonja C. Krüger et al., "Old World Vultures Reflect Effects of Environmental Pollutants Through Human Encroachment," *Environmental Toxicology and Chemistry* 41, no. 7 (July 2022): 1586–1603, https://doi.org/10.1002/etc.5358.
[81] Zahra Didarali et al., "Awareness of Environmental Legislation as a Deterrent for Wildlife Crime: A Case with Masaai Pastoralists, Poison Use and the Kenya Wildlife Act," *Ambio* 51, no. 7 (July 2022): 1632–42, https://doi.org/10.1007/s13280-021-01695-8.

Without the KRCP, current conservation efforts would remain fragmented and would not have the scope or resources to sustain the ecosystem-wide benefits the project aims to provide.

Governance & Regulatory Context

Existing laws, regulations, and governance arrangements in Kenya provide some legal recognition of community land rights (e.g., Community Land Act, 2016), wildlife conservation efforts (e.g., Wildlife Conservation and Management Act, 2013), and environmental protection policies (e.g., Environmental Management and Coordination Act, 1999). However, there is a lack of enforcement and inadequate governance structures to ensure proper implementation of sustainable land management at scale.

- Land tenure insecurity remains a challenge, with ongoing subdivision and land sales disrupting traditional grazing systems.
- Existing environmental policies do not provide sufficient incentives or enforcement mechanisms to prevent continued land degradation.
- Without the project, rangeland degradation and fragmentation would continue unchecked, as the regulatory framework alone is not strong enough to drive community-wide adoption of sustainable grazing and conservation practices.

Barriers to Implementation Without the Project

The implementation of sustainable land management and biodiversity conservation measures under the without-project scenario would be highly unlikely due to the following barriers:

- Financial Barriers: Local communities lack sufficient long-term funding to sustain effective grazing management and conservation activities. Without the financial support from carbon revenue, community-led conservation initiatives would be constrained by inconsistent donor funding and limited government support.
- Technological Barriers: The adoption of satellite-based grazing monitoring, rotational grazing planning, and ecosystem monitoring requires technical expertise and infrastructure that are not currently available to most community-managed lands.
- Institutional and Capacity Barriers: While some communities have attempted to implement grazing plans, the lack of centralized coordination, knowledge sharing, and structured governance mechanisms has limited success. The project provides capacity-building support to overcome these barriers and implement standardized conservation and grazing practices.

Legal Requirements & Enforcement

Some aspects of the project align with existing laws and policies, such as the National Climate Change Action Plan 2023-2027, which encourages sustainable land-use management to combat desertification. However, there is no legal mandate that requires the specific project activities outlined in the KRCP, such as RRG, carbon credit generation, or structured community benefit-sharing agreements. Even where relevant environmental laws exist, they lack enforcement mechanisms, making voluntary conservation projects like KRCP essential to achieving large-scale rangeland restoration.

2.2.4 Benefits to be used as Offsets (CCB, G2.2)

No other benefits are intended to be used as offsets.

2.3 Safeguards and Stakeholder Engagement

2.3.1 Stakeholder Identification (VCS, 3.18, 3.19; CCB G1.5)

The iconic Maasai tribe have historically occupied rangelands stretching across 155,000 square kilometers of Kenya and Tanzania. Due to a complex history of colonial and post-independence land-tenure regulations, the Maasai were increasingly constrained to present day Kajiado and Narok counties on the Kenyan side and over 8 districts in the Arusha and Manyara regions on the Tanzania Side.

The Kenyan Land (Group Representatives) Act of 1968 led to the adjudication of land into Group or Individual Ranches, the membership of which was determined by respective sections (sub-tribes), but was also influenced by political elite, education and social influence. The history and evolution of the Group Ranch is a complex subject, however these Group Ranches (now defunct) continue to be used as a self-identification tool and hold linkages to land and usage rights.

Maps of the former group ranches were also accessible to the team through reports published for the Amboseli Ecosystem Management Plan, the Kenya Wildlife Conservancies Association's State of Conservancies Report, the SORALO website, and peer-reviewed journal articles on the Amboseli Ecosystem. These resources facilitated the identification of group ranches and conservancies within the landscape. Additionally, as members of the KRCP team originate from the area, they were already familiar with the initial group ranches and their leadership.

The KRCP team first started engaging with communities in September 2021 by identifying the land rights-holders and their representatives – the group ranch leadership. This was followed by informative meetings with the respective community members to describe the intention, project activities, potential benefits and risks and the carbon project cycle. Once an MOU was signed with respective communities, indicating intentions to analyze the feasibility of a soil carbon project, the project undertook a stakeholder analysis.

Structured discussions were conducted by Converge with key informants in each community. They targeted leadership, elders, women and youth, and were followed by wider focus groups individually encompassing elders, women and youth. The purpose of these studies was to understand issues around grazing including how grazing is planned and managed, and mapping the influencers versus the implementers of grazing planning and management. This was further informed by peer-reviewed research focusing on anthropological studies related to Maasai culture and grazing.

Furthermore, the KRCP team have been keenly participating in community meetings across the landscape, and engaging with government bodies, NGOs and CSOs to understand their objectives, roles and build on existing synergies. This has resulted in a mapping of the various stakeholders and an understanding of social networks for grazing planning and management in the landscape.

2.3.2 Stakeholder Descriptions (VCS, 3.18, 3.19; CCB, G1.6, G1.13)

The pastoral Maasai community remains the primary constituent of Kajiado County, with 60-75% of the total 1.1 million residents belonging to the Maasai tribe. The other tribes are primarily found in larger towns of Kajiado, Ongata Rongai, Ngong and Kiserian which offer affordable housing and are in close proximity to the capital in Nairobi. The pastoral communities in Kajiado County are organized under the former group ranch system, which has been a legally recognized institution with quasi-traditional roles and responsibilities grandfathered into a formal mechanism. Group ranch members hold land rights and are custodians of the land. The project area currently includes a number of former group ranches in Kajiado County (**Error! Reference source not found.**). Although other tribes inhabit high potential agricultural areas within these pastoral landscapes, they do not actively engage in pastoralism but may own or lease land for agriculture within the appropriately zoned areas, or run small shops. They are also actively included in the project as appropriate when it comes to project information sharing. Table 2-3 lists the communities in the project zone that are currently participating in the project, or may join at a later date, the former Group Ranch they belonged to, if applicable, and the name of the umbrella community they belong to, if applicable. This designation of umbrella community is used to denote where communities have grouped themselves under a common name for various purposes (communications, negotiations, legal advice, etc.).

The project also recognizes marginalized and vulnerable groups within the pastoral Maasai community, particularly:

- Poorest 25% - Small-scale herders and landless pastoralists: These individuals lack the financial stability derived from large livestock holdings and are disproportionately impacted by drought and economic fluctuations.
- Female-Headed Households - Women: These groups face structural challenges due to traditional gender roles that limit livestock ownership and direct market engagement.
- Youth: Youth face challenges to accessing education due to lack of funds to cover school costs. Another barrier to educational access is presented when travel across long distances (far from school) is necessary to access forage, as it is customary for youth to care for small livestock.
- Elderly: This group is vulnerable because of complications related to aging, decreased mobility, chronic health conditions, social isolation, and lack of financial independence.

These groups have been formally identified as community groups in the project and their inclusion ensures equitable access to project benefits and decision-making processes. The revenue-sharing model and grazing plans incorporate targeted measures to address the unique vulnerabilities of these groups.

Appendix 1 provides further stakeholder descriptions and details regarding these community groups and their relevance to the project.

Table 2-3. List of communities in the project zone that are currently participating or may join the project at a later date.

Index	Name of Individual Community	Previous Group Ranch	Maasai clan (Iloshon)	Name of Umbrella Community (if Applicable)
1	Eselenkei	Eselenkei Group Ranch	Ilkisonko	
2	Olgulului	Ilkisonko	Olgulului	Olgulului
3	Kitenden Conservancy	Ilkisonko	Kitenden Conservancy	Olgulului
4	Oloitiptip Ranch	Individual Ranches	Ilkisonko	Olgulului
5	Mailua	Mailua Group Ranch	Matapato	
6	Olkeri	Olkeri Group Ranch	Loodikiliani	
7	Olkiramatian	Olkiramatian Group Ranch	Loodikiliani	
8	Shompole	Shompole Group Ranch	Loodikiliani	
9	Kilitome	Kimana Group Ranch	Ilkisonko	ALOCA
10	Nailepu	Kimana Group Ranch	Ilkisonko	ALOCA
11	Nolarami	Kimana Group Ranch	Ilkisonko	ALOCA
12	Olepolos	Kimana Group Ranch	Ilkisonko	ALOCA
13	Inkariak Rongena Oltiyani	Kimana Group Ranch	Ilkisonko	ALOCA
14	Osupuko Kimana	Kimana Group Ranch	Ilkisonko	ALOCA

Index	Name of Individual Community	Previous Group Ranch	Maasai clan (Iloshon)	Name of Umbrella Community (if Applicable)
15	Tawi	Kimana Group Ranch	Ilkisonko	ALOCA
16	Satao Elerai Conservancy	Individual Ranches	Ilkisonko	
17	Kiboko	Kiboko Group Ranch	Kaputei	Nasaru Olosho Conservancy Trust
18	Orkarkar	Orkarkar Group Ranch	Kaputei	Nasaru Olosho Conservancy Trust
19	Merueshi	Merrueshi Group Ranch	Kaputei	Nasaru Olosho Conservancy Trust
20	Imbuko	Imbuko Group Ranch	Kaputei	Nasaru Olosho Conservancy Trust
21	Oldonyo Orok	Oldonyo orok Group Ranch	Matapato	RAMAT - Oldonyo Orok
22	Elesai	Mailua Group Ranch	Matapato	RAMAT - Mailua
23	Osewan	Mailua Group Ranch	Matapato	RAMAT - Mailua
24	Oltepesi	Mailua Group Ranch	Matapato	RAMAT - Mailua
25	Olchorro Oibor	Mailua Group Ranch	Matapato	RAMAT - Mailua
26	Ilumbwa	Mailua Group Ranch	Matapato	RAMAT - Mailua
27	Kaparasi	Mailua Group Ranch	Matapato	RAMAT - Mailua
28	Lolbetera	Mailua Group Ranch	Matapato	RAMAT - Mailua
29	Murrtuna	Mailua Group Ranch	Matapato	RAMAT - Mailua

Index	Name of Individual Community	Previous Group Ranch	Maasai clan (Iloshon)	Name of Umbrella Community (if Applicable)
30	Noosiktok	Mailua Group Ranch	Matapato	RAMAT - Mailua
31	Olgirra	Mailua Group Ranch	Matapato	RAMAT - Mailua
32	Maparasha	Maparasha conservancy	Matapato	
33	Kikesen River Conservancy	Meto Group Ranch	Matapato	RAMAT - Meto
34	Kisapuk Conservancy	Meto Group Ranch	Matapato	RAMAT - Meto
35	Oldonyo Sambu	Meto Group Ranch	Matapato	RAMAT - Meto
36	Parsilet Conservancy	Meto Group Ranch	Matapato	RAMAT - Meto
37	Lesoit Cooperative	Elangata Wuas	Matapato	Elangata Wuas
38	Olarilang Cooperative	Elangata Wuas	Matapato	Elangata Wuas
39	Olioisurr Cooperative	Elangata Wuas	Matapato	Elangata Wuas
40	Oldonyo Nyokie	Oldonyo Nyokie Group Ranch	Loodikiliani	
41	Imaroro	Imaroro Group Ranch	Kaputei	
42	Nkama	Inkama Group Ranch	Kaputei	
43	Imbilin	Imbilin Group Ranch	Kaputei	
44	Mashuuru		Kaputei	

Index	Name of Individual Community	Previous Group Ranch	Maasai clan (Iloshon)	Name of Umbrella Community (if Applicable)
45	Lorngosua	Lorngosua Group Ranch	Matapato	
46	Torosei	Torosei Group Ranch	Keekonyokie	
47	Kilonito	Kilonito Group Ranch	Keekonyokie	
48	Ilpatimaro	Ilpartimaro Group Ranch	Matapato	
49	Osilalei	Osilalei Group Ranch	Matapato	
50	Purko	Purko	Purko	
51	Nentanai	Nentanai Group Ranch	Matapato	
52	Mosiro-Suswa	Mosiro Group Ranch	Keekonyokie	
53	Ewuaso Kedong	Ewuaso Kidong' Group Ranch	Keekonyokie	
54	Olorgaisalie	Olorgaisalie North Conservancy	Loodikiliani	
55	Olorgaisalie	Olorgaisalie Land Owners Conservancy	Loodikiliani	
56	Olerai	Olerai conservancy	Keekonyokie	
57	Enkereyian	Enkereyian conservancy	Keekonyokie	
58	Empaash	Empaash conservancy	Keekonyokie	
59	Oloserian	Oloserian conservancy	Keekonyokie	

Index	Name of Individual Community	Previous Group Ranch	Maasai clan (Iloshon)	Name of Umbrella Community (if Applicable)
60	Olorropil	Olorropil conservancy	Keekonyokie	
61	Entiamai	Entiamai conservancy	Keekonyokie	
62	Kwenia	Kwenia conservancy	Loodikiliani	

2.3.3 Stakeholder Access to Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

Full project documentation, including this project description document and future editions, and future monitoring reports, is always publicly available to communities, stakeholders, and anyone with an internet connection, on the Verra Registry under the VCS and CCB programs (ID# 4714). Stakeholders will be provided with access to project documentation in a number of ways, including the following:

1. Prior to project validation, summaries of the project document will be reproduced in Kiswahili and Maasai and posted at visible locations in community centers and at County government offices.

2. Project proponent representatives will attend County Council meetings and provide written summaries of project documents and summary presentations during validation and each year during the crediting period.

3. Summaries of grazing reports and household surveys will be presented separately to grazing committees for confirmation, and their implications for issuance of credits and community payments will be discussed.

4. An Advisory Council of key stakeholders, or similar group as defined in the latest government regulations, will be convened and meet semi-annually or more frequently during crisis periods such as during extreme drought. Stakeholders with temporary interest, such as off-project communities whose livestock have encroached or who have been visited by project livestock will be invited to these meetings. Summaries of the project leakage report, which will include numbers and movements of project livestock off the project area and encroachment by non-project livestock into the project area, will be shared with grazing committees and community leaders of involved off-project areas.

2.3.4 Dissemination of Summary Project Documents (VCS, 3.18, 3.19; CCB, G3.1)

Communities have been, and will continue to be, actively provided with access to project documentation in a number of ways, including the following:

1. Project summary information was presented in native languages at community meetings including Annual General Meetings (AGMs), meetings of cooperatives, and grazing committee meetings in May

and June, 2024. Project document summaries were produced in native languages and presented in meetings and posted in visible locations in community centers.

2. After project validation, English and native language summaries of monitoring reports, including a summary of expected credit issuance, will be presented at community meetings including Annual General Meetings (AGMs), advisory meetings, meetings of cooperatives, and grazing committee meetings.

3. Summaries of grazing reports and household surveys will be presented separately to grazing committees for confirmation, and their implications for issuance of credits and community payments will be discussed.

4. Summaries of financial reports to demonstrate transparency of project cash flows will be presented to the Advisory Council/related group.

2.3.5 Informational Meetings with Stakeholders (VCS, 3.18, 3.19; CCB, G3.1)

Informational meetings with communities and local stakeholders have been occurring since September 2021, when the project team first met with representatives from the former Maasai group ranches, with initial meetings first identifying the right holders and their representatives – the group ranch leadership. Informative meetings to describe the intention, project activities, potential benefits and risks, and project cycle were held in the respective Phase 1 group ranches (i.e., the initial Project Area Instances), and central towns of Kiserian and Kajiado as determined by the respective group ranch leadership. These meetings sought to clarify the right holders, land tenure and legal registration of the group ranch under the laws of Kenya. To widely publicize information meetings, group ranch leadership have in turn engaged in the traditional structures to pass information about the potential carbon project across their constituencies. This has included engaging with grazing committees, who have then informed their constituents of the project. The iterative process has ensured that initial project information has been communicated to the relevant parties and high awareness of meetings has been achieved. This process has continued at each stage of engagement between the project team and communities and local stakeholders – at MOU signing, at signing of Carbon Rights Transfer and Benefit Sharing Agreements (at which a majority of community members are required to be present), and at signing of Rapid Rotational Grazing Plans. See more details in Section 2.5.7 on Free, Prior, and Informed Consent. The initial PAIs have completed all these steps, and the subsequent groups of PAIs are at different points along the way.

Information sharing with communities during the ongoing project will occur as documents and presentations associated with AGMs in each community. Information will also be shared on a weekly basis informally between communities and project proponent personnel, such as community liaisons and grazing coordinators.

Information sharing with stakeholder organizations will occur primarily regular meetings. The meetings will feature presentations on leakage, grazing reports and livestock movements, as well as results from social data gathering to assess community needs and possible community priorities for project

revenues. Summaries of financial reports to demonstrate transparency of project cash flows will be presented to the Advisory Council/related group meeting.

2.3.6 Risks from the Project and No Net Harm (VCS, 3.18, 3.19)

All risks are communicated to project stakeholders on a periodic basis through in-person meetings and are captured within our project information note (PIN), which serves as a guiding template for introductions at every meeting. A copy of the PIN is also left with a community representative at every meeting so that the community can access it for reference. These meetings are conducted by KRCP staff on regular RRG updates, project information sharing and benefit-sharing. The KRCP team establishes a seasonal stakeholder engagement plan to ensure all constituents have been reached.

The potential project risks to stakeholders that have been identified are:

1. Project delays that result from delays in reviews by Verra and Verification and Validation Bodies (VVBs) that, in turn, cause delays in credit issuances and community payments.

2. Delays in distribution of project revenues due to delays in submitting community benefit sharing proposals. Such delays may be caused by delays in community meetings or inefficiencies in generating proposals, etc.

3. Unfavorable changes in carbon market prices.

4. Reductions in carbon credit issuances due to leakage (i.e., project livestock going outside the project area) or to excessive visitation and negative impacts produced by livestock from off the project area (encroachment). Such outcomes are the likely consequence of excessive drought. The project has sought to increase contiguity in grazing lands so as to reduce risks by enhancing pastoral mobility.

5. Extreme drought slows the shift of rangeland vegetation from predominantly bare ground and annual plants to predominantly perennial grasses, which may result in lower-than-expected carbon credit issuances.

6. Financial malfeasance is a possible risk, but numerous mechanisms are in place, as specified in the Benefit Sharing Agreement, to prevent theft, corruption, or embezzlement of community funds. Transparent presentation of independently audited cash flows are planned for Advisory Council meetings to assure contractual distribution of revenues to communities.

7. The project does not anticipate there to be risks to food security, land loss, loss of yields, negative impact on livelihoods, or climate change adaptation.

The project's objective is to fortify pastoral livelihoods and in turn food security against climate change shocks by augmenting grass cover. This enhances forage availability for livestock and has a cascading impact on pastoral livelihoods, including increased meat and milk production, and the potential for expanding herd sizes. Empirical evidence from Little et al. (2008) has demonstrated that a herd size with a TLU above 4.5 (10-12 cattle) is crucial for pastoralists to prevent pastoral dropouts and withstand climate-induced shocks[82]. By augmenting grass cover through RRG, the resources required to sustain

[82] Peter Little et al., "Challenging Orthodoxies: Understanding Poverty in Pastoral Areas of East Africa," *Development and Change* 39, no. 4 (July 2008): 587–611, https://doi.org/10.1111/j.1467-7660.2008.00497.x.

necessary herd sizes are protected. [83]8. The project does not pose risks to the safety of women, girls, or children. In fact, project activities aim to enhance food security and nutrition within these groups by increasing the availability of meat and milk for women and children. Further, the project reduces burdens of travel on women and childeren.Among the Maasai community, it is culturally customary for women and children to care for small livestock and milk cows that graze close to human settlements. This practice ensures a reliable source of meat and milk near their households. By improving forage availability around homesteads, the project reduces the need for women and children to travel long distances for grazing, lightening their household responsibilities and enabling children to attend school. Additionally, keeping livestock closer to homesteads contributes to better nutrition for both young children and the elderly.

For young boys, herding responsibilities traditionally involve cattle, which move farther from settlements. However, the implementation of RRG is the responsibility of young men, as it is culturally appropriate for them to protect herds from wild animals in the rangelands. While young boys learn herding skills from older men as a part of their cultural education, they are not responsible for implementing RRG plans.

Finally, financial constraints often limit access to education in participating communities. To address this, community members have indicated that a portion of the project's financial benefits will be allocated to bursaries and educational support, helping to reduce school dropout rates and mitigating the risk of children leaving school to herd livestock due to lack of tuition fees.

9. The project poses no risks to children, minorities and/or marginalized peoples. The majority of the project population comprises Maasai pastoralists, accounting for 99% of the total. The remaining 1% comprise migrant agriculturalists who own subsistence farms and engage in small-scale businesses. If the Maasai perform well with livestock, there is an increased availability of cash within the project area for purchasing from them. Additionally, the project encourages participation from all members of the community, enhancing equity in access to grazing lands no matter what the herd size.

10. Given that land rights in Kenya are vested in the local communities, there are no concerns about potential land losses. In fact, the project's approach of encouraging and facilitating communal grazing not only creates contiguous grazing landscapes but also contributes to climate change mitigation efforts.

11. The project releases no effluent, does not create any noise or vibration pollution, and does not include any application of fertilizers or pesticides. These potential risks are not applicable as a result of the project activity.

2.3.7 Community Costs, Risks, and Benefits (CCB, G3.2)

The project ensures that all costs, risks, and benefits associated with participation are communicated in a transparent, participatory, and understandable manner. These elements are discussed before communities make any decisions about project participation, during village meetings, AGMs, and target stakeholder engagements.

Communication of Costs

Community costs associated with the project are almost entirely borne by the project proponents. Specifically, the project ensures that no direct financial contributions are required from participating

communities and all revenues distributed under the benefit-sharing mechanism are based on net revenues after covering project costs.

- Opportunity costs related to changes in land use, particularly restrictions on grazing in certain zones, have been communicated though participatory land-use planning discussions.
- The project explicitly informs communities about any indirect costs, including potential adjustments to traditional grazing patterns or temporary access limitations to specific land areas.
- All cost-related details are outlined in community benefits-sharing agreements, which are reviewed and explained in local languages (Kiswahili, Maasai) before signing.

Communication of Risks

The project actively identifies and communicates risks to communities in an accessible and participatory manner:

- Risks, including potential changes in grazing access, enforcement of land-use agreements, and climatic uncertainties, are discussed during FPIC consultations and community validation meetings.
- The risk assessment process is participatory, ensuring that community members provide input on perceived risks and co-develop mitigation measures.
- The Benefit Sharing Agreement outlines specific measures taken to mitigate community risks, such as alternative grazing strategies and community resilience support programs.
- A plain-language risk summary document is provided to community representatives during FPIC consultations to ensure long-term accessibility and reference.

Communication of Benefits

As with information about the project's risks, information about the project's benefits is shared with communities in an accessible and participatory manner:

- Benefits, including monetary benefits, capacity building and community infrastructure improvements are discussed during FPIC consultations and community validation meetings
- A plain language summary of the project, including its benefits, is provided to community representatives during FPIC consultations to ensure long-term accessibility and reference
- Benefits to communities are described in detail and communicated in an accessible manner in Benefit Sharing Agreements, which are developed collaboratively with communities. These Benefits Sharing Agreements include a structured breakdown of expected benefits, including monetary benefits, capacity-building programs, and community infrastructure improvements.
-
- The project produces annual impact reports (provided in English, Kiswahili, and Maasai) that outline historic payments, benefit allocations, and their uses. These are presented during community meetings before verification events.

- Non-financial benefits are highlighted in Benefits Sharing Plans and annual reports. For example, livelihood support programs, technical training, and sustainable land management initiatives are highlighted to ensure communities fully understand the broader value of their participation.

2.3.8 Information to Stakeholders on Validation and Verification Process (VCS, 3.18.6, 3.19; CCB, G3.3)

The project ensures that all stakeholders (including participating communities, government agencies, conservation NGOs, and other relevant parties) are informed of the validation and verification process through multiple communication channels. This includes details on the validation and verification requirements, timelines, stakeholder roles, and independent communication opportunities with the VVB.

Measures Taken to Inform Stakeholders

Contractual Agreements: The process for validation and verification is explicitly included in the benefit-sharing agreements between the project proponent (SftFA) and participating communities. Each agreement outlines the community's role in the validation and verification process and how information will be shared.

Community Meetings & Consultations: Information is delivered directly to community members through regular meetings with grazing committees, community liaison officers, and local leaders. These meetings provide details on project monitoring, expected verification timelines, and stakeholder engagement processes.

Printed & Digital Communications: The project distributes project information notes summarizing the validation and verification process. These documents, available in English, Kiswahili, and Maasai, are shared with community leadership, government agencies, and stakeholders via email, WhatsApp, and printed copies at meetings.

Stakeholder Engagement Plan: The Stakeholder Engagement Plan (SEP) includes a specific section on the verification process and outlines methods of engagement for each stakeholder group.

Grievance & Feedback Mechanism: Stakeholders can submit questions, concerns, or grievances related to the verification process through designated contact persons, KRCP's phone hotline, email, and in-person meetings with KRCP staff.

2.3.9 Site Visit Information and Opportunities to Communicate with Auditor (VCS, 3.18.6; CCB, G3.3)

Participating communities will be notified of the procedures required for CCB validation and verification, as stipulated in the contractual benefit-sharing agreement for each community or cooperative. Targeted community meetings will serve as the primary mode of engagement with the constituents, given that a significant portion of community members lack literacy. The processes will explicitly outline the following:

- The project will communicate the project design and implementation rules at these engagement meetings as part of the FPIC process. KRCP has established a template to communicate its identity, mission, project objectives, risks, costs, and benefits, as well as details about the benefit-sharing arrangements. Additionally, the guiding template includes contact information for further information or to report any grievances. A copy of this project information note, available in English, Kiswahili, and/or Maasai, is left behind with a community leader. This ensures that all attendees at a meeting are fully informed about the project, its implications, participation rules, including a clear understanding of rapid rotational grazing.
- Furthermore, as part of the stakeholder engagement prior to the verification event, the project will share monitoring reports, including an annual impact report that describes the rapid rotational grazing plan and its implementation success, highlights of social and biodiversity indicators that demonstrate the impact trends, and a report on benefit share payments received by each community. A copy of the annual environmental impact report is also shared with each community's leadership.
- The project will elucidate the advantages, costs, and potential risks associated with the project prior to any VVB events. This information has been documented in our project information note indicated above.
- Furthermore, as part of our project information note, which guides the introductions at any meeting, benefit sharing, including how payments are calculated and made, is included. The annual impact report will also detail historic payments and their use. These will be discussed as agenda points at stakeholder consultations prior to a verification event.
- The KRCP FPIC process is continuous, with every meeting commencing with a project summary, outlining roles and responsibilities for participation, the grievance redress mechanism, including contact information, and benefit share. These materials are guided by a concise version of the project information note utilized by all field staff. The project further emphasizes the FPIC concept at all meetings. Additionally, the community is the primary designer of all RRG plans, ensuring that the implementation plan aligns with their traditional land management practices, with technical input from the KRCP.
- The KRCP project maintains a comprehensive employee handbook that undergoes annual updates to reflect any amendments to regulations. The organization strongly advocates for the annual review of the handbook by all employees. Prior to the VVB event, a KRCP team meeting will be held, attended by all grazing coordinators, to provide an overview of all worker's rights and applicable laws in Kenya.
- The community will be informed of VVB visits through their leaders, who'll organize community meetings to share project info, monitor feedback, and provide details on the VVB process. Leadership has demonstrated effective communication with constituents through phone calls, SMS, WhatsApp, and in-person communication. These meetings will engage all community members, including women and youth. Other key stakeholders such as government officials and NGO/CSO partners will be informed via phone calls, emails, and official invitation letters and in person meetings to share project info and progress, feedback on monitoring, and provide details on the VVB process and timelines.

Notification of Auditor's Site Visit:

1. Community Notification through Leaders: Community members will be informed of VVB site visits through their traditional leaders, grazing committees, and the KRCP staff. Community meetings

will be scheduled to provide an overview of the verification process and what to expect during the site visit.

2. Other Stakeholder Notification:
    a. Government officials (County authorities, Kenya Wildlife Service, and NEMA) will receive formal written invitations along with a briefing document summarizing the verification objectives and timeline.
    b. Conservation NGOs and CSOs involved in the project will be notified via emails, phone calls, and virtual pre-visit briefing meetings organized by the KRCP.

Facilitating Independent Communication with VVB:

1. Community Meetings with VVB: Each community will have the opportunity to meet with the VVB independently of project staff to share feedback, ask questions, or provide additional evidence about the project's impact.
2. Household Surveys: The VVB will conduct randomized household surveys across different zones to ensure broad representation in feedback collection.
3. Stakeholder Interviews: Non-community stakeholders (e.g., government agencies, NGOs, research institutions) will have the opportunity to engage with the VVB through pre-scheduled interviews facilitated by the KRCP.
4. Confidential Communication Channels: Any stakeholder who prefers to communicate privately with the VVB can do so via a designated phone line or email address provided by the VVB, which will be shared during pre-visit meetings and in printed verification materials.

2.3.10 Stakeholder Consultations (VCS, 3.18; CCB, G3.4)

Stakeholder Consultation Overview

The project engages a diverse range of stakeholders in ongoing consultations to ensure broad participation and influence over project design and implementation. These consultations include community groups, government authorities, NGOs/CSOs, grazing committees, and marginalized groups (women, youth, and non-livestock households). The project uses a combination of in-person meetings, digital communication (SMS, WhatsApp, email), and formal documentation to ensure accessibility and inclusiveness in decision-making.

Stakeholder Consultation Summary

Community Members (Elders, Grazing Committees, Women, Youth, and Non-Livestock Households)

Date of stakeholder consultation	Ongoing since 2022, with regular meetings held at village, zonal, and regional levels
Stakeholder engagement process	Community meetings, grazing committee workshops, WhatsApp groups, focus groups for women and youth, and in-person discussions
Consultation outcome	• Validated grazing plans developed collaboratively. • Establishment of grievance mechanisms. • Increased participation of marginalized groups in grazing decisions.

Stakeholder input	• Requests for improved training for women and youth on grazing management. • Need for enhanced benefit-sharing transparency. • Desire for increased project communication through digital channels and village meetings.

Government Representatives (Local, County, and National Authorities)

Date of stakeholder consultation	Ongoing since 2022, with bi-annual meetings and official correspondence
Stakeholder engagement process	Formal letters, in-person meetings, regulatory workshops, field visits
Consultation outcome	• Compliance alignment with national policies. • Enhanced coordination on biodiversity monitoring. • Established partnerships for drought contingency planning.
Stakeholder input	• Need for structured reporting of project benefits. • Request for integration of local government in decision-making. • Interest in knowledge-sharing on rotational grazing best practices.

NGOs & Civil Society Organizations (CSOs)

Date of stakeholder consultation	Ongoing since 2022, with quarterly engagement sessions
Stakeholder engagement process	Workshops, virtual meetings, field collaborations
Consultation outcome	• Strengthened biodiversity conservation strategies. • Improved capacity-building initiatives for local communities. • Research collaboration opportunities explored.
Stakeholder input	• Need for data-sharing protocols on biodiversity indicators. • Recommendations for additional conservation-focused training programs. • Interest in joint monitoring efforts.

Broader Community Engagement (General Public Meetings & Consultations)

Date of stakeholder consultation	Annual village and zonal meetings since 2023
Stakeholder engagement process	Public assemblies, print materials distribution, radio broadcasts, email updates

Consultation outcome	• Increased awareness of project activities. • Strengthened community feedback loops. • Broader community buy-in for rotational grazing practices.
Stakeholder input	• Requests for simplified project materials in local languages. • Concerns about access to grazing lands. • Recommendations for expanding training opportunities to additional villages.

Stakeholder Engagement Process

The stakeholder engagement process follows a multi-tiered approach that aligns with community governance structures:

- Village-Level Consultations: Discussions with community elders and grazing committees to design and refine grazing plans.
- Zonal-Level Coordination: Integration of village-level decisions into broader regional grazing strategies.
- Landscape-Level Planning: Engagement with county officials, conservation groups, and NGOs to ensure ecological and socio-economic sustainability.

Consultation Outcomes

- Validated grazing plans developed with active community input.
- Feedback mechanisms established, including regular community meetings, grievance channels, and digital outreach.
- Stakeholder concerns integrated into adaptive management processes.

Stakeholder Input & Project Response

Summary of comment received	When comment was received	Actions taken
Request for additional training on rotational grazing for women and youth.	January 2023	Conducted training workshops specifically for these groups.
Concerns about equitable benefit-sharing between villages.	March 2023	Adjusted allocation process and improved transparency in revenue-sharing agreements.
Need for better communication of project updates.	July 2023	Established KRCP WhatsApp groups and increased frequency of community meetings.

Request for inclusion of off-project herders in planning meetings.	September 2023	Integrated off-project herders into zonal grazing committee discussions.

2.3.11 Continued Consultation and Adaptive Management (VCS, 3.18; CCB, G3.4)

The project has developed a structured plan for ongoing communication and consultation between the project proponent, participating communities, and stakeholders to ensure the project remains responsive to community needs.

Ongoing Consultation Framework

Grazing plans will be developed annually at the beginning of the year. The grazing coordinator in partnership with grazing committees will develop a draft grazing plan. These will be validated at zonal grazing committee meetings held with the KRCP monitoring team. This opportunity will be used to understand and map changes. Annual plans will be used to compare daily reports to planned activities.

Weekly monitoring reports will be shared with KRCP Grazing Coordinators to be shared and discussed with Community Grazing Committees. Results will be communicated with various settlements through the Grazing Committees, and with herders when the Grazing Coordinator visits the Grazing Blocks. These results will also be shared through a predetermined schedule of village and zonal meetings targeting livestock owners and herders on rapid rotational grazing and its implementation. There will be a concerted effort to include women in these meetings. Stakeholders with temporary interest, such as off-project communities whose livestock are bestowed grazing in project lands or who have been visited by project livestock will be invited to these meetings. Any relevant edits on the planned annual grazing plans will be discussed by the grazing coordinator and grazing committee during these meetings and further communicated as annual grazing plan edits to the KRCP monitoring team. They will capture these accordingly.

If needed, grazing plans can be expanded from the village or zone level to move livestock to other communities within the project area.

If movements of livestock to other communities within the project area or off the project area are intended or deemed inevitable due to drought, then the project proponents will:

1. Convene a meeting of leaders of all registered communities or cooperatives in the project area for regional grazing planning. Leaders of off-project communities will be invited, as relevant.

2. Establish agreements for management of project livestock on off-project lands, if possible, to include payments for access to grazing lands if necessary; and

3. Prevent encroachment on protected areas. In severe droughts, livestock have been historically taken to protected areas. We will avoid this, if possible, but if it is deemed necessary, project proponents will work with community leaders and protected area administration to minimize encroachment and negative effects.

Annual socio-economic surveys will be conducted using appropriate sampling methodology to have a pulse on key variables related to pastoral household wellbeing, community governance and project activities. The data from these surveys will be recorded digitally so the results can be assessed within 30 days. Results will be reviewed semi-annually by project proponents and the Advisory Council.

Communities must annually submit proposals for specific projects for the benefit of the community to receive their share of project revenues. These proposals are based on community-identified priorities and require the community to follow a consultative process. Proposals will be compared with priorities identified by the Advisory Council.

Mechanisms for Inclusive Participation

To address barriers to participation, the project has implemented special engagement measures for marginalized groups:

- Dedicated focus group discussions for women, youth, and non-livestock households.
- Incorporation of community liaison officers to facilitate direct outreach.
- Inclusion of marginalized groups in benefit-sharing decision-making processes.

Adaptive Management Strategy

The project employs a flexible and responsive approach to adaptive management:

- Feedback Integration: Inputs from community consultations are reviewed quarterly and incorporated into project strategies.
- Livestock Mobility Planning: If required, livestock movement across zones or off-project areas will follow structured agreements with clear grazing management protocols.
- Drought Contingency Planning: In extreme conditions, stakeholders will collaborate with protected area administrators to minimize environmental impact.
- Regular Review by Advisory Council: Socio-economic survey results and community priorities will be evaluated semi-annually to inform decision-making.

2.3.12 Stakeholder Consultation Channels (CCB, G3.5)

As noted in previous sections, communication with participating communities will occur through:

1. Community AGMs following zonal and village-level awareness meetings about the project to approve the project.

2. Zonal and village meetings organized by grazing coordinators and community liaison officers on grazing planning, monitoring, review and trainings on rapid rotational grazing. Weekly and seasonal monitoring meetings with the KRCP monitoring team and grazing coordinators.

3. Informal communication between project proponent personnel, including community liaisons and grazing coordinators, and leaders of registered communities and cooperatives.

4. Communication to community representatives, elected by the communities, to the Advisory Council/related group.

5. Communication during semi-annual AGMs in the individual communities.

6. Appropriate social media platforms, TV and radio.

Communication with other stakeholders will occur primarily through:

1. Semi-annual Advisory Council meetings

2. Regional grazing planning meetings with attendant chairs of grazing committees, leaders of registered communities and cooperatives, and relevant off-project communities, NGOs, and government representatives.

3. Attendance and presentation of project progress at County Council meetings.

4. Representation by the project on the County Development Council to coordinate project activities with County land use plans.

5. Quarterly review meetings with the State Department of Climate Change.

2.3.13 Stakeholder Participation in Decision-Making and Implementation (VCS, 3.18, 3.19; CCB, G3.6)

Community Governance & Decision-Making Structure

As described in Section 2.3.3 (Figure 1), communities within the project area operate under a quasi-traditional hierarchical structure that facilitates communication, collaboration, and decision-making. This structure is integral to both community governance and project engagement, ensuring effective participation at multiple levels:

- Village-Level Engagement: Local decisions regarding pasture management are made in consultation with village elders, women's groups, and youth representatives through community meetings and grazing committees.
- Zonal-Level Planning: These village-level decisions are consolidated at the zonal level, where wet and dry season grazing plans are collaboratively formulated, incorporating feedback from all community groups.
- Landscape-Level Coordination: Multiple zones converge to form a regional land-use plan, integrating pasture management with economic development strategies and county-level governance, ensuring representation across scales.

Consultation & Participatory Processes Undertaken

The project actively engages stakeholders, including women, youth, and landless households, using the existing governance structure and additional participatory mechanisms. The consultation process includes:

- Regular Community Meetings & Workshops: Held at village, zonal, and regional levels to discuss project activities, grazing management, economic opportunities, and biodiversity conservation.

- Stakeholder Workshops & Capacity Building: Dedicated trainings and technical support sessions with community representatives, county officials, and grazing committees.
- Free, Prior, and Informed Consent (FPIC) Process: As detailed in Section 2.3.7, the project implemented FPIC to ensure communities provided input and consent before key project activities were initiated.
- Dedicated KRCP Field Staff Presence: Community liaison officers, grazing coordinators, and KRCP staff conduct regular field visits to villages and grazing blocks, facilitating direct communication and ensuring ongoing community participation.

Additionally, the project recognizes that some community members face barriers to engagement within the hierarchical structure, particularly women, youth, and households without livestock. To ensure inclusivity, the project has:

- Conducted focus group discussions targeting these marginalized groups.
- Provided alternative avenues for engagement, such as direct outreach through KRCP staff and designated liaison officers.

Justification for Adequate Information Sharing

To ensure that project information is widely accessible and communities remain informed, the project has implemented multiple information-sharing mechanisms:

- Public Meetings & Community Assemblies: Regularly scheduled village meetings where project updates, land-use planning decisions, and training materials are shared.
- Printed Materials & Digital Communication: The KRCP team has produced project brochures, posters, and information sheets distributed at community gatherings and government offices.
- Dedicated Grievance & Feedback Mechanisms:
    - A KRCP phone hotline and email address have been established and are publicly listed on all printed materials to ensure accessibility for all stakeholders.
    - A formal grievance mechanism allows community members to raise concerns and seek resolutions through structured reporting channels.
- Monitoring & Documentation of Engagement: Meeting minutes, attendance records, and signed consent forms are maintained as documentation of ongoing consultations.

2.3.14 Anti-Discrimination Assurance (VCS 3.19; CCB, G3.7)

In the SftFA Employee Handbook, it is stated that the policy of SftFA is to provide equal employment opportunities to all individuals regardless of age, race, color, religion, gender, national origin or ancestry, physical or mental disability, marital status, military service record, genetic information or any other protected group as provided by law. This applies to all areas of employment including, but not limited to hiring, training, promotion, compensation, benefits, and termination.

As an Equal Employment Opportunity Employer, SftFA is committed to creating and maintaining a positive work environment for all Employees, free of offensive or hostile conduct. SftFA will not tolerate harassment or other actions that interfere with our equal employment opportunity policy. Staff are asked to review the Harassment Policy and reporting procedures. In addition, staff are instructed that if

they believe there have been any other actions in violation of SftFA's Equal Employment Opportunity Policy, they are strongly encouraged to use the Open-Door Policy to report such concerns.

In addition, it is also stated in the Employee handbook that SftFA is committed to a diverse, inclusive, and equitable environment where staff respected and valued regardless of gender, age, race, ethnicity, national origin, disability, education, or any other bias. SftFA is committed to being nondiscriminatory and providing equal opportunities for employment, volunteering, and advancement in all areas of SftFAs work.

SftFA's philosophy is to provide informed leadership for diversity, inclusion, and equity, and states that SftFA will:

- Strive to see diversity, inclusion, and equity in connection with our vision and mission.
- Aim to recognize and address inequities in our policies, programs, and services.
- Update and document progress on our diversity, equity, and inclusion practices.
- Commit to advocating for systemic inequities that impact our work and address it according to this policy and in accordance with our mission.
- Commit to challenging commonly accepted notions about what constitutes strong leadership within our organization.
- Commit to being transparent about diversity in all our interactions.
- Commit to leading with respect and tolerance and we encourage all employees and volunteers to express this in their work within our organization.

2.3.15 Feedback and Grievance Redress Procedure (VCS, 3.18.4; CCB, G3.8)

The KRCP team has implemented a multi-layered grievance redress mechanism to address disputes that may arise between the project proponent and stakeholders. This procedure was developed in collaboration with community representatives, leveraging the traditional Maasai conflict resolution system and feedback gathered during FPIC consultations.

KRCP has also established non-discrimination and anti-harassment policies, ensuring equitable stakeholder engagement. These policies are aligned with SftFA's Employee Handbook (April 2023) and associated training programs.

Non-Discrimination & Anti-Harassment Measures

KRCP has zero tolerance for discrimination and harassment in all aspects of project design and implementation. The following measures ensure compliance:

1. Policies & Ethical Standards
    - Equal Opportunity & Anti-Discrimination Policy
        - Outlined in the SftFA Employee Handbook (April 2023).
        - Prohibits discrimination based on gender, ethnicity, age, disability, religion, or socioeconomic status in hiring, project implementation, and community engagement.

- Covers stakeholder interactions, ensuring fair representation of marginalized groups (e.g., women, youth, pastoralists with no livestock).

- Anti-Harassment & Workplace Conduct Policy
  - Prohibits all forms of sexual harassment, including verbal, physical, and non-verbal misconduct.
  - Defines clear reporting channels for victims and witnesses.
  - Ensures no retaliation against those who report incidents.

2. Training & Awareness Programs

All KRCP personnel, contractors, and community liaisons undergo:

- Mandatory annual training on anti-discrimination and harassment prevention (outlined in SftFA Employee Handbook).
- FPIC (Free, Prior, and Informed Consent) training to ensure culturally sensitive stakeholder engagement.
- Gender sensitivity training for all field staff and grazing coordinators.
- Reporting procedures training, ensuring personnel understand how to document and escalate complaints appropriately.

3. Reporting & Enforcement Mechanisms

To ensure non-discrimination and harassment-free implementation, KRCP has established the following grievance reporting procedures:

- Community & Staff Grievance Mechanisms
  - Confidential reporting channels: email, WhatsApp, SMS, and designated grievance coordinators.
  - Anonymous reporting option: allows individuals to report misconduct without fear of retaliation.
  - Logging & tracking system: all grievances are recorded in Salesforce CRM for transparency and accountability.
- Incident Resolution & Accountability
  - Initial review (within 5 working days): report logged, acknowledged, and assigned for review.
  - Mediation (within 6 weeks): conflict resolution through structured dialogues with community leadership and senior KRCP staff.
  - Escalation (within 10 weeks): if unresolved, the case is escalated to SftFA senior management or legal mediation services.
- Whistleblower Protection
  - Ensures all grievances are addressed impartially.
  - Protects complainants from retaliation or exclusion from project activities.

Table 2.3.15-1. Development & Design of the Grievance Redress Procedure.

Development process	The Kajiado Rangelands Carbon Project has initiated a multi-pronged grievance redress mechanism that is open to the public.

	The first step includes working through the culturally appropriate group ranch leadership structure where grievances are captured and addressed at the local and regional level. At each stage, StfFA grazing coordinators are responsible for capturing and logging the information through a grievance case file mechanism that has been established on Salesforce Customer Relationship Management (CRM). A second straight-to-project mechanism includes a phone number with access for phone calls and short messaging services (SMS), WhatsApp and an email address. These are linked to the Salesforce CRM to log and track grievances and to ensure that each case is resolved in a timely and appropriate manner.
Grievance redress procedure	**Traditional mechanisms** The Maasai governance systems cater to feedback, capturing, and addressing grievances across the community. The hierarchical manner of communication starts with community members, predominantly male household heads, who approach the community leaders or elders of their clan to raise issues. These issues or conflicts are resolved by the elders either through one-on-one meetings or community forums. Issues of an escalated nature that may span various villages are addressed by clan leaders, and/or brought to the attention of the group ranch leadership when legal matters (land tenure or highly sensitive) arise. Women and youth are also encouraged to bring issues to the table through their male household heads. In cases of disempowerment, women and youth are also able to bring issues to the table through women or youth age-set leaders or direct communication to the elders and group ranch leadership. SftFA grazing coordinators also have a high-touch relationship with the community members and their leadership. The StfFA country coordinator and Grazing Coordinator Supervisors work closely with the group ranch/community leadership on project implementation and any concerns related to the project are identified and addressed in a timely manner. The grazing coordinators also have a high-touch relationship with the community members. They hail from the communities, communicate with local village leaders daily and host community meetings to map and monitor grazing. This provides an accessible manner through which the community can approach the grazing coordinators. All grievances identified

and addressed through this channel are reported through a centralized manner to have an audit trail.

Communication channels

The project has mapped various communication channels for communities to directly approach the project proponents. During the FPIC process, proponents have widely circulated contact information (email address and phone number) to communities. The contents of this communication have been translated into Kiswahili and Maa. The email address and phone number are linked to a CRM platform to automate incident reporting and create cases for management and resolution. SOPs have been established so that issues are prioritized and resolved in the most effective timeframe. Additionally, because there is a high degree of WhatsApp use among the youth in the communities, the various group ranches have established KRCP related groups for communication directly with proponents. This allows the project to capture grievances particularly among the youth that make up most of the general population and are primarily the implementers of the herding strategy.

Grievance Received	In Person - KRCP All Staff	Email/Phone/Social Media Communication	Community Representative
First Step Within 5 Working Days	Acknowledge receipt of compliant. Report to Grazing Coordinator Supervisor. Record within CRM. Identify subject of complaint. If involving a person and of high concern, they are recused from the complaint or sent on a temporary leave of absence.	Acknowledge receipt of complaint. Report to Grazing Coordinator Supervisor. Record within CRM. Identify subject of complaint. If involving a person and of high concern, they are recused from the complaint or sent on a temporary leave of absence.	Community representative to notify KRCP grazing coordinator/community liaison officer of complaint. KRCP officer together with Grazing coordinator Supervisor to visit the complainant accompanied by the community representative.
Attempt to Resolve withing Two Weeks	Grazing Coordinator Supervisors and Community Liaison Officer holds a meeting to inform Community Leadership and separately holds a meeting with complainant.	Grazing Coordinator Supervisors and Community Liaison Officer holds a meeting to inform Community Leadership and separately holds a meeting with complainant.	Grazing Coordinator Supervisors and Community Liaison Officer holds a meeting to inform Community Leadership together with the Complainant if appropriate.

Attempt to Resolve within Six Weeks	Grazing Coordinator Supervisors and Community Liaison Officer hold further meetings with Complainant, Community Leadership, and/or Wider Community.	Grazing Coordinator Supervisors and Community Liaison Officer hold further meetings with Complainant, Community Leadership, and/or Wider Community.	Grazing Coordinator Supervisors and Community Liaison Officer hold further meetings with Complainant, Community Leadership, and/or wider Community.
Escalation Within Ten Weeks	Senior management staff at SftFA hold further mediation meetings with Complainant accompanied by their representative of their choice or Government of Kenya provided mediation services.	Senior management staff at SftFAhold further mediation meetings with Complainant accompanied by their representative of their choice or Government of Kenya provided mediation services.	Senior management staff at SftFAhold further mediation meetings with Complainant accompanied by their representative of their choice or Government of Kenya provided mediation services.

2.3.16 Accessibility of the Feedback and Grievance Redress Procedure (VCS, 3.19; CCB, G3.8)

All grievances and response measures are recorded in a time-stamped, traceable manner in the organization's CRM to have a clear record of the developments and decisions. It is the expectation of SftFA that all grievances related to the project that are received by the company, and the follow up, will be reported to the Advisory Council/related group meetings. The purpose of this will be to obtain input from the Advisory Council/related group on the effectiveness of the SftFA Grievance Redress process to modify and improve the process over time. This is one of the values and objectives of the Advisory Council/related group – as it should include significant community representation from across the project area.

2.3.17 Worker Training (VCS, 3.19; CCB, G3.9)

For all new employees – such as grazing coordinators, supervisors, monitoring and evaluation personnel, accountants, etc., there will be training on all aspects of the SftFA Code of Conduct via training sessions associated with the SftFA employee handbook. Worker training occurs initially on the signing of the original employee contract, and periodically over time for various aspects of the Environmental, Social and Governance (ESG) procedures. All procedures have evolved from experienced practice by local community members and are specifically designed to build local capacity that transcends personnel turnover. Grazing coordinator training has historically involved university courses and offsite training, such as the US Forest Service rangeland management training or programs at the Savory Institute. However, these courses have been summarized and distilled into local versions for use in areas with little to no internet connectivity.

Training in grazing management at the level of grazing committee members is expected to occur on an annual basis. In the first year of the project, the concepts of RRG were communicated with the grazing committees to develop the RRG grazing plans that had to demarcate grazing blocks within both wet and dry season grazing areas – something that had not been done previously. Review of grazing plan implementation will be a primary focus of most future grazing coordinator and grazing committee training sessions.

2.3.18 Community Employment Opportunities (VCS, 3.19.13; CCB, G3.10)

The project will provide numerous employment opportunities for residents of Kajiado County. Positions or grazing coordinators, monitoring specialists, field assistants, drivers, interviewers, accountants, and other positions will actively seek local applicants. These jobs will be announced and posted locally, and in standard job posting sites, with special attention will be given to applicants from vulnerable or marginalized groups, such as women and members of households without cattle.

In the SftFA Employee Handbook, which existing and new employees are regularly trained on, it is stated that the policy of SftFA is to provide equal employment opportunity to all individuals regardless of age, race, color, religion, gender, national origin or ancestry, physical or mental disability, marital status, military service record, genetic information or any other protected group as provided by law. This applies to all areas of employment including, but not limited to hiring, training, promotion, compensation, benefits, and termination. The project provides equal pay for equal work in project design and implementation. This policy ensures equal opportunities and gender equity across roles and responsibilities. SftFA human resources staff actively monitor compliance with this policy during the hiring process. All project staff must be at least 18 years old, meeting the legal age requirement, and are selected based on a merit-based system to ensure fairness and competence.

The worker selection process is initiated by SftFA staff, who develop a job description and post it via online adverts and in public locations. Applicants are scored in a standardized system that has been designed in keeping with the equal employment opportunity policy stated above. The scoring system is based on their qualifications, the quality of their application materials, their knowledge of the project area, their work experience, and their possession of a valid driver's license. Grazing coordinator positions represent the largest number of advertised and hired staff positions, and the pool of applicants for these positions in 2024 and 2025 has ranged from 100% male to 74% male, depending on the community.

2.3.19 Occupational Safety Assessment (VCS, 3.19; CCB, G3.12)

Worker Safety & Risk Mitigation

The KRCP is committed to ensuring worker safety through compliance with Kenyan labor laws and adherence to international best practices. The project follows the Occupational Safety and Health Act of 2007 and integrates workplace safety standards outlined in the SftFA Employee Handbook. Compliance is monitored by SftFA human resources staff and reinforced through training and risk mitigation measures.

1. Risk Assessment & Project Implementation Risks

The following risks have been identified as substantial risks to worker safety during project implementation:

- Vehicular Accidents: Field employees frequently operate 4WD vehicles and motorcycles on rough terrain.
- Exposure to Harsh Environmental Conditions: Fieldwork in remote rangelands exposes workers to extreme temperatures, dehydration, and wildlife encounters.
- Fire Hazards: Controlled burns and bushfires pose a risk to field personnel.
- Discrimination & Harassment Risks: Risks associated with gender-based violence, sexual harassment, and discrimination in the workplace or during community interactions.

2. Risk Awareness & Mitigation Measures

Workers are informed of risks and trained to minimize them through the following measures:

- Vehicle & Road Safety:
  - Annual training in defensive driving and road safety provided by the National Transport and Safety Authority (NTSA)
  - Use of licensed, trained drivers and provision of helmets and protective gear for motorcycle use.
  - Field staff work in pairs to ensure rapid response in case of an accident.
- Environmental & Field Safety:
  - Heat stress prevention protocols (mandatory hydration, shaded breaks).
  - Wildlife safety training to minimize risks of encounters in remote areas.
- Workplace Harassment & Discrimination Prevention:
  - Annual mandatory training on anti-harassment and non-discrimination (outlined in the SftFA Employee Handbook).
  - Grievance mechanism for reporting incidents anonymously via email, WhatsApp, SMS, or designated grievance officers.
  - Strict no-retaliation policy to protect complainants and ensure a safe working environment.

3. Risk Minimization & Accountability

- Incident Tracking & Reporting:
  - All workplace safety incidents are logged in Salesforce CRM to ensure transparency and resolution.
  - Immediate response measures ensure grievances and safety concerns are addressed within 5 working days.
- Emergency Medical Support:
  - Field teams have designated emergency contact procedures and access to local health providers.
  - At least one team member per field unit is trained in first aid.
- Review & Continuous Improvement:

- Safety training and protocols are reviewed annually based on incident reports and feedback.

2.4 Management Capacity

2.4.1 Project Governance Structures (CCB, G4.1)

The KRCP is operated and managed on the ground by Soils for the Future Africa (SftFA), a for-profit company based in Kajiado, Kenya. SftFA is incorporated in Kenya and partially owned by a Kenyan citizen. The organization is responsible for:

- Engaging and coordinating with participating communities on livestock grazing management.
- Providing capacity-building support for the development and implementation of rotational grazing plans that are designed to enhance rangeland health and increase soil carbon sequestration.
- Conducting monitoring and evaluation programs to document compliance with grazing management plans, ensuring that carbon increases are properly accounted for and converted into carbon credits.
- Marketing the carbon credits generated through project activities.

Supporting Entities & Their Roles

CarbonSolve (CS)
CarbonSolve (CS) is a U.S.-based company specializing in developing carbon projects in grassland and rangeland habitats worldwide (see https://www.carbonsolve.world). CS's role in the KRCP includes:

- Providing technical expertise on carbon project development.
- Developing the Verra-approved methodology VM0032, authored by Mark Ritchie, Ph.D., which will be used in the project.
- Developing and implementing SNAPGRAZE, a soil carbon predictive model that will estimate carbon accruals and determine community-based payments based on grazing plan effectiveness.
- Supporting SftFA by providing guidance on project structuring, carbon accounting, and financial sustainability.

Biodiversity Research Institute (BRI)
Biodiversity Research Institute (BRI) is a U.S.-based 501(c)3 non-profit conservation organization that plays a key role in biodiversity-related aspects of the project. BRI's responsibilities include:

- Leading biodiversity monitoring and reporting to ensure compliance with CCB standards.
- Conducting scientific research on the relationship between rangeland carbon project activities and biodiversity outcomes.
- Publishing peer-reviewed reports on biodiversity impacts associated with the KRCP.
- Providing oversight and technical support to ensure best practices in biodiversity conservation are upheld.

Participating Communities & Their Roles

Participating communities in the KRCP are the legal carbon rights owners in Kenya and play a central role in project activities. Their responsibilities include:

- Signing the benefit-sharing agreements (BSAs) that include the transfer of carbon rights to SftFA, enabling the organization to market the carbon credits.
- Implementing rotational grazing management plans to enhance rangeland productivity and increase soil carbon sequestration.
- Participating in project governance structures, including the KRCP Advisory Council, to ensure transparency and equitable distribution of project benefits.
- Providing input and feedback to ensure that the project aligns with community priorities and needs.

Identification of Initial Participating Areas (PAIs)

As part of the grouped project structure, the initial PAIs include:

- Olgulului Trust
- Eselenkei Cooperative
- Shombole Community Land
- Olkeri Community Land
- Olkiramatian Community Land
- Four of the ten RAMAT East Conservancies (Elesai, Murtuna, Oltepesi, and Osewan)

These communities have signed MOUs and benefit-sharing agreements with the project and are actively implementing grazing management plans. Additional communities will be incorporated into future project phases based on SftFA's capacity to engage and onboard new participants.

Governance & Oversight

As part of the overall project governance structure, the KRCP will establish an Advisory Council (or equivalent governance body, per national regulations). This community-led council will:

- Oversee the implementation of the carbon project, ensuring financial transparency and two-way communication between project stakeholders.
- Facilitate dispute resolution and provide community representation in key project decisions.
- Support ongoing engagement and feedback mechanisms between SftFA, CS, BRI, and participating communities.

2.4.2 Required Technical Skills (VCS, 3.19; CCB, G4.2)

Community engagement: Converge Analytics, Ltd is the leader in education and social monitoring efforts to establish FPIC and thus community consent for the project. The in-country project management company SftFA also has hired more than 30 permanent employees directly from the larger Maasai community that engage with communities on a daily basis.

Biodiversity assessment: This aspect of the project will be coordinated by CarbonSolve (https://carbonsolve.world/) through its relationship with the Biodiversity Research Institute (https://briwildlife.org/), a world leader with vast international experience in conducting biodiversity surveys of various taxa.

Carbon measurement and monitoring: The project carbon accounting will be overseen by CarbonSolve and its relationship with Soils for the Future USA (SftF USA; see https://www.soilsfuture.com/). SftF USA, headed by Mark Ritchie, Ph.D. has experience in designing and validating multiple carbon projects, and is a Verra expert in carbon modeling, especially in rangelands under different grazing management regimes. SftF USA also brings various tools to the project, including the SNAPGRAZE model that links grazing management to soil carbon dynamics, and different satellite-based methods of assessing livestock impacts and movement.

Kenya-based project management and administration: The project requires substantial daily efforts by project proponent employees of SftFA, including financial, human resources, logistics, and grazing coordinators and community liaisons.

Carbon sales: Climate Asset Management (CAM), is a U.K.-based joint venture of HSBC Asset Management and Pollination founded in 2020 and specializing in natural capital investment. Climate Asset Management has set up Funds to invest in nature-based solution projects that generate high quality carbon credits. CAM has entered into an ERPA with CarbonSolve and SftFA. CarbonSolve - through its relationship with multiple major carbon buyers or brokers - is well equipped to monetize any volume of carbon credits that are not contractually agreed under the ERPA with CAM.

2.4.3 Management Team Experience (VCS, 3.19; CCB, G4.2)

Mark Ritchie, Ph.D., is a Director of CarbonSolve and a Director of Soils for the Future Africa. Dr. Ritchie is also the author of VM0032, the approved Verra Methodology used by CarbonSolve's soil carbon projects. Dr. Ritchie has published predictive models in the peer-reviewed literature that are used to implement VM0032, led the application of the methodology to the Northern Kenya Rangelands Project, and is deeply engaged with the scientific underpinnings of the KRCP, as well as supporting and supervising on-the-ground activities by KRCP staff.

Timothy H. Tear, Ph.D., is a Director of Soils for the Future Africa and also a Director at CarbonSolve. Dr. Tear is an Africa conservation specialist and Director of BRI's Climate Change Program, that has prioritized rangeland carbon projects as a central initiative of climate change work at BRI. Dr. Tear is available to support field-based monitoring and provide oversight of governance systems via on-the-ground training and capacity building. These two Directors make frequent trips to the KRCP, and are available for remote technical assistance training and coordination meetings.

SftFA is led on-the-ground by Jackson Kikardi Suiyanka. Mr. Kikardi is a Kenyan citizen and resident who was born and raised in Kajiado County. He is the Country Coordinator for SftFA, is a partial owner in the company, and oversees the day-to-day operations of the KRCP. Mr. Kikardi has extensive experience in soil carbon monitoring and evaluation, program logistics, and is a respected member of the Maasai community in Kajiado. Presently, he is building his local management team, that includes

other members of the Maasai community in Kajiado and currently includes two grazing coordinator supervisors, the lead accountant, and soon will be joined by a Director of Monitoring and Evaluation.

2.4.4 Project Management Partnerships and Team Development (VCS, 3.19; CCB, G4.2)

SftFA has entered into a contract with Converge Catalysts (www.convergecatalysts.com) to support socioeconomic data collection and community engagement strategies in the KRCP. Converge works "at the nexus of monitoring and evaluation, strengthening governance and building ecosystem resilience for improving ecological productivity." They state that "when these converge, we seek to establish carbon finance projects." Their team is made up of socio-economists, ecologists, GIS/Remote Sensing specialists, translators, and experts in data analysis, finance and technology. Converge is led by Deepali Gohil, who has a master's degree in economics, and has been working at Converge since 2016. Prior to that, Ms. Gohil was an impact monitoring specialist for the Northern Rangelands Trust, where she worked on the largest soil carbon project in the world – the Northern Kenya Grasslands Project. Ms. Gohil still provides consulting services for NRT.

SftFA has contracted with Kieti Law (https://www.cliffedekkerhofmeyr.com/en/about/kieti.html), for legal advice on all issues concerning carbon project development. Kieti Law has worked closely with the Government of Kenya on the development of carbon regulations.

Similarly, SftFA has also contracted with Russell Bedford Alexander and Associates in Nairobi (https://russellbedford.ke/) to support all the project accounting. Established in 1967, Russell Bedford Alexander & Associates is a certified/chartered accounting firm, serving over 300 clients from various industries locally, and across the region.

SftFA currently has over 50 full-time employees and continues to hire and build capacity in Kenya.

2.4.5 Financial Health of Implementing Organization(s) (CCB, G4.3)

Soils for the Future Africa (SftFA) and CarbonSolve have entered into a long-term collaboration agreement with Climate Asset Management (CAM – see Climate Asset Management | Investment Strategies) to ensure the financial sustainability of the KRCP. CAM is a London-based asset manager specializing in nature-based investment strategies and currently manages over $650 million USD in global assets from companies and investors, including Apple and HSBC.

As part of its Nature-Based Carbon Strategy, CAM provides upfront financing for large-scale landscape restoration and conservation initiatives in developing and emerging markets, including the KRCP. This financial model ensures that project activities – such as RRG implementation, biodiversity monitoring, and community benefit-sharing mechanisms – are adequately funded throughout the project's 40-year duration.

CAM's investment agreement with KRCP secures financial support by committing capital in exchange for the future flow of high-quality carbon credits generated by the project. High-quality carbon credits

are defined as those resulting from verified landscape restoration activities, which also yield tangible benefits for local communities, biodiversity, and ecosystems.

To further mitigate financial risk, the project proponents have also established:

- A structured financial plan ensuring that project funds are allocated effectively to cover operational, monitoring, and implementation costs. The project has provided a confidential financial model to the validator that demonstrates that the financial mechanisms adopted provide an adequate actual and projected flow of funds, and also demonstrates projected revenues from carbon dioxide removals that substantiate the projection of self-sustainability after year 4.
- A benefit-sharing mechanism that reinvests revenue from carbon credits sales back into the participating communities.
- Contingency planning for financial sustainability, including diversified revenue streams beyond carbon credit sales, such as conservation partnerships and ecosystem service payments.

This financial framework ensures that KRCP is well-capitalized throughout its lifetime and capable of delivering its intended climate, community, and biodiversity benefits while maintaining financial integrity and long-term viability.

2.4.6 Avoidance of Corruption and Other Unethical Behavior (VCS, 3.19; CCB, G4.3)

Neither the project proponent nor any of the other entities involved in the project are involved in any form of corruption, bribery, or other unethical behavior. SftFA is a new company, formed in 2022. To quickly achieve the highest internationally accepted standards, it relied on the support of the non-profit BRI's time-tested approach (25 years) of adhering to globally recognized policies and standards for ethical behavior (https://briwildlife.org/about-us/mission/). BRI embraces a workplace empowered by diversity, equity, and inclusion. As such, BRI is committed to recognizing and addressing systemic inequities that have historically limited or excluded some groups from participation in wildlife science. BRI captures their philosophy on sound business practices in an employee handbook that serves as a "one stop shop" for all guidance and policies related to the ethical behavior of all employees. Working with staff from BRI, SftFA modified this employee handbook for use in Kenya.

Within the SftFA Employee Handbook is a section on "Anti-Corruption (Fraud, Bribery, Collusion, Money Laundering) and Terrorism." In this section, it states that "SftFA is committed to the prevention of corruption (fraud, bribery, collusion, money laundering) and terrorism - and any other forms of dishonesty and will promote an anti-corruption culture. It is our policy to conduct all our business in an honest and ethical manner. We take a zero-tolerance approach to all forms of corruption. We are committed to acting professionally, fairly and with integrity in all our business dealings and relationships wherever we operate, implementing, and enforcing effective systems to counter corruption."

Furthermore, it states that "SftFA's anti-corruption policy applies to the conduct of all staff. It also applies to volunteers, consultants, associates or agents of SftFA and any third party acting on its behalf, or any other person associated with SftFA, wherever they may be located. SftFA will investigate

all suspicions of corruption committed by staff, suppliers and other third parties. SftFA requires all staff to act honestly and with integrity at all times; and to report all suspicions of corruption. We will uphold all laws relevant to countering corruption in all the jurisdictions in which we operate."

In addition, it states that "SftFA does not do business with other companies or individuals that directly or indirectly to assist in, sponsor, or provide support for acts of terrorism or to support organizations or persons listed as terrorists on lists maintained by the United States government, the United Nations, the European Union, and other entities."

Finally, SftFA's handbook provides important definitions so that all employees are aware of each term – and sign a document declaring that they have read the handbook and understand its implications before formal employment can commence. The definitions are as follows:

- Corruption - Is an act of dishonesty or criminal offence committed by a person or organization entrusted with a position of authority, to acquire illicit benefit or abuse power for private gain. Corruption may include many activities including bribery and embezzlement, though it may also involve practices that are legal in many countries.
- Fraud - A deliberate intent to acquire money or goods dishonestly through the falsification of records or documents. The deliberate changing of financial statements or other records by a staff or supplier of SftFA.
- Bribery - Is the offering, promising, giving, accepting or soliciting an advantage as an inducement for action that is illegal or a breach of trust. A bribe is an inducement or reward offered, promised or provided to gain any commercial, contractual, regulatory or personal advantage.
- Collusion – Involves firms coming to an agreement to artificially raise prices and increase profitability at the expense of consumers.
- Money laundering - Is the process of concealing the origin of money, obtained from illicit activities by converting it into a legitimate source.
- Terrorism - the unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims.

2.4.7 Commercially Sensitive Information (VCS, 3.5.2 – 3.5.4; CCB Rules, 3.5.13 – 3.5.14)

The public version of the project description has not had any commercially sensitive information excluded or removed from it.

Section	Information	Justification
2.4.7	No commercially sensitive information has been withheld from the project document	The SNAPGRAZE model is copyrighted but is considered shareware. All other relevant data including baseline soil carbon stocks is intended to be publicly available and shared with communities and other stakeholders.

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (VCS, 3.1, 3.6. 3.7, 3.14, 3.18, 3.19; CCB, G5.6)

The project is complying with all relevant national, regional, and local laws, statutes, and regulatory frameworks in Kenya that apply to the project activities.

Key Laws Relevant to Project Activities

The following national and regional laws are applicable to the project:

- Land Act, 2012 (Land Act)
- Land Registration Act, 2021 (LRA)
- Community Land Act, 2016 (CLA)
- Land Control Act (Cap. 302) (LCA)
- Kenya Co-operatives Act, 2005 (Cap. 490)
- Wildlife (Conservation and Management) Act, 2013 (Cap. 376)
- Occupational Safety and Health Act, 2007
- Kenya Employment Act, 2007 (Rev. 2012) (Cap. 226)
- Environmental Management and Co-ordination Act, 1999
- Constitution of Kenya, 2010
- Climate Change Amendment Act, 2023

Local Laws & Regulatory Frameworks

The following local and county-level laws are also relevant to the project:

- Kajiado County Community Land Management Policies
- Kajiado County Integrated Development Plan (CIDP), 2023-2027
- Kajiado County Natural Resource Management By-Laws

Laws Related to Devolution of Government

The following laws are relevant in relation to devolution of government, particularly in terms of land administration, governance, and financial management at the county level:

- The County Governments Act, 2012 – Establishes structures and functions of county governments.
- The Intergovernmental Relations Act, 2012 – Governs collaboration between national and county governments.
- The Urban Areas and Cities Act, 2011 – Provides for the management of urban areas within counties.
- The Public Finance Management Act, 2012 – Regulates financial management in government institutions, including counties.
- The Transition to Devolved Government Act, 2012 – Outlined the process of transferring functions from national to county governments.
- The National Government Loans Guarantee Act, 2011 – Governs financial borrowing at the county level.

- The Elections Act, 2012 – Establishes electoral processes at all levels of government.
- The Leadership and Integrity Act, 2012 – Ensures ethical governance in public service, including county governments.
- The Political Parties Act, 2009 – Regulates political party activities, which may influence local governance structures.

Compliance, Assurance, & Implementation

To ensure compliance with all listed laws, the project is implementing the following measures:

1. Legal Review & Monitoring
    a. The project team works with legal advisors and regulatory bodies, including the National Environment Management Authority (NEMA) and Kajiado County Government, to ensure compliance with national and local legal frameworks.
    b. Annual legal compliance audits are conducted to assess adherence to environmental and land management regulations.
2. Regulatory Approvals & Permits
    a. The project has obtained a Letter of No Objection from NEMA (2023) and approval from the Kajiado County Government, ensuring alignment with applicable regulations.
    b. Compliance with the Climate Change Amendment Act, 2023 is maintained through adherence to NEMA's climate action guidelines.
3. Community Land Governance Compliance
    a. The project adheres to the Community Land Act, 2016, ensuring that land tenure rights and benefit-sharing agreements are in accordance with national policies.
    b. Regular stakeholder engagement meetings are conducted with county officials and community representatives to ensure that project activities align with county-level laws and policies.
4. Environmental & Social Compliance
    a. The project follows Environmental Impact Assessment (EIA) guidelines as required under the Environmental Management and Coordination Act, 1999.
    b. The project integrates wildlife conservation measures to comply with the Wildlife Conservation and Management Act, 2013.
    c. Worker safety and labor rights are ensured under the Occupational Safety and Health Act, 2007 and the Kenya Employment Act, 2007.

2.5.2 Relevant Laws and Regulations Related to Worker's Rights (VCS, 3.18.2; CCB, G3.11)

Awareness

The KRCP is committed to full compliance with all Kenyan labor laws and regulations governing workers' rights, health, and safety. The project adheres to the following laws:

Applicable Labor Laws:

1. Employment Act of 2007 – Regulates employment contracts, working conditions, wages, and worker protections.
2. Occupational Safety and Health Act of 2007 – Ensures workplace safety and health standards.
3. Labor Relations Act of 2007 – Governs trade unions, collective bargaining, and dispute resolution between employers and employees.
4. Work Injury Benefits Act of 2007 – Establishes employer responsibilities for compensation in cases of work-related injuries and illnesses.

To ensure compliance, SftFA has engaged Russel Bedford Alexander and Associates of Nairobi, Kenya, a professional labor and compliance consultancy, to oversee employment coverage, taxation, and legal obligations related to worker protection.

Worker Rights Awareness & Training Measures:

The KRCP ensures all project staff and workers are informed of their rights through the following mechanisms:

- Employee Handbook & Workplace Policies
  - The Soils for the Future Africa (SftFA) Employee Handbook serves as a comprehensive reference for worker rights, ethical workplace conduct, and grievance procedures.
  - It explicitly outlines freedom on association, the right to collective bargaining, and non-discrimination policies, reinforcing compliance with Kenyan labor laws.
- Mandatory Worker Rights Training
  - All employees receive annual training on workers' rights, workplace safety, and dispute resolution mechanisms.
  - Training covers employment conditions, anti-discrimination laws, workplace safety standards, and grievance reporting procedures.
  - New hires undergo an onboarding session where they are briefed on their rights and project policies.
- Grievance Mechanism & Reporting Channels
  - A confidential grievance reporting system allows workers to report labor violations, workplace concerns, or human rights issues without fear of retaliation.
  - Workers can file grievances via multiple channels:
    - In-person reporting to KRCP supervisors or HR representatives.
    - Email, phone, WhatsApp, and SMS communication.
    - Anonymous reporting mechanisms integrated into the Salesforce CRM system for case tracking and resolution.
  - Complaints are addressed within the designated timeframes, following the three-stage grievance resolution framework (initial resolution, mediation, arbitration/legal action if required).

2.5.3 Human Rights (VCS, 3.19)

In alignment with the United Nations Declaration on the Rights of Indigenous Peoples and ILO Convention 169 on Indigenous and Tribal Peoples, the project will protect the rights of land ownership and possession for Maasai pastoralists, who are the majority landowners. The project collaborates with Maasai pastoralists,to implement RRG and respects the cultural and spiritual importance of their relationship with the land. The landowners have historically been aggregated, based on clans, into now defunct group ranches that have transitioned into communal landholdings (conservancies, cooperatives and trusts) or own individual lands. These remain clan-based structures of aggregation.

The project emphasizes the efficient and regenerative nature of rapid rotational grazing, which is grounded in traditional knowledge and practices and helps protect and preserve the environment of the Maasai territories.These practices are integrated with monitoring regulations and technology to establish a holistic system that harmonizes traditional knowledge with technological advancements. A key aspect of these plans is the recognition and utilization of traditional knowledge, particularly regarding land use patterns, mobility, and seasonality. Additionally, central to the Maasai culture is the idea of sharing resources, which the project encourages for on-project area communities. Furthermore, the project will honor and protect the customary cultural and governance values and structure of Maasai society, where elders make decisions, while youth and men are responsible for implementation. To do so, regular consultations with grazing committees and village elders are conducted, and traditional conflict resolution mechanisms are employed to address general conflicts. Consensus meetings serve as the primary platform for discussing items and issues, and allow Maasai landowners to participate in the formulation and implementation of project activities.

The project has fomented a deep understanding of the Maasai culture, having employed more than 70 Maasai in full-time and part-time position that forms the core of the KRCP community engagement process, and seeks to respect, protect, and strengthen Maasai pastoral values, identity and practices. As described at multiple points throughout the document, Benefit Sharing Agreements for the project are subject to specific provisions including required translation into local languages, required majority concensus, approval by traditional Maasai governance structures, and inclusion of risk mitigation that serve to recognize, respect, and promote the protection of Maasai rights, In line with the United Nations Declaration on the Rights of Indigenous Peoples, the project affirms the equality of Maasai people, and the urgent need to respect and promote their inherent rights derived from traditional structure, culture, and self-organization, As described by the International Labor Organization's Convention 169, the project affirms that the measures adopted by the project to safeguard Maasai culture and environment shall not be contrary to the communities' freely expressed wishes and that communities are fully consulted in regards to any administrative measures. The project respects Maasai self-determination and the right to decide community development priorities, as they are enabled through carbon revenue as a result of the project.

2.5.4 Indigenous Peoples and Cultural Heritage (VCS, 3.18, 3.19)

Hi Rich The Maasai community practices semi-nomadic pastoralism. They move from one place to another in search of pasture and clean water. Their movement and duration for which they settle in one area are determined by rain. In drought seasons, they migrate further away from their permanent settlement. Wet and dry grazing blocks are determined by factors such as closeness to permanent water sources and the quantity and quality of forage. Wet season grazing blocks are in located in areas receiving more rainfall and have lush vegetation and are close to permanent settlements. Dry season grazing areas are selected so that livestock can get access to water sources and grass remains

available during the entire dry season. Establishment of temporary home settlement areas (Ronjo) is determined by proximity of grazing blocks to permanent homes, the more the distance livestock have to cover to get pasture and water, the more likely elders will advise herders and warriors to migrate with livestock to avoid the long distances covered.

The KRCP uses the basis of the semi-nomadic pastoralism to create a new system of more intense and higher impact rapid rotational grazing. It retains the wet and dry season grazing blocks, however it requires these to be grazed only once a year. Livestock are moved together in tightly bunched herds to new forage on a daily basis. Livestock herds are grazed in a single location until the grass reaches the height of four fingers put together (the width of your palm or length of your thumb - approximately 5cm) or for a maximum of 14 days - whichever comes first. Livestock herds will be encouraged to move across the landscape so as to avoid over-use of areas near settlements or water points. Some areas will be rested for one complete year to allow recovery from past grazing or to provide grass banks during the dry season or droughts, but different areas will be rested each year in order to reduce animal impacts and re-establishment of a diverse plant communities in all areas. Herders follow agreed-upon grazing plans for livestock movements that are developed by community grazing committees with support from KRCP grazing coordinators. Grazing coordinators employed by the project in each grazing area will monitor and advise herders and grazing committees in the field.

2.5.5 Statutory and Customary Property Rights (VCS, 3.18, 3.19; CCB, G5.1)

The Maasai's ancestors came to East Africa from southern Sudan in the first millennium AD. They ‘settled' in Kenya and Tanzania, where they now dwell, with a large part of Maasailand following the Rift Valley and spreading out on either side. At their peak in the early nineteenth century, they inhabited territory on both sides of the Rift from Lake Baringo in the north to central Tanzania in the south. British colonialists forced the “Purko” section of the Maasai through treaties signed in 1904 and 1911 into smaller reserves in Southern Kenya now commonly referred to as “Maasailand.”

During the pre-colonial and most of the colonial period in Kenya, the Maasai lived in traditional communities where land was communally owned for the individual benefit of all the community members. There was no individual ownership of land as the concept of individual rights did not exist. The land belonged to the community and was held for the benefit of all the people. Equality in access and use of land was guaranteed by customary rules prescribed by cultural norms.

The treaties of 1904 and 1911 enabled Maasailand, represented by crown lands to be held in trust for the entire communities. The land adjudication process in the late 1960s, gradually transformed the two southern Maasai districts of Kajiado and Narok from trust to freehold because of a government land adjudication initiative. This paved the way for the formation of group ranches, because many Maasai feared that land adjudication would adversely affect the territorial integrity of Maasai rangelands (Rutten,1992; Kimani and Pickard,1998). In areas of varying sizes, representing divisions of traditional "sections,"[84] group ranches were formed, the titles of which were held by formally constituted "group

[84] Maasai customary territories are sub-divided into sections (*Il-oshon*) and subsections (*In-kutot*).

representatives," composed of adult males with recognized claims to local residence who were registered as members[85].

As one observer noted regarding the formation of group ranches[86], they "*were formed under the Land (Group Representative) Act of 1968. This was an Act of Parliament to provide for the incorporation of representatives of groups who had been recorded as owners of land under the Land Adjudication Act, and for the purpose connected collective pastoral management and resource use. This arrangement continues to be maintained until the members decide to dissolve the group ranch (The Land Group Representative Act -Cap 287). The group ranch can be dissolved upon a written application to the registrar signed by a majority of the group representative pursuant to a resolution passed by a sixty percent of the group present in person or proxy at a special general meeting convened for that purpose. The affairs of the group shall be wound up in such manner as the registrar may approve*."

Fifty-two group ranches were incorporated, encompassing 75% of Kajiado District by 1985[87]. Pastoralists continued to manage their herds largely based on subsistence strategies and movement of their livestock across group ranch boundaries when climatic conditions demanded it. Whereas traditionally there were eight sections in Kajiado District with a mean size of 2275 km^2, in 1985 there were 51 group ranches, with a mean size of 300 km^2, and hundreds of individually owned ranches[88].

Barely ten years after their creation there were demands for their dissolution and subsequent division into individual, titled units for distribution among registered members [89]. Disintegration began as early as the mid-1970s to early 1980s and gained momentum for a decade starting the mid-1980s. "*In 2000, thirty-one group ranches had subdivided and been issued with titles. An additional fourteen that had resolved to subdivide were being surveyed and demarcated. Only twelve group ranches had resisted subdivision*"[90].

To help provide clarity and curb sub-division for enhanced pastoral livelihoods and conservation, The Community Land Act, No. 27 of (2016) was introduced. The Community Land Act looks to provide legal protection and recognition of pastoral groups with an aim of registering and allowing land ownership by communities. According to a report issued by Namati (*2023*), as of May 2023, 7 years after the enactment of the Community Lands Act, only 46 out of 315 group ranches in the country had fully transitioned. This represented only 14% of the undissolved group ranches in Kenya. The main barriers

[85] John G. Galaty, "Grounds for Appeal: Maasai Customary Claims and Conflicts," *Anthropologica* 39, no. 1/2 (1997): 113, https://doi.org/10.2307/25605857.
[86] Paul Niati, "Group Ranches Subdivision Study in Loitokitok Division of Kajiado District, Kenya," Land Use Change Impacts and Dynamics (LUCID) Working Paper (Nairobi, Kenya: International Livestock Research Institute, February 2002), https://cgspace.cgiar.org/items/e1904c70-cfe2-4be5-b1ca-2a521b89089f.
[87] P.K. Thornton et al., "Modelling the Impacts of Group Ranch Subdivision on Agro-Pastoral Households in Kajiado, Kenya," *Agricultural Systems* 87, no. 3 (March 2006): 331–56, https://doi.org/10.1016/j.agsy.2005.03.001.
[88] Solomon Bekure, ed., *Maasai Herding: An Analysis of the Livestock Production System of Maasai Pastoralists in Eastern Kajiado District, Kenya*, ILCA Systems Study 4 (Addis Ababa: ILCA, 1991).
[89] Esther Mwangi, "The Puzzle of Group Ranch Subdivision in Kenya's Maasailand," *Development and Change* 38, no. 5 (September 2007): 889–910, https://doi.org/10.1111/j.1467-7660.2007.00438.x.
[90] Mwangi.

to progress included conflicts among group members (39.7%), financial constraints (22.5%), lack of information on the transition processes (20.6%), and registration challenges (17.2%).

The KRCP is working with the communities through appropriate channels of legally recognized customary and property rights including institutions that have transitioned to community lands, individual ranches, and group ranches that have sub-divided but are still aggregated in legally registered land management structures.

Current Land Tenure & Use Rights in the Project Area

The KRCP operates within a diverse tenure framework, including:

- Registered community lands under the Community Land Act.
- Individually owned ranches established from subdivided group ranches.
- Group ranches still aggregated under legally registered land management structures.

Land tenure and resources vary across the project area. While community landowners retain grazing rights and resource access, land-use decisions must align with local governance structures. To provide further clarity, Figure 2.1 (referenced in Section 2.1.16) illustrates existing access and management rights within the project area.

2.5.6 Recognition of Property Rights (VCS, 3.7, 3.18, 3.19; CCB, G5.1)

In Kenya, land laws related to pastoral communities are primarily governed by the Constitution of Kenya, 2010, as well as various statutes and regulations. These laws recognize the unique land tenure systems and traditional practices of pastoralist communities and seek to protect their rights to land and natural resources. Some of the key laws and policies related to land rights of pastoral communities in Kenya are as follows:

- The Constitution of Kenya, 2010: This constitution guarantees the rights of communities to own ancestral lands traditionally occupied by hunter-gatherer, pastoralist, or agriculturalist communities. Article 63(1) specifically recognizes the right of communities to own, manage, and control their ancestral lands.
- The Community Land Act, 2016: This law provides for the recognition, protection, and registration of community lands, including lands traditionally occupied by pastoral communities. It outlines the process for registration and management of community land and establishes institutions such as Community Land Management Committees to oversee community land matters.
- The Land Act, 2012: This legislation governs land tenure, administration, and management in Kenya. It contains provisions recognizing the rights of communities to own land collectively and provides for the conversion of community land into individual title deeds.
- The Land Registration Act, 2012: This act establishes the legal framework for the registration of land titles in Kenya, including communal lands held by pastoral communities.
- The Wildlife Conservation and Management Act, 2013: This law regulates wildlife conservation and management in Kenya. It recognizes the role of pastoral communities in wildlife

conservation and provides for their participation in wildlife management and benefit-sharing arrangements.

- National Land Policy: Kenya's National Land Policy provides guidelines and principles for land administration, management, and use in the country. It emphasizes the need to address historical injustices in land ownership and to recognize the rights of marginalized communities, including pastoralists.

These laws and policies aim to secure land tenure rights, promote sustainable land management practices, and empower pastoral communities to participate in decision-making processes concerning their lands and natural resources.

Kenya has various national and county institutions involved in its carbon regulatory framework. The Climate Change (Amendment) Act 2023 (CCA) is the guiding document for carbon project development in Kenya, augmented by the Natural Resources (Benefit Sharing) Bill, 2022 (the Natural Resources Bill). The Ministry of Environment, Climate Change and Forestry formulated the Climate Change (Amendment) Bill, 2023 (Bill) to incorporate carbon markets in the Climate Change Act and govern the participation in these markets. The Act, which will regulate carbon projects and trading in Kenya, came into force on 15 September 2023 and imposes various requirements on stakeholders in the carbon market. In addition to specifying project developer roles and responsibilities, it sets up the regulatory structures for Kenya to participate in projects under Article 6. Of relevance are the requirement of a project developers to submit and Environmental and Social Impact Assessment to NEMA and registration with the National Carbon Registry. The Amendment Act requires every land-based project to have a Community Development Agreement (CDA) in place. The CDA is intended to enable the identification of the stakeholders of the project; the establishment of a framework for the involvement and engagement of communities in carbon trading initiatives; and to document the impacted communities' socio-economic development priorities. Furthermore, the CDA should provide for the prescribed annual social contributions (being at least 40% for land-based projects and at least 25% for non-land based projects).

The Carbon Credit Trading and Benefit Sharing Bill, 2023 is currently being debated in the Kenyan parliament. It seeks to establish a carbon credit trading scheme and facilitate benefit sharing agreements. The bill seeks to create a system requiring project developers to obtain carbon trading licenses to be renewed every 7 years, create a Carbon Credit Trading and Benefit Sharing Authority to further manage revenue distribution between project developers, communities, county and national governments, and to create a Carbon Credit Trading Tribunal for dispute resolution.

The Natural Resources (Benefit Sharing) Bill, 2022 (Natural Resources Bill) is intended to apply to natural resources such as sunlight, water resources, wildlife resources, wind, industrial fishing, forests, biodiversity, and genetic resources. It defines the term benefit sharing as the "sharing of any benefits arising from the exploitation of natural resources in a fair and equitable manner". Exploitation, on the other hand, is defined to mean "the extraction or utilization of a natural resource for commercial purposes." As such, though not explicitly mentioning carbon projects, the use of sunlight, water or

forests for commercial purposes such as to earn carbon credits through the establishment of relevant carbon projects, may be read as falling within the provisions of the Natural Resources Bill.

Kenya currently has no clear laws defining carbon rights, however, precedence from numerous projects including Kasigau REDD+ project, Chyulu Hills REDD+ project and the Northern Kenya Rangelands Carbon Projects demonstrates that carbon rights are treated in the same manner as property rights. Land rights-holders whether individual or communal, through the Land Act, 2012 recognizes the rights to own, manage, and control their ancestral lands, including soil resources.

The following policies explicitly govern and guide the implementation of Kenya's low-carbon climate resilient pathway:

- National Green Fiscal Incentives Policy Framework
- National Climate Change Policy Framework
- National Climate Change Action Plan 2023–2027
- Kenya National Adaptation Plan 2015–2030
- National Climate Change Strategy 2010
- Environmental Management and Coordination Act Cap 387
- Sessional Paper on Drought Management
- Other miscellaneous sectoral laws and policies.

How the Project Recognizes, Respects, & Supports Property Rights

The KRCP ensures compliance with these laws by:

- Engaging communities in land-use planning to respect statutory and customary rights.
- Facilitating community landowners in decision-making related to carbon project participation.
- Ensuring Free, Prior, and Informed Consent (FPIC) is obtained before project implementation.

Support for Securing Statutory Rights

The KRCP does not replace or impose land tenure structures but assists community landowners in navigating legal processes when requested. Specifically:

- Providing informational resources on legal land registration requirements.
- Facilitating engagement with legal bodies where community landowners seek formal recognition.
- Working with registered community land management committees to support land tenure security.

2.5.7 Free, Prior and Informed Consent (VCS, 3.18; CCB, G5.2)

Description of process for obtaining consent	Soils for the Future Africa (SftFA) started engaging with communities in September 2021 by first identifying the right holders and their representatives – the group ranch leadership. Informative meetings to describe the intention, project activities, potential benefits and risks, and project cycle were held in the

respective Phase 1 group ranches, and central towns of Kiserian and Kajiado as determined by the respective group ranch leadership. These meetings sought to clarify the right holders, land tenure and legal registration of the group ranch under the laws of Kenya. Group ranch leadership have in turn engaged in the traditional structures to pass this information across their constituencies. This has included engaging with grazing committees, who have then informed their constituents of the project. The iterative process has ensured that initial project information has been communicated to the relevant parties.

SftFA has recruited a team of Grazing Coordinators to further engage with the communities. The project team has trained the grazing coordinators on FPIC protocols. Meetings are organized in collaboration with group ranch, zonal and community leadership. These meetings seek appropriate times and availability based on feedback from constituents. Clear agendas for the meetings are also established and communicated. Prior to commencing meetings, project details are shared with attendees to refresh the purpose and objectives of the Kajiado Rangelands Carbon Project. The details have been simplified and translated into Maasai and Kiswahili for ease of communication and consistency of messaging. All meetings conducted with stakeholders are recorded through a meeting reporting form. Meeting report forms capture details of attendees with signatures of consent, details of meeting objectives, discussions and next steps.

During the initial consultation stages with the group ranch leadership, a draft Memorandum of Understanding (MOU) was presented to the group ranch leaders. It was stressed that this was a draft version, and the group ranch leadership should engage with their members and get advice from legal experts to review and refine on any concerns they have. The MOU described the process that leads to joining the project – including entering into this MOU to show intent, then to follow with a similar engagement process that would result in the transfer of carbon credits and entering into a benefit sharing agreement. The primary purpose of the MOU was to indicate a consensus and goodwill towards initiating the project consultation process.

The Draft Benefit Sharing Agreement and Draft Transfer of Carbon Rights agreements have also been shared with the Group Ranch leadership for review with their respective lawyers. These

	documents were also be translated into local Maasai language for wider distribution within the communities for review. Once deliberations with the community are completed, StfFA is invited to an AGM where majority of community is present. Where group ranches are sub-divided, individuals sign a transfer of carbon rights to an established legal entity (e.g., a cooperative society), which then sign the agreement with SftFA. Where consent is withheld, the project proponents (SftFA) will repeat the FPIC process all over again. More meetings and consultations with communities/individuals who have withheld their consent will be planned. Causes of refusal will be established, renegotiations considered and terms & conditions fixed until consensus is reached.
Outcome of FPIC process	The project has signed transfer of carbon rights agreements with the initial participating communities, with the associated PAIs identified as Eselenkei Group Ranch Cooperative Society Limited; Olgulului Conservation and Development company with a separate agreement with Oloitiptip Ranch Organization; Olkeri Community; Olkirimatian Community; Shombole Community Land, and the Elesai, Murtuna, Osewan, and Oltepesi conservancies (four of the ten RAMAT East conservancies). The project is currently in the process of finalizing carbon rights agreements with additional PAIs and those agreements will be appended to the project documentation upon completion.

2.5.8 Benefit Sharing Mechanisms (VCS, 3.18, 3.19;)

Process used to design the benefit sharing plan	The benefit-sharing agreement was developed through extensive community consultations, participatory workshops, and engagement with local governance structures. The agreement incorporates feedback from multiple rounds of discussions to ensure equity and transparency. The project proponents have documented the consultative process in meeting records, which are accessible for review by stakeholders.
Summary of the benefit sharing plan	The benefit-sharing agreement specifies that 70% of net revenues will be distributed to participating communities. The allocation is based on the amount of viable rangeland a community has entered into the carbon project and the effectiveness of grazing plan implementation. Community representatives participated in developing the revenue-sharing framework to ensure fairness and transparency.

	Where affected stakeholder groups wish to keep elements of the benefit-sharing plan private, those elements have been documented separately in commercially sensitive agreements, which will be available to authorized stakeholders upon request. The project proponents have obtained written confirmation from affected communities that they wish to maintain confidentiality on these aspects.
Approval and dissemination of benefit sharing plan	The benefit-sharing agreement was reviewed and approved by community representatives during formal meetings and workshops. The agreement was shared in a culturally appropriate manner, including oral presentations in Maasai and Kiswahili and written translations provided to local leaders. Stakeholders who wish to review the benefit-sharing agreement may do so through designated community representatives or by requesting access from the project proponents. Copies of the agreement are stored at community offices and with the legal representatives of each participating entity.

2.5.9 Property Rights Protection (VCS, 3.18, 3.19; CCB, G5.3)

At no time in this project will any planned grazing activities or other project activities directly or indirectly result in the involuntary removal or relocation of property rights holders from their lands or territories, nor will they displace activities essential to culture and livelihoods.

Rapid rotational grazing (RRG) management does not require relocation from lands currently used for grazing—an activity central to pastoralist culture and livelihoods. Instead, it represents a collaborative effort among pastoralist communities to intensively graze designated rangeland sectors before allowing them to rest, ensuring a sustainable and regenerative grazing system.

In addition to protecting land tenure and cultural practices, the project is committed to upholding human rights and ethical labor standards. HR protocols mandate full compliance with international and national labor laws, ensuring that no victims of human trafficking, forced labor, or child labor are involved at any stage. The project undergoes regular audits and training to confirm adherence to these standards, with zero tolerance for exploitation. Policies and procedures are in place to monitor and prevent any violations, safeguarding the dignity and rights of all workers.

With respect to children's participation in grazing activities, Soils for the Future Africa does not support child labor. As stipulated in the Employee Handbook, Principle 5 explicitly states the organization's commitment to the abolition of child labor. No children are permitted to take responsibility for the implementation of project-related RRG activities. However, pastoralist communities have long-standing cultural practices of teaching children about livestock management through observation and guided participation—which is considered education, not labor.

These culturally significant practices are often differentiated by gender:

1. Women's Role in Livestock Care
   Among the Maasai, women are traditionally responsible for caring for small livestock and milking cows that graze near their homes, ensuring that households have ready access to meat and milk. While adult women hold this responsibility, they also teach their children how to care for animals

as part of cultural education. The KRCP's RRG approach enhances forage availability around homesteads, reducing the need for women and children to travel long distances to herd. This in turn lightens household burdens and allows children to attend school, while also improving nutrition for young children and the elderly.

2. Herding Responsibilities & Cultural Education for Boys
In KRCP RRG plan implementation, young adult men (not children) are responsible for cattle herding. These individuals must be old and mature enough to protect herds from wild animals coexisting within the rangelands. However, as part of cultural tradition, young boys observe and learn herding practices from older men. While they may participate in herding as an educational experience, they are never responsible for executing RRG plans.

Beyond reinforcing cultural traditions, KRCP actively supports children's access to education, helping to reduce child labor. A significant financial barrier to education in participating communities is the cost of school fees. As outlined in community proposals, many communities have chosen to allocate a portion of KRCP's financial benefits toward bursaries and education, in some cases covering school fees for all children in the community. This investment helps mitigate the risk of children dropping out of school and reverting to herding as a livelihood strategy due to financial constraints.

2.5.10 Illegal Activity Identification (VCS, 3.19; CCB, G5.4)

In many areas of Kenya, poaching, illegal wildlife trade, and livestock theft present challenges to biodiversity conservation and local livelihoods. However, these activities are limited within the KRCP due to several factors, including cultural values, conservation-minded practices among the Maasai, and ongoing mitigation efforts by conservation organizations.

1. Poaching & Illegal Wildlife Trade

The Maasai community has strong cultural taboos against poaching and illegal wildlife trade, contributing to their rarity in the project area. The Maasai do not traditionally engage in these activities, as they prioritize the conservation of wildlife and natural resources. Despite the minimal occurrence of poaching, proactive measures are taken to ensure ongoing deterrence:

- Community Awareness & Education: The project partners with conservation organizations to reinforce Maasai cultural conservation values and educate community members on the ecological and economic importance of wildlife.
- Monitoring & Reporting: Community members and grazing coordinators report any observed illegal wildlife activities to relevant authorities and conservation partners, such as Kenya Wildlife Service (KWS)

2. Livestock theft is not a significant issue within the project area because it primarily occurs between ethnic groups rather than within Maasai communities. Given that the KRCP operates entirely within a single ethnic group, the risk of livestock theft is inherently low. However, to further mitigate any potential risk:

- Community Enforcement: Traditional governance structures, such as age-set leaders and grazing committees, monitor livestock movements and ensure community-wide vigilance against theft.
- Livestock Branding & Registration: Many households mark and register their livestock, making it easier to track stolen animals and discourage theft.

3. Retaliatory Lion Killings & Their Mitigation

Some instances of retaliatory lion killings occur in response to livestock depredation. The project does not derive benefits from these activities, as they do not contribute to improved biodiversity outcomes. However, the community-related impact of increased livestock numbers (due to improved forage availability) is potentially affected by lion predation. Therefore, the KRCP supports mitigation efforts to reduce human-wildlife conflict, including:

- Partnerships with Conservation Organizations:
  - Lion Guardians (http://lionguardians.org/) operates in the broader Amboseli-Tsavo ecosystem, mitigating human-lion conflict through monitoring, early warning systems, and community education.
  - The Peregrine Fund is addressing poisoning incidents, which inadvertently harm vultures and raptors, through education programs and vulture liaison officers (https://www.peregrinefund.org/africa-program-vulture-liaison-officers). The KRCP is exploring a formal partnership with the Peregrine Fund to expand this work within the project area.
- Education on Biodiversity & Ecosystem Services: The KRCP integrates community workshops to highlight the benefits of biodiversity conservation, particularly emphasizing how predator populations regulate ecosystem balance and how reducing retaliatory killings can promote long-term ecological stability.
- Improving Livestock Protection Strategies: Encouraging the adoption of boma reinforcement, improved herding practices, and predator deterrents to reduce livestock losses.
- Community-Based Monitoring & Reporting: Grazing coordinators and local leaders will continue to monitor livestock predation trends and report human-wildlife conflict incidents to conservation partners.

2.5.11 Ongoing Disputes (VCS, 3.18, 3.19; CCB, G5.5)

Devolution is one of the major changes that the Constitution adopted by Kenyans and promulgated in August 2010 has made to the arrangement of government in Kenya (FES 2012). This process could create some disputes as the current Government of Kenya undergoes a process of developing new carbon regulations. The characteristics of Kenya's devolution (as described by FES 2012[91]) are summarized below, highlighting the challenges of a system of that relies on two levels of equal government. The core issue is that there are two levels of government created on equal basis by the Constitution, the County and National governments.

The Constitution divides Kenya into 47 counties with clearly defined geographical boundaries. This is found in Article 6 (1) and in the First Schedule.

Although the Constitution has created two levels of government and forty-seven counties, Kenya is still a unitary state.

[91] https://library.fes.de/pdf-files/bueros/kenia/09856.pdf

Although the two levels are distinct, they are required to respect each other and work in harmony. This is provided for in Article 6 (2) of the Constitution. This means that the relationship between the two must be consultative and cooperative.

Neither the County nor the National Government is senior or superior to the other. Both levels of government have power to secure resources. The two governments and institutions established under them are required by the Constitution to ensure participation by citizens in their affairs.

The two levels have democratically elected representatives and autonomous political authority. The elected representatives are for Senate, National Assembly, the President, the County Assembly and the Governor in each of the forty-seven counties.

The two levels of governments have a clear mandate to provide a range of significant services. These are outlined in the Fourth Schedule of the Constitution. The two governments can be taken to court or can take others to court. In other words, both the County and National governments are body corporate.

The two governments can hold bank accounts and employ staff. They have the power to control own budget and accounts and the ability to raise own revenue. The county governments have been given constitutional authority to make and enforce local legislation. Citizens equal access to available resources at either level is guaranteed.

At the time of writing this document, there are no known ongoing disputes related to devolution and the two levels of government that affect the project area. We only raise this issue because there is some uncertainty over the role of the County Government in the development of the carbon project. Regardless, the KRCP acquired letters of no objection from both the Kajiado County and the national government.

While there have not been any disputes related to devolution and the two phases of government in the project area, there have been some local disputes in Phase I communities regarding rights to lands, territories, and resources in the past twenty years. These include:

- In the Ogulului Group Ranch, there is an ongoing dispute regarding the legality of the 2018 election of the leaders of the Group Ranch, and thus whether any actions taken by these leaders since their election, including the continued subdivision and allocation of land, is legal (see Environment and Land Case 341 of 2019). Currently, an injunction is in place to pause the process of subdividing and allocating Group Ranch Land to community members. The carbon project's activities will have no bearing on the outcome of these legal proceedings, as the project does not involve purchasing or leasing land, and thus the project will not influence the legal issues in question. However, if the court deems the election of the current leaders of the Group Ranch to have been illegal, the community's participation in the project may be paused until new elections are held and a new MOU, Benefits Sharing Agreement, and Transfer of Carbon Rights Agreement are negotiated and signed with the new community leaders in place. Because the project will not influence the outcome of the dispute, no action needs to be taken on part of the project other than adjusting the participation of Ogulului as described above.

- A three-decade long dispute between the Osilalei and Eselenkei Group Ranches over 720 acres of land that lay on the boundary between the two ranches was resolved in 2024. The Governor of Kajiado, Dr. David Nkedienye, settled the dispute by awarding half of the disputed land to each group ranch (see https://www.kajiado.go.ke/governor-solve-720-disputed-land-boundary-between-osilalei-and-eselenkei-group-ranch/?utm). This conflict is fully resolved; thus, it will not be influenced by the project's activities and no further action is required by the project.

- In Olkiramatian, there is an ongoing dispute over the subdivision and transfer of an approximately 21,600 ha parcel of land (Environment and Land Case E053 of 2022). The subdivision and transfer were ruled illegal as it lacked approval from the community general assembly, and an injunction was issued in 2023 preventing further handling or subdividing of the parcel. This dispute will not be affected by the project's activities as RRG does not influence governance issues as noted above. In addition, no action is needed by the project as the resolution is related to governance, which is beyond the purview of the project.

- There is an ongoing dispute regarding the location of the boundary between the Olkeri Group Ranch and the Oldonyo-Nyokie Group Ranch. In 2023, the Environment and Lands Court ruled that the conflict needs to be resolved by the land registrar, which has the authority to determine property boundaries (see Environment and Land Appeal E022 of 2022 at https://kenyalaw.org/caselaw/cases/view/292538/) . As with other governance and land disputes, the project's activities will not affect the outcome of this dispute. However, the project will ensure its activities on the Olkeri Group Ranch avoid land that is actively under dispute with the Oldonyo-Nyokie Group Ranch, which is not currently part of the project; this will ensure that the project does not exacerbate tensions associated with the conflict.

In addition to the above conflicts, there is an ongoing, unresolved conflict in the Oldonyo-Nyokie Group Ranch in Kajiado county, which lies within the Project Geographic Area. This conflict stems from local governance issues related to community membership and how land is divided and allocated to community members. There have also been protests from some members of the community regarding their potential participation in the KRCP project (https://www.facebook.com/james.martineijnr/videos/residents-of-oldonyo-nyokie-group-ranch-protest-the-carbon-credit-deal-involving/989512603378006/). However, the Oldonyo-Nyokie Group Ranch is not currently engaging in the KRCP, and we will only resume our engagement with the community once these internal conflicts have been resolved and the community has collectively decided it is in its best interest to participate.

2.5.12 Approvals (CCB, G5.7)

The KRCP has received formal approvals from relevant authorities at multiple levels:

- **National Approval:** The KRCP has received a letter of no objection from the National Environmental Management Authority (NEMA), confirming approval for the project's development as described in the Project Concept Note submitted to NEMA.

- **Biodiversity Surveys & Monitoring Approval:** The project has received approval from Kenya Wildlife Service (KWS) for biodiversity baseline surveys and ongoing monitoring efforts within the project area.
- **County-Level Approval:** The Kajiado County Government has approved the project following discussion with county representatives, recognizing the project's alignment with local conservation and land management objectives.
- **Approval from Local Community Authorities:** Each initial PAI has received approval from the appropriate formal and traditional authorities. These approvals are documented through Memorandums of Understanding (MOUs), Benefit Sharing Agreements, and Transfer of Carbon Rights Agreements between local communities, conservancies, and Soils for the Future Africa. The agreements have been validated by both government-recognized community leadership and traditional governance structures, ensuring adherence to customary land rights practices.

Official approval documentation, including letters of no objection, government approvals, and signed agreements, are available as supporting documents.

2.5.13 Double Counting and Participation under Other GHG Programs (VCS, 3.23; CCB G5.9)

2.5.13.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program, or any other form of community, social, or biodiversity unit or credit?

☐ Yes ☒ No

2.5.13.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

2.5.13.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

2.5.14 Double Claiming, Other Forms of Credit, and Scope 3 Emissions (VCS, 3.24)

2.5.14.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

2.5.14.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

2.5.14.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

2.6 Additional Information Relevant to the Project

2.6.1 Leakage Management (VCS, 3.11, 3.15)

According to the VCS VM0032 Methodology, the project proponent must consider two forms of leakage: 1) displacement leakage from the movement of livestock off the project area where they may reduce soil carbon and 2) market leakage, where reductions in livestock numbers as a project activity would create market incentives to replace the lost livestock.

To address displacement leakage, the project proponent must prevent or manage incursion of livestock from outside the project area or limit excursion of livestock from inside the project area. Any impacts of such excursions on GHG emissions or reductions outside the project area must be accounted for as leakage (Eq. 18). Where the project area is not fenced, such as in open pastoralist systems in the KRCP, the movement and excursion of livestock to more than one kilometer from the project area boundary is considered leakage. This one-kilometer threshold, reduced from the two-kilometer distance prescribed in VM0032, is based on interviews with herders in the project region. These interviews indicate that community members can identify their position in the landscape with approximately one-kilometer accuracy using well-known terrain features and landmarks.

Livestock on the project area are monitored intensively by grazing coordinators, who submit bi-weekly reports of all grazing areas including livestock numbers and spatial coordinates plus the estimated fixed radius of the herd. These data are used to determine herd locations and whether the livestock belong to the reporting community, another community within the project area, or from outside the project area. Missing livestock that household surveys indicate should be present within a community will be tracked and their locations recorded. If such livestock are found within the grazing zones of another KRCP-participating community and can be shown to adhere to that community's grazing plan, that activity will not count as leakage. However, if the location of missing livestock is unknown or, if known but livestock movements cannot be monitored, then such animals will be counted as leakage.

Leakage methane emissions are deemed as zero because project methane emissions are accounted from project livestock regardless of whether they are on or off the project area and movement of project livestock off the project area does not result in a net increase in the number of livestock emitting methane. However, the movement of livestock into the project area increases livestock and their methane emissions, for which the project must account. In addition, movement of livestock out of the project area could result in losses of carbon from higher levels of overgrazing off the project area. Leakage may be accounted for in two possible ways – either by a monitored approach or penalty approach. The KRCP will employ the monitored approach where possible, both to identify when livestock travel outside the project area and where livestock from outside of the project area may enter the project area. In these cases, numbers and locations of encroaching livestock will be monitored and recorded by grazing coordinators, such that resulting disruption to grazing plans can be accounted for. Other off-project-area movements that cannot be monitored will likely be treated with the penalty approach. This is due in part to the fact that the penalty approach is a more conservative option (leakage calculations will likely be larger) but no monitoring of soils and/or vegetation outside the project area is required and off-project area use of grasslands, croplands, and forests is not differentiated. In this case, displacement leakage must be calculated as a proportion of net removals from increased soil carbon in year y, based on the estimated proportion of total project livestock-days in project year that occurred outside the project area.

Market leakage emissions result from an increase in activity by other producers of a commodity outside the project area to compensate for the reduced supply of a commodity from within the project area, such as increased timber harvesting elsewhere in a country to compensate for reduced harvesting in a project area. Market leakage is generally considered to be minimal in ALM projects because the projects still allow the same livelihood choices and production of grassland commodities (e.g., livestock). The applicability condition that limits project size, and thus potential impact of the project on national and international markets, reduces the chance that project activities will result in declining supply of livestock. Nevertheless, market leakage for any intentional reductions in livestock must be made by using the VCS module VMD0033 “Estimation of emissions from market leakage” to estimate LMy emissions from market leakage.

2.6.2 Further Information

No further information is required at this time.

3 CLIMATE

3.1 Application of Methodology

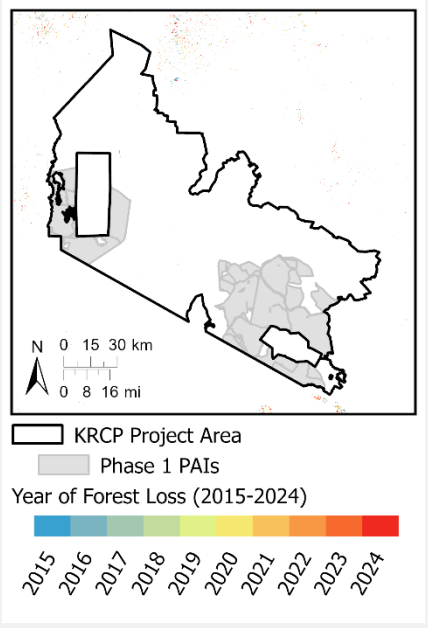
3.1.1 Title and Reference of Methodology (VCS, 3.1)

Type (methodology, tool, module)	Reference ID (if applicable)	Title	Version
Methodology	VM0032	Methodology for the Adoption of Sustainable Grasslands through Adjustment of Fire and Grazing	1.0
Module	VMD0016	Methods for stratification of the project area (X-STR)	1.0
Module	VMD0053	Model Calibration, Validation, and Uncertainty Guidance for the Methodology for Improved Agricultural Land Management	Module
Tool	VT0001	Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities	
Tool	N/A	AFOLU Non-Permanence Risk Tool	4.2
Module	VMD0033	Estimation of Emissions from Market Leakage	4.0

3.1.2 Applicability of Methodology (VCS, 3.1)

Reference ID/Title	Applicability condition	Justification of conformance
VM0032	General applicability: VM0032 applies to project activities that adjust the number, type and husbandry of grazing animals, adjust the frequency and intensity of planned or unplanned fires, and/or introduce herbaceous grassland species as potential forage for grazing animals or to restore degraded soils.	The KRCP proposes implementing rapid rotational grazing plans, which will adjust the husbandry practices of grazing animals in the project area.
VM0032	1) The project area must be grasslands in the baseline and project scenarios.	The KRCP project area is grasslands in the baseline scenario, with no conversion proposed or planned in any project scenarios.

VM0032	2) Lands are grazed and/or subject to fires in the baseline and/or project scenarios. Lands may be used for different purposes, such as livestock production, conservation, hunting or tourism.	Lands in the KRCP project area are grazed in the baseline and project scenarios. Some of the project area is used for tourism and/or conservation, but none of the project area is used for hunting (as hunting wildlife is illegal in Kenya since 1977 under Legal Notice 120 and later updated in the Wildlife (Conservation and Management) Act of 2013.
VM0032	3) The project must be structured to keep livestock within the project area, and the project proponent must be able to enforce the boundaries of the project area.	Grazing plans approved by participating communities will clearly identify and recognize the boundaries of the project area. These agreements will be generally sufficient to keep livestock within the project boundaries, with the assistance of paid grazing coordinators and with the understanding that all villages will be participants in ensuring that political boundaries are respected. Grazing plans are designed to keep livestock on the project area, which is sufficiently large to include viable grazing areas during both wet and dry seasons and in the case of local droughts. Meetings to communicate grazing plans emphasize to herders the need to remain in the project area and to avoid excursions into neighboring jurisdictions.
VM0032	4) The project must result in no net increase in the density of, or time spent by animals in confined corrals where dung can pile up and begin to decompose anaerobically and result in	The KRCP will not result in any net increase in density of animals or time spent in corrals (bomas), nor in any accumulation of dung that might result in conditions that favor additional methane or nitrous

	methane and nitrous oxide emissions, such as an increase in the number of livestock aggregated (e.g., kept in corrals or pens) that would result in more than 50 percent of the ground area covered by dung.	oxide production. On the contrary, it is expected that livestock will spend less time in bomas than they currently do, because they will travel farther distances more often under implementation of RRG.
VM0032	5) Baseline emissions derived from livelihood-driven human impacts on aboveground woody biomass (e.g., cutting for fuel wood, charcoal or timber sales) must be deemed de minimis (i.e., not included in the cumulative 95 percent of total baseline emissions) and project activities cannot significantly alter such livelihood-driven activities.	Baseline emissions from livelihood-driven aboveground woody biomass impacts will be de minimis in the project area, which is overwhelmingly dominated by grassland with minimal shrubland or woodland. We conducted an investigation into temporal and spatial patterns of forest loss in the project area during the previous 10 years of available data (2015-2024) using the Global Forest Change database[92]. 

[92] Hansen MC, Potapov PV, Moore R, Hancher M, Turubanova SA, Tyukavina A, Thau D, Stehman SV, Goetz SJ, Loveland TR, Kommareddy A, Egorov A, Chini L, Justice CO, Townshend JRG (2013) High-resolution global maps of 21st-century forest cover change. science. 342(6160):850-853

Overall, total forest loss within the KRCP project geographic area was 255.6 ha (0.02%). We found no significant temporal trend in annual forest loss across the KRCP project area from 2015 to 2024 ($p = 0.138$, $R^2 = 0.097$).

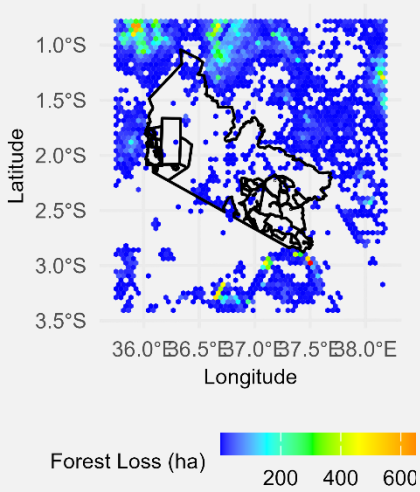
Spatially, we also examined annual forest loss within each initial project area instance (PAI) community (see table below, within this panel). No PAI community exceeded 0.022% total forest loss from 2015-2024.

Community	Forest Loss (ha)	Forest Loss (%)
Eselenkei	1.32	0.00%
Olgulului	0.00	0.00%
Olkeri	0.00	0.00%
Olkiramatian	3.78	0.02%
RAMAT East	11.79	0.02%
Shompole	11.63	0.02%
KRCP PGA Total	255.61	0.02%

Similar analyses will be conducted for future PAIs. Due to uncertainty related to inclusion, and final areas, we have not presented forest loss area or percentage loss for future PAIs here. The low overall forest loss of 255.6 ha (0.02%) in the KRCP project geographic area and lack of a temporal trend from 2015-2024 gives no indication that the applicability condition will not be met for future PAIs. However, we will conduct similar analyses for each future PAI to ensure applicability.

Forest loss is aggregated for visualization using hexagonal grid cells of ~21.7 km² (5 km across

east to west) because the scale and distribution of forest loss makes maps difficult to interpret (see the figure below, in this panel; the KRCP project geographic area and PAI Communities shown in black outline).



Additionally, deforestation estimates from charcoal production data[93] suggest an annual woodland loss of ~3,035 ha in all of Kajiado County (~0.07% annual deforestation rate). This rate is higher than the overall Global Forest Change database rate of 0.02% (604 ha) forest loss over 10 years in all of Kajiado County. Forest Loss was concentrated particularly in the Chyulu Hills and hilly region north of the KRCP project geographic area. This difference is likely partially attributed to the Global Forest Change database limiting analysis to stand level

[93] Walter Angwere Onekon and Koech Oscar Kipchirchir, "ASSESSING THE EFFECT OF CHARCOAL PRODUCTION AND USE ON THE TRANSITION TO A GREEN ECONOMY IN KENYA," *Tropical and Subtropical Agroecosystems* 19, no. 3 (December 16, 2016), https://doi.org/10.56369/tsaes.2243.

		disturbances rather than extrapolating forest loss from source attribution in surveys of charcoal traders (and users). Conservatively assuming 10% of this occurs in the project area instances (Global Forest Loss database estimates indicate that 4.7% of the Kajiado County forest loss from 2015-2024 occurred in the PAIs), the estimated GHG loss from woody biomass is 4,021 tCO_2e/year in the PAIs. Given these findings, livelihood-driven aboveground woody biomass impacts are considered de minimis, meeting this applicability condition.
VM0032	6) For projects that propose to modify grazing, the maximum individual project size is 3 million ha or 5 percent of a country's land area currently or potentially used to graze livestock, as judged by national government land use inventories or other documentation.	Published estimates of the amount of rangeland in Kenya range from 80-88% of Kenya's land mass of 582,650 sq km[94,95]. Given that the size of the project geographical area is less than 5% of the total area of rangelands in Kenya, this condition is safely met.
VMD0053	Model used must be publicly available, though not necessarily free of charge, from a reputable and recognized source (e.g., the model developer's website, IPCC or government agency). Sufficient conceptual documentation of inputs, outputs and information	The project will use SNAPGRAZE version 2.3 which is documented and published in spreadsheet form on the Soils for the Future, LLC USA website (http://www.soilsfuture.com).

[94] Ogutu et al., "Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya."
[95] Lilian Ndungu et al., "Application of MODIS NDVI for Monitoring Kenyan Rangelands Through a Web Based Decision Support Tool," *Frontiers in Environmental Science* 7 (December 11, 2019): 187, https://doi.org/10.3389/fenvs.2019.00187.

	on how the model functionally represents SOC dynamics must be accessible to the public. Providing the source code or an API for independent replication of calculations is not necessary;	
VMD0053	At least one version of the model must be appropriately reviewed, tested and shown in peer-reviewed scientific studies to successfully simulate changes in SOC and trace gas emissions resulting from changes in ALM introduced by the project activity;	SNAPGRAZE v 1.0 was published and tested against grassland soil carbon data for different grazing systems (continuous to use of a large number of grazing blocks) from North America[96]. The carbon dynamic portion of the model (SNAP) was previously published and applied to an East African protected area with a wide range of grazing intensities[97]. SNAP was then later applied and reviewed by a Validation and Verification Body for livestock grazing in northern Kenya[98]. SNAPGRAZE Model predictions of change in SOC over 8 years have been compared and shown not to differ from measured changes in SOC in that project area[99].
VMD0053	The model must be able to support repetition of the project model simulations. This includes clear versioning of the model used in the project and stable software support for that version, as well as fully reported sources and values for all parameters	The SNAPGRAZE v 2.3 model used for this project is presented in spreadsheet form. All inputs are either measured in or near the project area or justified from published literature. Thus, all input values, coefficients and parameters not subject to

[96] Mark E. Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics," *Resources* 9, no. 4 (April 23, 2020): 49, https://doi.org/10.3390/resources9040049.
[97] Mark E. Ritchie, "Plant Compensation to Grazing and Soil Carbon Dynamics in a Tropical Grassland," *PeerJ* 2 (January 16, 2014): e233, https://doi.org/10.7717/peerj.233.
[98] Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12."
[99] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.

	used with the model version and the project activity. The same model version must be used in the baseline and project scenarios. For stochastic models, the seeding sequence to the random number generator must be provided so that model runs may be reproduced. Where multiple sets of parameter values are used in the project, full reporting must include clear identification of the sources of varying parameter sets as well as how they were applied to estimate stock change/emissions in the project. Acceptable sources include peer-reviewed literature and statements from appropriate expert groups (i.e., that demonstrate evidence of expertise with the model via authorship of peer-reviewed model publications or authorship of reports for entities supporting climate-smart agriculture, such as FAO or a comparable organization). Project proponents must describe the datasets and statistical processes used to set parameter values (i.e., the parameterization or calibration procedure);	calibration, all values of parameters and coefficients used in calibration, and the final choices of the calibrated model are transparent and replicable. The calibrated model version is used for all instances of project participation. The guidance for stochastic models is not applicable.
VMD0053	Validated per datasets and procedures detailed in Section 5.2. Model prediction error is calculated using datasets described in Section 5.2.5, using the same parameter sets applied to estimate stock changes/emissions in the project.	This condition does not apply to our use of VMD0053, as we are using it only for model selection criteria and calibration procedures. Nevertheless, the SNAPGRAZE v 2.3 model is assessed in its ability to predict initial SOC density across permanent sampling stations in

	Note that this means every parameter set must be validated separately	the participating entities from presumed historical baseline conditions and is subject to required statistical thresholds provided in VM0032 v 1.0. These statistical criteria map closely with those in VMD0053 v 2.0.
VT0001	1) AFOLU activities the same or similar to the proposed project activity on the land within the proposed project boundary performed with or without being registered as the VCS AFOLU project shall not lead to violation of any applicable law even if the law is not enforced.	Project activities of the KRCP will not lead to violation of any applicable laws, including but not limited to the list of laws relevant to the project activities provided in this document.
VT0001	2) The use of this tool to determine additionality requires the baseline methodology to provide for a stepwise approach justifying the determination of the most plausible baseline scenario. Project proponent(s) proposing new baseline methodologies shall ensure consistency between the determination of a baseline scenario and the determination of additionality of a project activity.	The KRCP employs a stepwise approach to determine and justify the most likely baseline scenario. This process is described in detail in this document under additionality.

3.1.3 Project Boundary (VCS, 3.12)

Carbon pool		Included?	Justification/ Explanation
Baseline	Aboveground woody biomass	Yes	Although grazing pressure limits woody encroachment, some woody biomass persists in the landscape. In areas where grazing intensity is lower or livestock are selectively avoiding woody species, woody biomass can accumulate. Including this pool ensures accurate carbon stock assessments.
	Aboveground non-woody biomass	No	Aboveground non-woody biomass is typicall burned or decomposed within the same year of its production and therefore is not a major sink. It is considered in balance with CO_2 uptake, respiration by plants, and annual decomposition.

Carbon pool		Included?	Justification/ Explanation
	Soil organic carbon (SOC)	Yes	In the baseline, heavy grazing and minimal organic inputs maintain SOC at near equilibrium. While minor SOC losses may occur due to erosion and reduced plant productivity, overall changes are assumed to be small.
	Belowground biomass	No	Belowground biomass remains in equilibrium with carbon inputs and decomposition. Heavy grazing limits deep root development, preventing significant accumulation.
	Dead wood	No	Dead wood is minimal in grassland ecosystems due to limited woody vegetation and grazing pressure.
	Litter	No	Litter experiences high turnover rates and remains in balance with CO_2 uptake and decomposition.
	Wood products	No	Wood product accumulation is not a factor in untilled grasslands and does not impact baseline carbon dynamics.
Project	Aboveground woody biomass	Yes	The project reduces grazing pressure and improves rangeland management, potentially leading to increases in woody biomass. Since woody plants can contribute 10-30% of total carbon stocks, their accumulation must be quantified and monitored for accurate carbon accounting.
	Aboveground non-woody biomass	No	Aboveground non-woody biomass is typicall burned or decomposed within the same year of its production and therefore is not a major sink. It is considered in balance with CO_2 uptake, respiration by plants, and annual decomposition.
	Soil organic carbon (SOC)	Yes	Improved forage availability, rotational grazing, and reduced grazing pressure promote SOC sequestration, making this a major carbon pool for carbon accounting. Increased root biomass and organic matter inputs enhance soil carbon storage.
	Belowground biomass	No	Belowground biomass remains in balance and since tillage is not permitted, increases in belowground biomass are conservatively excluded.
	Dead wood	No	Woody plant increases under rotational grazing may result in some dead wood accumulation, but overall, this pool remains negligible in the project area.
	Litter	No	While grazing adjustments may alter litter levels, it is expected to remain in balance with annual decomposition.
	Wood products	No	While optional for VCS ALM projects, wood products remain negligible in the project scenario and do not require inclusion.

Source		Gas	Included?	Justification/Explanation
Baseline	Source 1: Grazing animals	CO_2	No	Balance with CO_2 uptake, respiration, and annual decomposition of grazed plants
		CH_4	Yes	Target removal for methodology
		N_2O	No	No increase in concentration of dung and forage is not fertilized (applicability conditions)

Source		Gas	Included?	Justification/Explanation
		Other	No	Negligible under applicability conditions
	Source 2: Burning biomass	CO_2	No	Balance with CO_2 uptake by plants
		CH_4	No	Fire is extremely rare (occurring on less than 1% of the overall project geographical area from 2015-2024) in the baseline due to heavy grazing and the lack of fuel from herbaceous biomass available during the dry season, Detailed evidence, including methodologies, is provided in the section on baseline fire frequencies in section 3.1.4.3. Thus, methane emissions from biomass burning are considered negligible.
		N_2O	No	Fire is extremely rare (occurring on less than 1% of the overall project area from 2015-2024) in the baseline due to heavy grazing and the lack of fuel from herbaceous biomass available during the dry season, Detailed evidence, including methodologies, is provided in the section on baseline fire frequencies in section 3.1.4.3. Thus, nitrous oxide emissions from biomass burning are considered negligible.
		Other	No	Negligible under applicability conditions
	Source 3: Soil emissions	CO2	No	Assumed to be in balance with C inputs to SOC (SOC at equilibrium)
		CH4	No	Negligible because project area soils are not under anaerobic conditions such as those encountered in wetlands and hydric soils
		N2O	No	Negligible under applicability conditions
		Other	No	Negligible under applicability conditions
Project	Source 1: Grazing animals	CO_2	Yes	Balance with CO_2 uptake, respiration, and annual decomposition of grazed plants
		CH_4	Yes	Target removal for methodology
		N_2O	No	No increase in concentration of dung and forage is not fertilized (applicability conditions)
		Other	No	Negligible under applicability conditions
	Source 2: Burning biomass	CO_2	No	Balance with CO_2 uptake by plants
		CH_4	Yes	The project activities may increase the likelihood of fire due to accumulation of fuel into the dry season

Source		Gas	Included?	Justification/Explanation
				in grass banks and regrowth from early livestock rotations. Consequently, proponents must document combustion factors for herbaceous and aboveground woody biomass and determine if methane emissions from biomass burning are negligible, as they were in the baseline.
		N_2O	No	The project activities may increase the likelihood of fire due to accumulation of fuel into the dry season in grass banks and regrowth from early livestock rotations. Consequently, proponents must document combustion factors for herbaceous and aboveground woody biomass and determine if nitrous oxide emissions from biomass burning are negligible, as they were in the baseline.
		Other	No	Negligible under applicability conditions
	Source 3: Soil emissions	CO_2	Yes	Accounted for in measured ΔSOC
		CH_4	No	Negligible because project area soils are not under anaerobic conditions such as those encountered in wetlands and hydric soils
		N_2O	No	Negligible under applicability conditions
		Other	No	Negligible under applicability conditions

Figure 2-1 provides a map of the project boundary that clearly shows the locations of the initial PAIs and subsequent instances, which are the management units of the RRG activities. As noted in Section 2.1.16, the project zone has no identifiable boundaries, as historically, livestock have ranged south into Tanzania and used protected areas in Kenya such as Amboseli, Chyulu Hills and Tsavo national Parks during extreme droughts; thus, these areas are the expected leakage belts.

3.1.4 Baseline Scenario (VCS, 3.13)

Current and past grazing plans for the participating and anticipated participating entities (instances) in the project provide for continuous grazing within seasonal ranges (short and long wet seasons and short and long dry seasons). No explicit or planned rotations occur within seasonal ranges, nor did they in the past. This form of grazing management is expected to continue in a Baseline Scenario and result in further degradation (see Section 2.2.2 regarding the Most Likely Scenario Justification). Other baseline conditions are addressed below per the methodology.

Livestock grazing by Maasai is not regulated by the government as most households are interested in keeping as many livestock as possible rather than raising livestock for production and entry into the beef market. Historical grazing plans for each community indicate no government policy guidelines or decisions related to access to government-subsidized veterinary materials. Access to veterinary

materials does not guide decisions about how to aggregate or move livestock around the landscape, as sick animals are kept in home bomas until recovered and then recovered animals rejoin the herds in their normal movements

3.1.4.1.Baseline Fire Conditions

Fire history in the project area was assessed using MODIS Burned Area Product Collection 6.1 (MCD64A1.061; Giglio et al. 2021). The monthly Burned Area Product was globally available from 2001 through December 2024 at the time of download. The assigned values for each pixel are the approximate day of burn (1-366, Julian day), zero if unburned, -1 for no data that month, and -2 for areas not considered burnable (e.g., water bodies). Only values 0-366 were considered in this analysis. For each available year, the 12 monthly datasets were aggregated into an annual dataset with each pixel assigned a value of one if it was determined it had burned during that given year (a value of 1-366 in any individual monthly dataset). The sum of the annual datasets over a period of interest determines the number of years with fire.

Overall, we defined fires during the 10 years of complete data from 2015-2024 as the baseline fire frequency. Fires were infrequent in the project area with over 99% of the project area never burning during the 10-year baseline included in the analysis (Table X, Figure 3-1). Additionally, we analyzed fire burn frequency for each initial project area instance (PAI) community area in KRCP. More than 90% of each individual PAI never burned during the 10-year baseline. Shompole was the only PAI that had less than 98.5% of its area never burn (91.09%). However, an additional 8.76% (4834.23 ha) of Shompole burned once indicating over 99.85% of it burned one or fewer times. Across all the PAIs, no area burned more than twice during the 10-year baseline (fire return interval [FRI]= 5 years). Research on miombo woodlands in Mozambique found that at a FRI of 5, aboveground biomass accumulated, even with high intensity fire regimes[100]

Table X. Percentage of each initial project area instance (PAI) community area in KRCP classified by the number of years with fire from 2015 to 2024. Fire history was assessed using the MODIS Burned Area Product (MCD64A1.061), with values representing the proportion of each community's area that experienced fire for a given number of years. Total represents the entire overall project area, including areas outside the PAIs.

Community	Number of years with fire (2015-2024)				
	0	1	2	3	4
Eselenkei	100.00	0.00	0.00	0.00	0.00
Olgulului	98.66	1.33	0.01	0.00	0.00
Olkeri	100.00	0.00	0.00	0.00	0.00
Olkiramatian	100.00	0.00	0.00	0.00	0.00
RAMAT East	99.96	0.04	0.00	0.00	0.00
Shompole	91.09	8.76	0.16	0.00	0.00
KRCP Total†	99.22	0.75	0.03	0.01	0.00

[100] Ryan CM, Williams M (2011) How does fire intensity and frequency affect miombo woodland tree populations and biomass? Ecological applications. 21(1):48-60

The fire frequency in the project area will continue to be monitored going forward using the MODIS Burned Area Product allowing continual assessment to understand if there is a change in the frequency of fire due to project activities. Due to the infrequent occurrence of fires in the baseline period, formal fire management programs (e.g., prescribed burns) do not currently exist in the project area.

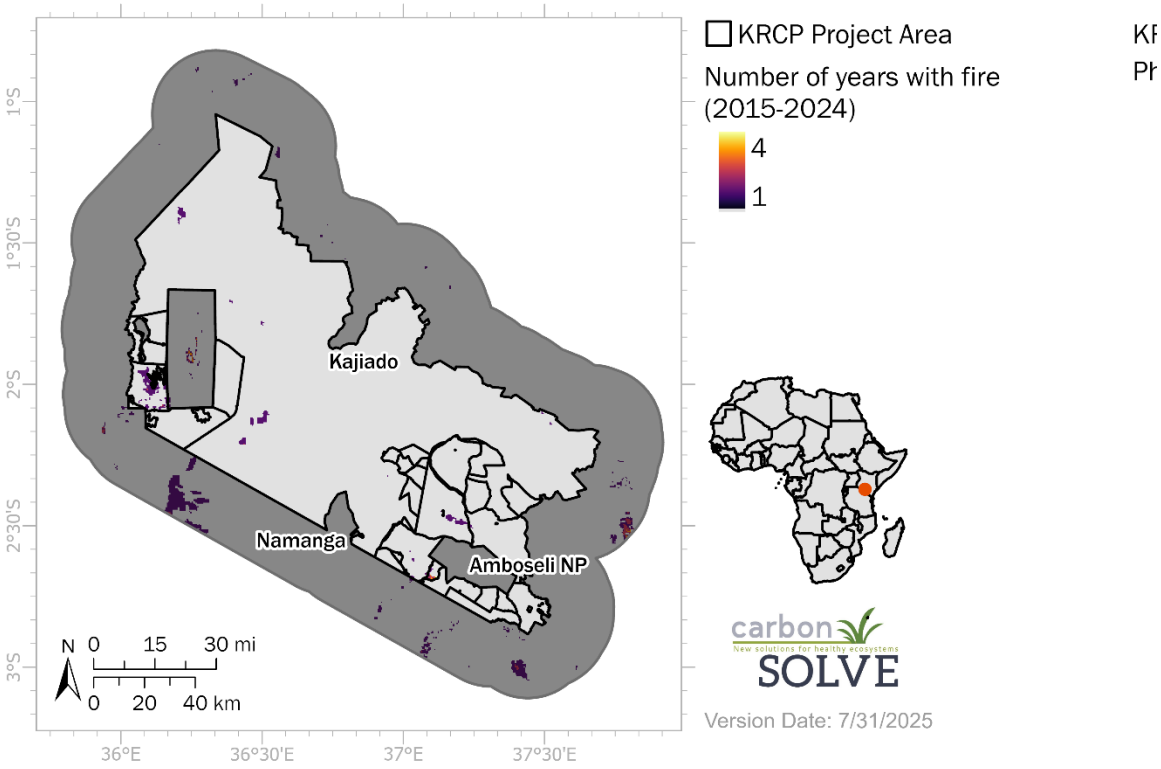


Figure 3-1: Fire history in the project geographical area and PAIs over the baseline period from 2015-2024, demonstrating that fire is rare, with less than 1% of the potential project area experiencing any fire.

3.1.4.2. Baseline Vegetation Conditions

Figure 2-3 2-4 in section 2.2.2 demonstrates that NDVI, an indicator of green vegetation and productivity, has declined significantly in the project area, despite a trend of increasing rainfall during the baseline period. Further evidence of declining productivity is provided by declining trends in the major livestock species during the baseline period (Figure 3-2).

3.1.4.3.Baseline Methane emissions

Enteric methane emissions from livestock in the baseline scenario are quantified in section 3.2.1.

3.1.4.4. Baseline carbon stocks

Initial soil carbon density to a maximum depth of 40 cm (mean depth 35 cm) was measured at 224 permanent sampling stations in the initially project area instances and in an additional community that initially intended to participate but then delayed entry in order for community members to acquire title deeds (see Section 3.2.1; Table 3-1) Since the project does not intend for fire management to be a project activity, we did not assess initial aboveground woody biomass. However, assessment of aboveground woody biomass will begin during our next field survey will be completed at all sampling stations by the end of 2025.

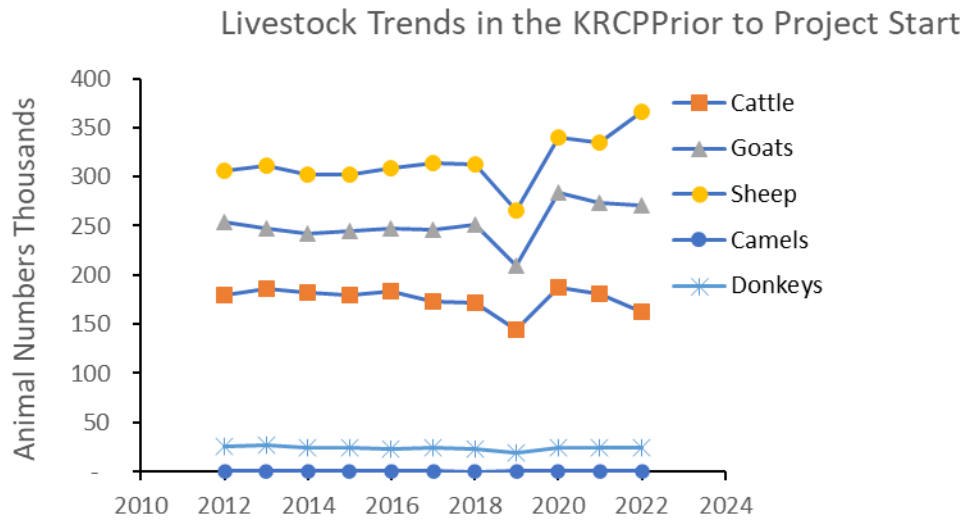


Figure 3-2. Annual censuses of livestock numbers in the initial project area instances (participating communities) within the project geographical area. Censuses resulted from nearly 5,000 household surveys through the six initially participating communities, and respondents were asked to declare the number of and type of livestock owned for each year back to 2012. Totals were estimated by multiplying household means by the number of households registered across all six communities.

Table 3-1. Measured mean baseline soil organic carbon stocks (± standard error) to a mean depth of 35 cm in the project area, sorted by community and with 90% confidence limits and margins of error.

Community	SOC Density	SE	90% LCL	90% UCL	Margin of Error
Eselenkei	30.40	2.43	26.42	34.39	13.11%
RAMAT East	49.67	3.33	44.20	55.13	11.00%
Olgulului	35.11	2.44	31.11	39.12	11.41%
Olkeri	32.39	3.31	26.96	37.82	16.77%
Olkiramatian	27.73	3.41	22.15	33.32	20.15%
Shompole	35.57	3.61	29.66	41.49	16.64%

3.1.4.5. Model Assessment

This project intends to follow the **Modeled Approach** detailed in the methodology VM0032 v 1.0. Model parameter inputs and predictions of baseline soil carbon stocks highlight the origin of baseline carbon stocks from past history of grazing practices and evaluate the accuracy and precision of the model for use in calculating ex ante carbon dioxide removals by the project. Consequently, in this section we evaluate the SNAPGRAZE model and its ability to predict baseline soil carbon stocks from the history of baseline conditions discussed in Section 2.2.

3.1.4.5.1. Model Selection

The project will use SNAPGRAZE v 2.3 (http://www.soilsfuture.com). This model is superior to other models, such as DNDC, Mems 2, DayCent (Century), or RothC for this project because 1) it explicitly incorporates the duration and intensity of grazing events rather than model grazing as a continuous offtake, and 2) does not require detailed measurements of soil carbon fractions that are difficult to measure in the remote rangelands within the project area. Further, SNAPGRAZE and its progenitor SNAP have been shown to accurately predict (R^2 = 0.7 – 0.82) the impact of different grazing practices on soil carbon in East African grassland - savanna habitats[101],[102] as well as other grassland habitats[103]. The other models mentioned above have not yet been tested in tropical grassland and savanna habitats and soils.

3.1.4.5.2. Model Inputs

The SNAPGRAZE model features nine inputs, several of which can be measured directly or obtained from satellite data.

The soil and vegetation parameters (i.e., soil texture (SAND%), lignin and cellulose content, livestock densities) along with interpolated average annual rainfall, were entered into SNAPGRAZE to predict SOC values to a depth of up to 40 cm (mean 35 cm) at each of the 224 sampling stations in the current project geographical area). For details about methods, see section 3.3.1. **Data and Parameters Available at Validation.** The parameters are provided in two sets – one for environmental inputs into SNAPGRAZE[104] and the other for parameters relevant to grazing management[105].

Environmental Parameters

Fire frequency: As discussed in Sections 2.2.1, 2.2.2, and 3.1.4, fires are very infrequent and >99% of the project geographical area has experienced no fire during the baseline period, so FIRE = 0.

Soil texture: $SAND\%_{m,j}$ was estimated from archived baseline soil samples from all sampling stations that were sent to a professional laboratory (Crop Nutrition Services) to determine percent sand at each sample point.

[101] Ritchie, "Plant Compensation to Grazing and Soil Carbon Dynamics in a Tropical Grassland."
[102] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[103] Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics."
[104] Ritchie, "Plant Compensation to Grazing and Soil Carbon Dynamics in a Tropical Grassland."
[105] Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics."

Plant lignin and cellulose content: MAPLC of aboveground vegetation was estimated by collecting samples of the four most common species of the dominant types of herbaceous vegetation: perennial grass, annual grass, legume or forb. Samples for analysis of each type of plant were collected from 58 sampling in northern Kenya, encompassing a range of mean annual precipitation (250-800 mm/yr) and from sandy loam and clay soils. Vegetation was clipped to the ground surface from two 0.125 m^2 quadrats at each station, sorted to vegetation class, sun-dried (at 45°C for 3-6 days) and weighed. Plant material was ground through a 0.9 mm sieve with a Wiley Mill, and a standard fiber analysis was performed, consisting of sequential digestion in acid detergent (to obtain cellulose) and 12 M sulfuric acid to remove lignin[106]. For results and further details see the table for MAPLC in section 3.3.1 – **Data and Parameters Available at Validation.**

Mean annual precipitation and **mean annual temperature:** $MAP_{m,j}$ and $MAT_{m,j}$ were interpolated from digital layers of estimated mean annual rainfall from WorldClim[107]. These climatic data were assigned to the sample points by using the Sample Raster Values option from the Processing Toolbox in QGIS 3.14.

Parameters relevant to grazing management

Animal density: Historical livestock densities H_m in stratum m were determined as the average total livestock numbers over the 10 years prior to the start of the project divided by project area of each community.

$$H_m = \frac{\sum_{y=1}^{10} N_{m,y}}{10 \times PA_m}$$

(Equation 1)

However, livestock densities were unlikely to be uniform across the landscape, as continuous grazing within a seasonal range generally results in animals being concentrated near water and/or spending more time closer to settlements. We assume that the probability of use of a given location declined linearly with distance from settlement to a value of zero at the maximum distance livestock are herded from the settlement. Further analysis (see Box 1) shows that animal density declines with distance as:

$H_m(x) = \mu R(1-x/R)$ (derived in Box 1)

Box 1. Animal density as a function of distance from settlement

Assume a linear decline in livestock density, $H(x)$, with distance from settlement, x, in stratum m

[106] Lars S. Jensen et al., "Influence of Biochemical Quality on C and N Mineralisation from a Broad Variety of Plant Materials in Soil," *Plant and Soil* 273, no. 1–2 (June 2005): 307–26, https://doi.org/10.1007/s11104-004-8128-y.
[107] https://www.worldclim.org/data/worldclim21.html

$H_m(x) = a - bx$ (x1)

where a and b are constants. The number of animals N in the vicinity of the settlement with radius R surrounding the settlement (assuming for simplicity this area is a circle of area πR^2)

$$N = \int_0^R 2\pi(a - bx)\,dx \quad \text{(x2)}$$

And the boundary condition that herbivore density is zero at the outer boundary a distance R from the settlement

$a - bR = 0$; and thus $b = a/R$ (x3)

Solving the definite integral in equation (x2) after substituting for b from equation (x3) and assuming that the overall mean density μ is $N/\pi R^2$, yields

$a = \mu R$ (x4)

Substituting equation (x4) into (x3) and then (x3) and (x4) into (x1) yields an equation for livestock density as a function of distance

$H_m(x) = \mu R(1-x/R)$ (x5)

Informal conversations with herders in our project geographical area suggested that R = 3 km was the maximum distance that livestock would be herded from a settlement during the plant growing season in the baseline scenario.

Recent declines in livestock numbers (see Section 3.1.4.2) suggest that the livestock densities that were entered into the Baseline dataset for SNAPGRAZE may be lower than average densities extending back 30-40 years ago. But without available information, we used the last 10 years of livestock densities. To assign distances to settlement for each point, we used the QGIS 3.14 Processing Tool - Vector analysis - Distance to nearest hub (points) with a vector layer of settlement locations.

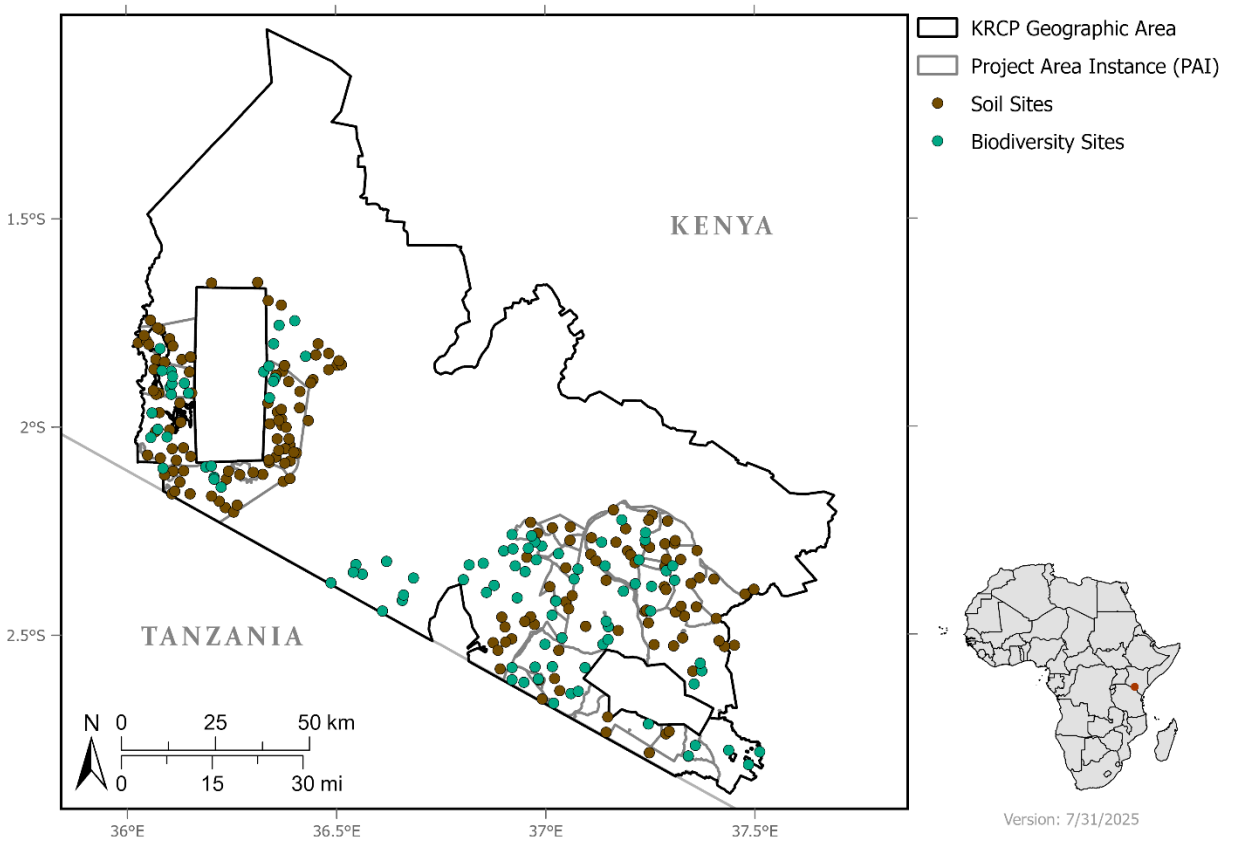


Figure 3-3: Maps of soil and biodiversity sampling sites and initial project instances (PAIs; gray) within the project geographic area (black)

Number of pastures: The herders in the communities in the project geographical area typically shift between seasonal ranges. Therefore, during the wet season(s), herders typically shift among two pastures, so *n*, number of pastures was set at 2 for baseline conditions. However, during calibration, we explored whether continuous grazing might provide better correspondence with observed SOC densities.

Body mass: Livestock of different species were converted into cattle equivalents using the Tropical Livestock Unit conversions: cattle (mean mass = 400 kg) are multiplied by a factor 1, Sheep and goats 35-40 kg are multiplied by a factor 0.17, while camels have a factor of 1, and donkeys have a factor of 0.7 (Jahnke 1982). Since all livestock were converted to cattle equivalents in estimating animal density, we used a mass of 400 kg as a model input. For further justification of animal masses see Section 3.2.1.1. **Baseline methane emissions.**

Growing season days: Number of days in the growing season for each sampling station, $G_{m,j}$ was estimated from mean annual rainfall (MAP) and temperature (MAT) using the regression equation $G_{m,j}$ =

22.99 MAT – 0.94 MAT^2 + 0.073 MAP derived from a review of the literature[108] as shown in Figure 5. However, the mean annual temperature in almost all of the project geographical area exceed the temperature range for the regression and the downward curve of the regression line, which is driven by the quadratic term in the regression and its coefficient, is uncertain (95% Confidence margin of error = 20.68%). Consequently, the coefficient of the quadratic term was a target for calibration.

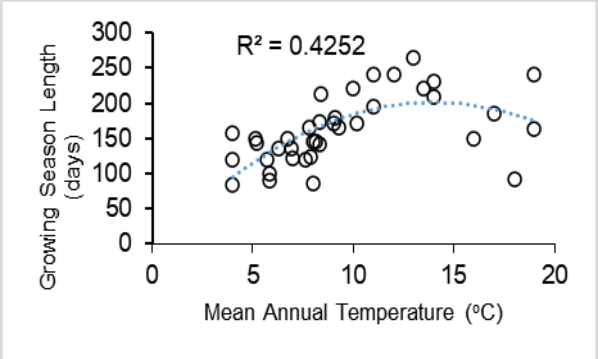


Figure 3-4: Regression of reported growing season length (days) versus mean annual temperature for 39 worldwide grassland sites. Reproduced from Ritchie (2020).

Summary

Although the SNAPGRAZE model is run for inputs at each sampling station, to provide an idea and show the uncertainty in these inputs, the mean and SE for the parameters that varied among sampling stations is shown in **Table** .

[108] Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics."

Table 3-2: Summary of SNAPGRAZE model input parameters by community.

Community	Samples	Cattle Equiv Density/ ha	SE	Mean Ann Temp °C	SE	Mean Annual Rainfall mm	SE	Growing Season Days	SE	Depth cm	SE	MAPLC Lignin and Cellulose %	SE	SAND%	SE
Eselenkei	43	0.31	0.03	21.38	0.04	623	2.9	134.9	0.5	39.5	0.3	27.8	0.7	50.7	3.0
RAMAT East	37	0.24	0.02	21.14	0.05	576	5.7	135.0	0.9	39.3	0.5	31.4	0.6	46.9	3.0
Olgulului	50	0.14	0.01	21.70	0.04	633	10.6	130.9	1.3	37.9	0.9	28.8	0.7	47.5	3.0
Olkeri	30	0.75	0.10	23.66	0.11	414	4.6	81.4	2.3	32.6	1.5	28.6	0.9	60.0	3.5
Olkiramatian	27	0.74	0.09	24.66	0.09	376	4.5	59.2	2.2	32.9	2.1	28.8	1.2	59.4	2.8
Shompole	40	0.44	0.03	24.72	0.09	374	5.2	57.8	2.1	28.2	1.8	28.6	0.9	59.9	3.4

3.1.4.5.3. *Model Calibration*

Based on prior sensitivity analyses[109,110], several unmeasured parameters are likely to influence predicted SOC densities across the 224 sampling stations. Mean annual temperatures in the project area are higher than the range of temperatures used to assess the effect of temperature on productivity and number of days in the growing season[111], so we freed the coefficient relating microbial respiration to SOC density. Likewise, we freed the coefficient of the quadratic term relating productivity to mean annual temperature in the equation for ANPPmax[112]. In addition, participating communities claimed to use seasonally divided grazing areas prior to the start of the project, so our approximation of this pattern was to input two pastures used as the baseline condition. To address uncertainty in the actual prior historical grazing practice, we also tested a value of 1 (continuous grazing everywhere in the project area). RGRmax, the maximum per unit biomass rate of growth was estimated for perennial grasses dominant in Serengeti National Park. Since many of the dominant grasses in the project area are annuals or shallow-rooted perennials that exhibit the same allocation to roots, shoots and seeds as annuals, it is likely that RGRmax for these taxa are lower than those measured in the Serengeti. Most other input parameters were measured or estimated independently, and other coefficients were determined to be appropriate since the range of independent variable values used to determine them included the range of variables that occur within the project area.

Calibration (Table) was performed on a random set of 48 sampling stations from the project area, representing approximately 20% of the total 224 sampling stations evaluated. Stations were each assigned to the calibration dataset based on generating a random number to form a uniform distribution, targeted to assign 1/3 of the stations to the calibration dataset. The finite draw of stations to the calibration dataset resulted in fewer than 1/3 of stations being assigned to the calibration dataset.

The SNAPGRAZE model generated a prediction of a current SOC density based on presumed baseline conditions of 1 pasture used during the plant growing season. The initial set of parameters was chosen to be those that were estimates from the original data used to parameterize the SNAPGRAZE model.

Table 3-3: Outcome of calibration process for the SNAPGRAZE model

RGRmax	Respiration Coefficient	Productivity Temperature Coefficient	WetDays Rainfall Coefficient	R^2	Slope	Intercept	Bias %	Test Bias %
0.034	0.00044	0.94	0.00044	0.8333	0.5943	2.4235	-55.66	
0.034	0.00042	0.94	0.00044	0.8332	0.5665	2.4873	-62.94	
0.034	0.00046	0.94	0.00044	0.8332	0.6217	2.3913	-48.94	
0.034	0.00048	0.94	0.00044	0.8334	0.6492	2.36	-42.79	
0.034	0.0005	0.94	0.00044	0.8334	0.6764	2.3487	-37.1	

[109] Ritchie, "Plant Compensation to Grazing and Soil Carbon Dynamics in a Tropical Grassland."
[110] Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics."
[111] Ritchie.
[112] Ritchie.

RGRmax	Respiration Coefficient	Productivity Temperature Coefficient	WetDays Rainfall Coefficient	R^2	Slope	Intercept	Bias %	Test Bias %
0.034	0.00052	0.94	0.00044	0.8334	0.7035	2.3487	-31.83	
0.034	0.00054	0.94	0.00044	0.8334	0.7305	2.3487	-26.94	
0.034	0.00056	0.94	0.00044	0.8334	0.7576	2.3487	-22.41	
0.034	0.00058	0.94	0.00044	0.8334	0.82	2.0256	-18.19	
0.034	0.00058	0.93	0.00044	0.8384	0.8094	2.8508	-14.32	
0.034	0.00058	0.92	0.00044	0.8484	0.82	2.0256	-12.66	
0.034	0.00058	0.91	0.00044	0.8254	0.7926	3.7054	-11.71	
0.034	0.00058	0.9	0.00044	0.8115	0.7721	3.2503	-11.15	
0.033	0.00058	0.9	0.00044	0.8115	0.8065	4.0768	-8.36	
0.032	0.00058	0.9	0.00044	0.811	0.8436	3.542	-5.56	
0.032	0.00058	0.9	0.00046	0.8112	0.8879	3.0851	-1.89	
0.032	0.00058	0.9	0.00048	0.8114	0.8602	1.0807	1.44	-7.7
0.032	0.00056	0.9	0.0005	0.8115	0.9427	2.1763	1.06	
0.032	0.00054	0.9	0.00052	0.8117	0.9502	1.7239	0.37	
0.032	0.00054	0.91	0.00052	0.8253	0.973	0.8245	-0.15	-9.4
0.031	0.00052	0.9	0.00054	0.7507	0.7591	2.9526	-0.84	
0.03	0.0005	0.9	0.0005	0.8086	0.9654	0.4679	-2.09	-10.9
0.031	0.00053	0.91	0.00052	0.8305	1.0021	0.1102	0.55	
0.031	0.00053	0.92	0.00052	0.8365	1.0249	-0.8819	-0.24	-9.5
0.031	0.00053	0.915	0.00052	0.8305	1.0148	-0.4057	0.22	-8.9
0.031	0.00053	0.915	0.00051	0.8283	1.0427	-0.858	1.43	
0.032	0.00053	0.9	0.00052	0.8143	1.0337	-0.7412	1.04	
0.032	0.00053	0.89	0.00052	0.8152	1.0294	-0.4435	1.52	
0.032	0.00052	0.89	0.00052	0.8152	1.01	-0.4435	-0.37	
0.032	0.00052	0.88	0.00052	0.8148	1.0017	-0.0611	-0.02	-7.5
0.032	0.00052	0.87	0.00052	0.8131	0.9908	0.378	0.26	-6.9
0.032	0.00052	0.87	0.00051	0.8132	0.9696	0.6151	-1.17	
0.032	0.00052	0.86	0.00051	0.8104	0.9575	1.0869	-0.92	
0.032	0.00052	0.86	0.00052	0.8104	0.9785	0.852	0.5	
0.032	0.00051	0.85	0.00052	0.8067	0.9577	1.2217	-1.18	
0.032	0.00051	0.84	0.00052	0.8024	0.9353	1.8264	-0.88	
0.032	0.00051	0.83	0.00052	0.7978	0.9237	2.3053	-0.54	
0.032	0.00051	0.83	0.00053	0.7978	0.9434	2.0863	0.84	
0.032	0.00051	0.83	0.000525	0.7978	0.9336	2.1852	0.16	-6.1
0.032	0.0005	0.82	0.000535	0.7934	0.9233	2.4805	0	-3.9
0.032	0.00051	0.82	0.00052	0.7929	0.9231	2.6449	0.53	-5.4

Key metrics for calibration fit were R^2 of the regression of measured versus model-predicted values, slope (expected to be a value of 1), intercept (expected to be a value of zero), and model bias (expected to be a value of zero), where

$$MBIAS = \frac{\sum_{i=1}^{n}(Y^{obs}{}_i - Y^{pred}{}_i)}{\sum_{i=1}^{n} Y^{obs}{}_i}$$

Where:

MBIAS = Percent bias of carbon model predictions relative to observed data

n = number of sampling stations tested

Y^{obsi} = observed or measured SOC density at station i

Y^{predi} = SOC density predicted by SNAPGRAZE at station i

Bounded light gray cells represent the parameter(s) changed in that step, and green cells indicate the parameter sets with bias closest to 0%. Multiple parameter sets yielded a bias very close to zero for the calibration dataset. However these sets differed in how accurately the model predicted measured SOC density values in the validation dataset (Test Bias %) and that yielding the least test bias (-3.9%) was the parameter set with RGRmax = 0.032, coefficient of the quadratic temperature term for number of days in the growing season = 0.82, the coefficient for microbial respiration as a function of SOC density = 0.00050, and the coefficient for number of days with > 10% soil moisture (WETDAYS) = 0.000535 . These values were used in all forward uses of the model.

3.1.4.5.4. Model Evaluation

Using the inputs for each sample station in the remaining validation dataset, the calibrated SNAPGRAZE model predicted the expected steady-state SOC density at each station. Per the protocol in Methodology VM0032 v 1.0, the predicted values were compared with the measured SOC density value at each station in a linear regression.

The calibrated model with bias for the calibration dataset and in the test data closest to 0% is shown in Figure 3-5.

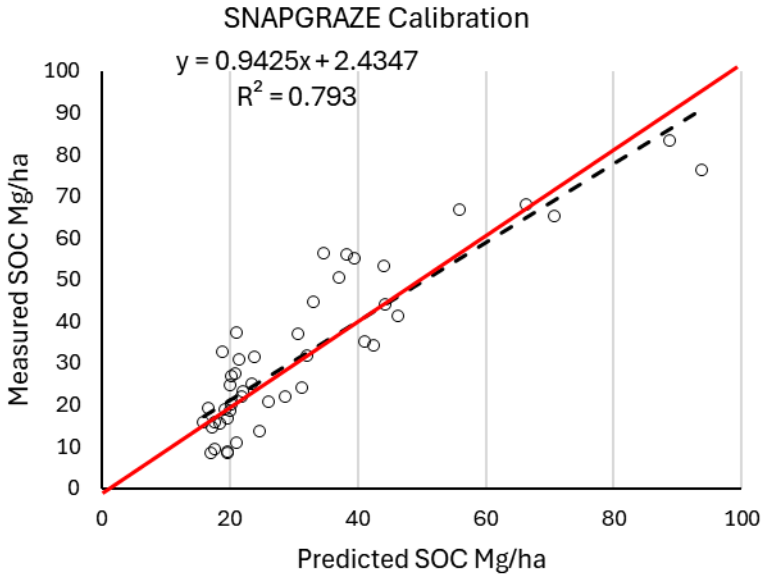


Figure 3-5. A. Regression of Measured SOC density in the baseline at the start of the project versus the predictions of the SNAPGRAZE model for each of 45 sampling stations in the initial project area instances. B. Regression statistics, showing R^2 > 0.80, slope not significantly different (α= 0.05) from one, and intercept not significantly different from zero. The red line shows the line of perfect agreement

The assessment or validation of the calibrated model is shown in Figure 3-6, along with the statistical tests for validity under VM0032 v 1.0 in Table 3-4.

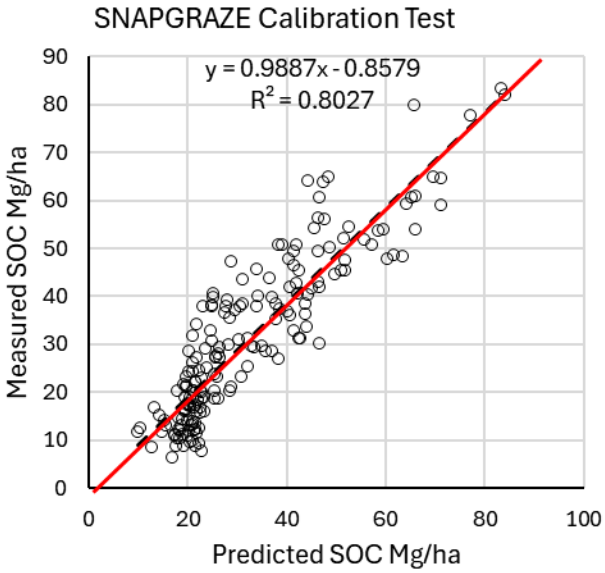


Figure 3-6: A. Analysis of the SNAPGRAZE model predicted SOC density versus measured SOC density at 179 sample points under the final calibration values for the calibration dataset of sampling stations in the Kajiado Rangelands Carbon Project. The red line represents the line of perfect agreement.

Table 3-4: Regression and bias analysis showing that the calibrated model meets the requirements of VM0032 (green fields): the intercept 95% confidence limits include zero, the slope 95% CL include 1, $R^2 > 0.80$, and bias is within ± 20%.

Regression statistics for the validation test of SNAPGRAZE

Regression Statistics	
R^2	0.8027
SE_{est}	7.5889
N	181

	Coeff	*SE*	*t*	*P*	*Lower CL*	*Upper CL*
Intercept	-0.8579	1.3171802	-0.651333	0.51566	-3.45712	1.741275
Predicted	0.9886	0.0366334	26.987861	5.39E-65	0.916368	1.060946

3.1.4.5.5. *Model Uncertainty*

As prescribed in methodology VM0032 v 1.0, uncertainty in the predictions of the SNAPGRAZE model are assessed using Monte Carlo simulation. Means and standard errors were calculated for all input parameters in each of the participating communities. Means and standard errors were calculated for all and standard errors for model coefficients were taken from previous publications[113,114]. These parameters and their standard errors define a presumed normal distribution of parameter values. The calibrated version of SNAPGRAZE was run 150 times, with random "draws" from each of the presumed distributions for each input parameter and coefficient. These uncertainties are reported in section 3.2.2 **Project Emissions.**

3.1.4.6. Determination of Conservative Baseline

Per VCS standard 4.7, all projects using modeling to estimate net removals to determine issued VERs are required to use a conservative baseline.

3.1.5 Additionality (VCS, 3.14)

3.1.5.1 Regulatory Surplus (VCS, 3.14)

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

[113] Ritchie, "Plant Compensation to Grazing and Soil Carbon Dynamics in a Tropical Grassland."
[114] Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics."

3.1.5.2 Additionality Methods (VCS, 3.14)

The use of VCS tool VT0001 requires a four-step process of determining additionality. Each step is described in detail below.

Step 1: Identification of alternative land use scenarios to the proposed VCS AFOLU project activity.

Sub-step 1a: Identify credible alternative land use scenarios to the proposed VCS AFOLU project activity

Scenario 1: Continuous, uncoordinated grazing

This scenario is a continuation of the pre-project land use in the project area. The rangelands in Kajiado County have seen decades of overgrazing pressure. Herders move livestock to locations of their personal choice within designated grazing areas without reference to a grazing plan. Herds at any given time are randomly distributed within these areas and a given location is grazed frequently and at any time during the plant growing season. In the case of drought, herders move livestock to wherever they can find grass in any jurisdiction and without any organized plan.

This scenario applies to both communally-grazed lands as well as privatized former communally managed Group Ranches. It includes what is sometimes referred to as *seasonal grazing* where wet season grazing land is grazed continuously during the plant growing season and then a separate dry season range is grazed continuously during the dry season. This is the baseline scenario as detailed in section 3.1.4.

Scenario 2: A shift to rapid rotational grazing, but without the incentive of carbon credits

This scenario considers rapid rotational grazing activities and regional grazing planning in the case of drought occurring in the project area in the absence of this proposed VCS AFOLU project. Herds are aggregated and herders follow a relatively detailed plan of movement within and among designated grazing blocks. Any given location receives just one major grazing event per year and animals leave these locations when grass has been reduced to a certain height. Longer migratory movements of animals in the case of drought limiting forage within communities are organized according to regional grazing plans. These plans would be reached by agreement among different communities.

This scenario would require communities to voluntarily organize and enforce grazing bylaws without the funds to organize additional community meetings or to receive community financial benefits. This scenario is credible because it mimics the nomadic movements of traditional grazing practices dating back thousands of years and is being implemented (with the help of donor funds) in the broader landscape in the Maasai Mara Wildlife Conservancies (see Common Practice assessment below).

Scenario 3: Wildlife conservation and tourism

In this scenario, activities would be oriented towards attracting wildlife to community land and hosting tourists. Land is set aside with minimal use by livestock for the purpose of harboring wildlife. Water points, such as inclusion of boreholes or enhancement of springs, will be developed to attract wildlife to specific viewing locations. Lodges and hotels will be constructed to attract and host tourists. Community members are educated to avoid killing large predators.

This land use is credible because it is currently occurring on various conservancies in the project area that surround tourist lodges operated by non-community members (such as the Selegay Lodge in Eselenkei). However, it requires significant capital investment and a de-emphasis of livestock culture within the community.

Scenario 4: Intensive land use conversion

Under this scenario, rangelands are converted to agricultural crops and sprawling commercial/residential development. Some community members, without access to lands that received rainfall and water points during the dry season, are compelled to sell their land. Youth often have less interest in livestock keeping and sell their land. Land buyers are often crop agriculturalists and convert grassland to cropland.

This is only a credible land use in communities that have privatized former communal Group Ranch lands. Even though this land tenure occurs in only three of the initial PAIs in the project, it is the predominant land tenure in most of the communities that will join the project later in 2025 and 2026.

Outcome of Sub-step 1a: a list of four credible land use scenarios.

Sub-step 1b: Consistency of credible land use scenarios with enforced mandatory applicable laws and regulations

Outcome of Sub-step 1b: All four credible land use scenarios are consistent with laws governing community land use in Kenya. Scenarios 1 and 2 are permitted under the Community Lands Act of 2016 which allows communities to either register as communal lands (e.g., Shombole, Olkeri and Olkiramatian Community Lands) or to subdivide into private parcels, as has occurred in Olgulului and Eselenkei. Scenario 3 is allowed under the Kenya Wildlife Act of 2013, in which communities can form conservancies that conserve wildlife habitat for the purpose of benefitting from tourism. Thus, the four candidate baseline scenarios are

1. Continuous grazing

2. Rapid rotational grazing without the carbon project

3. Wildlife conservation and tourism

4. Land conversion to crop agriculture

Sub-step 1c: Selection of the baseline scenario

The baseline scenario is discussed in detail in Section 3.1.4 above, in accordance with the guidelines of the VM0032 methodology used. In the absence of the proposed VCS AFOLU project, the most likely scenario is Scenario 1, in which the pre-project activities of continuous, unplanned grazing are carried on into the future. Scenario 1 is most likely as it requires no additional capital and will likely occur even in communities with privatized lands, as privatized land communities seek to form organizations such as cooperatives (Eselenkei) or trusts (Olgulului) to avoid Scenario 4. Scenarios 2 and 3 require significant startup capital and education of people to adopt new distributions of livestock and, in the

case of wildlife conservation and tourism, expertise in the hospitality industry. Consequently, these are less likely than Scenario 1. In addition, even if conservancies are formed and used to establish guest hosting in the case of Scenario 3, livestock grazing on these lands will likely continue, even if it may counter the goal of attracting wildlife. Scenario 4 is a likely scenario in privatized community lands, but sales are much more likely in lands near major roads that provide access of crops to market. In addition, with Scenario 4, local communities are seeking to slow such land conversion through establishment of land trusts and conservancies that link private landowners in a common effort to preserve grazing lands. Such efforts act as a barrier to land conversion

Step 2: Investment analysis

According to the VT0001 VCS documentation, the investment analysis may be skipped in favor of the barrier analysis in step 3. Here step 2 will be skipped, as the barriers and common practice analyses provide a better basis for determining additionality in this case.

Step 3: Barrier analysis

3a. The proposed project activity of RRG faces barriers to implementation without revenue from the sales of GHG credits, including:

Lack of capital to employ grazing coordinators, grazing coordinator supervisors, and grazing committees who are dedicated to implementing, tracking, and monitoring RRG;

Lack of technological equipment to implement monitoring of RRG (e.g., tablets, GPS devices);

Lack of existing organization of local communities to coordinate implementation of RRG;

Fear within communities of losing land and livestock; and

Misinformation about carbon projects that has been generated by negative press.

3b. Scenario 1 **is not prevented by any barriers** as each family or family group chooses to acquire and herd livestock in whatever way they choose within broad constraints of seasonal shifts in available grazing areas. The barriers to the proposed project activity do not prevent Scenario 1, as the capital, equipment, and enhanced organizational capacity of communities are not necessary to maintain business as usual continuous grazing. Under business as usual, rangelands will continue to degrade and increase the risk of livestock loss and poverty in this scenario. As livestock keeping becomes less productive, communities may devolve to Scenario 4.

Scenario 2 has significant barriers in the form of (1) necessary cash payments to pay professional herders to move large herds of livestock while children attend school and families have limited access to schools and healthcare across the landscape, (2) cultural traditions that discourage mixing of animals from herds of multiple unrelated families, (3) lack of confidence in the safety of animals kept far from permanent bomas, due to risks of wildlife predation and cattle theft. Without carbon finance to pay grazing assistants to support community decision-making processes, cross-community agreements such as regional grazing plans to discourage theft and grazing of grass banks or other conservation areas, this management practice would not be adopted.

Scenario 3 features barriers related to high capital investment required to build and operate tourist hosting facilities (e.g., lodges, hotels, tented camps, safari tour operators, etc.). Tourism requires individuals trained in the hospitality industry, which may not be available within communities. Finally, managing wildlife-based tourism requires restrictions on livestock distributions, which may produce negative perceptions within the community. While lack of capital remains a barrier to Scenario 3, it is possible and already occuring on some communities within the project area (see scenario description above).

Scenario 4 the conversion to cropland with dryland crops is limited only by a) the general lack of rainfall (< 800 mm/yr) sufficient to support crop agriculture in the region and b) efforts by community governance to slow such conversion in the interest of preserving grazing lands. Lack of ready access to surface water hinders the development of extensive irrigation schemes, whereas groundwater extraction-based irrigation requires a massive investment in boreholes, pumping, and water conveyance infrastructure. However, land sales continue to be fueled by land speculation and many of the land buyers come from agropastoral communities

Outcome of Step 3: The barrier analysis indicates that Scenario 1 faces no significant barriers to continuation, while Scenarios 2, 3, and 4 face significant barriers to replace the pre-project activities in the project area.

Step 4: Common practice analysis

Based on a literature search and canvassing-experienced NGO staff in the three counties where Maasai are the predominant ethnic group and livestock herding is the dominant livelihood, only the Maasai Mara Wildlife Conservancies have engaged in "holistic" or some sort of grazing management that resembled RRG. A map is shown of the Maasai Conservancies and the three counties (Figure 3-7). The total area of the conservancies is 133,160 ha, while the three counties encompass 3,846,526 ha as of the project start date. RRG type grazing practices are currently practiced on less than 4% of the Maasai dominated grazing area. This qualifies the project as meeting the requirement that RRG is not common practice.

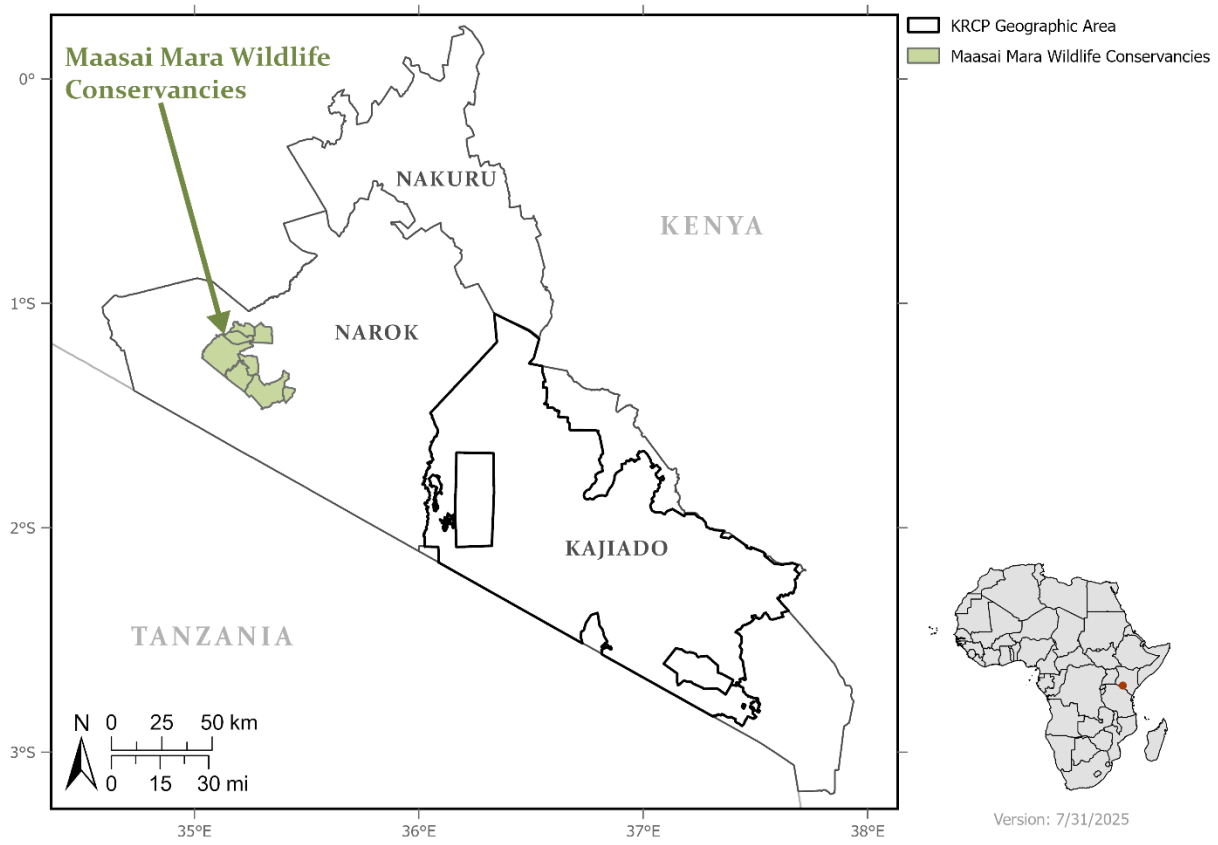


Figure 3-7. Lands (green, Maasai Mara Wildlife Conservancies) known to practice some form of rapid rotational grazing within the three-county area of Kenya equivalent to our project area (grasslands and savannas with Maasai as the predominant ethnic group).

Outcome of Step 4: the common practice analysis indicates that Scenario (i) is favored by common practice in the project area and that scenarios (ii), (iii), and (iv) are not favored by common practice.

Consequently, the project meets the criteria that scenario (ii) would not occur in the absence of revenues from the proposed grassland management soil carbon project.

3.1.6 Methodology Deviations (VCS, 3.20)

The project proponents request the following methodology deviations:

1. Use of the model selection and calibration protocols in Verra Module VMD0053 as part of the model assessment procedure prescribed in Methodology VM0032 v 1.0. Justification for this request invokes the following:

1) Methodology VM0032 v 1.0 Errata and Clarifications mentions the possibility of calibrating the model of choice for the unique conditions of the project area or for parameters that have no measurements in the project area or similar habitats and climate zones.

2) However, Methodology VM0032 v 1.0 provides no guidance as to how to conduct such a calibration. Module VMD0053 contains an explicit section on the appropriate procedures for calibration.

3) VM0032 v 1.0 requires that the equations of a model used be published in a peer-reviewed journal. However, most ecosystem process models evolve over time as they are used in different field systems, and VMD0053 recognizes that an initially peer-reviewed published model may have one or more downstream versions used in further research. As an applicability condition, VMD0053 provides detailed requirements for using downstream model versions, including their public availability, hosting on a stable server, documentation, and the specific codes and parameter sets consistently associated with specific versions.

4) Allowing downstream model versions to be used and calibration of a chosen model will *increase the accuracy of estimated carbon dioxide removals*, a primary purpose of methodology deviations.

5) We plan to use SNAPGRAZE version 2.3, a version previously calibrated to apply to degraded tropical grasslands and savannas. Version 2.3 is currently hosted in spreadsheet form at http://www.soilsfuture.com/snapgraze and in R-code on Github. Documentation of changes to the SNAPGRAZE model details how it differs from the originally published version (1.0) in the journal *Resources* in 2020[115] and is also available with the spreadsheet version and posted as a readme file with the R-code on the Github site.

6) Errata and Clarifications to VM0032 v 1.0 allow calibration of the chosen model but provide no guidance as to how to achieve a calibrated model. We request that the calibration steps required by VMD0053 be used. These steps include identification of separate calibration and validation datasets, appropriate procedures for identifying the variables to fit to calibration data, and appropriate mapping of the calibrated model to the model used in validating the calibration.

2. Reduction of the displacement leakage buffer from 2 km to 1 km:

1) As stated in Sections 2.6.1 and 3.2.3, VM0032 considers livestock excursions beyond 2 km from the project boundary to constitute displacement leakage. However, based on extensive field interviews with local herders in the KRCP project area, the project proponents request a methodology deviation to reduce this buffer distance from 2 km to 1 km. Herders consistently reported that, based on visual reference points and geographic familiarity, they are confident in their ability to identify whether livestock are within 1 km of project boundaries. This adjustment allows for more conservative and practical leakage monitoring, while maintaining methodological integrity and minimizing false-positive leakage attribution. The 1 km threshold will be applied consistently for monitoring and leakage calculation purposes throughout the project.

[115] Ritchie 2020 (ibid.).

3. Use of high-accuracy GPS to replace permanent markers at soil sampling stations

1) As described by section 8.1.2 of VM0032, describing the design of permanent sampling stations, soil sampling stations that will be revisited to measure change in SOC are to be marked with permanent materials like PVC, metal, or stone. Based on knowledge of the project area by the project proponent, as confirmed by community members, permanent markers as described above would have a 50% survival rate due to disturbance by livestock, wildlife, and/or community members. GPS devices are now accurate to +/- 5 m, making the use of permanent markers unnecessary to get close enough to previous SOC sampling cores to reasonably reduce sampling error. Data collectors will use GPS devices to locate SOC sampling stations on subsequent visits after establishment to ensure that the same area is being sampled.

3.2 Quantification of Estimated GHG Emission Reductions and Removals

3.2.1 Baseline emissions derived from livelihood-driven human impacts on aboveground woody biomass (e.g., cutting for fuel wood, charcoal or timber sales Baseline Emissions (VCS, 3.15)

Baseline Methane emissions

Baseline methane emissions from grazing animals will be estimated from data on total numbers for different livestock categories that reflect species, age, sex and their respective weights, in the project area. The methodology applies to Tier 2 approaches, as outlined in the *IPCC 2019 Update to Guidelines for National Greenhouse Gas Inventories* Chapter 10, Emissions From Livestock and Manure Management, but with local input data. Calculations are based on estimating daily methane emissions as a function of the body weight (kg) of each major animal category (Table 3-5), and then multiplied by the number of animals in each animal category and 365 days in a year. Emissions from all categories are summed to provide the total annual methane emissions for the project area. Domestic livestock grazing in the project area are mostly ruminants (e.g., goats, sheep, camels and cattle) with a small proportion of donkeys (non-ruminants).

$$BEM = \sum_{c=1}^{K} \left(BN_c \; x \; DMEF(W_c)\right) \; x \; GWP_{CH_4} x \; 365 \; x \; 6.26x10^{-7}$$

(Equation 2)

Where:

BEM	= Baseline annual emissions from grazing animals (tCO_2e)
BN_c	= Baseline number of animals of category *c* (head)
$DMEF(W_c)$	= Daily emission factor as a function of animal weight for category *c* (L CH_4 / day)
W_c,	= Average body weight during the baseline period for animals of category *c* (kg)
GWP_{CH4}	= Global warming potential for methane (tCO_2e / tCH_4)
c	= category of grazing animals

K	= number of categories of grazing animals, e.g., species, gender, age combinations
365	= Conversion factor for days to years
6.26 x 10^{-7}	= Conversion factor for L CH_4 / day to t CH_4 / day

These values must be determined using the relevant allometric equations in Table 3-5.

Table 3-5: Allometric Equations, with Uncertainty, for Daily Methane Emissions for Three Animal Types: Ruminants and Camelids, Equids, and Pigs.

Animal Type	Equation	n	R^2	Uncertainty Percent
Ruminants and Camelids	0.66 x WC $^{0.97}$	62	0.88	9.5%
Equids	0.18 x WC $^{0.97}$	23	0.76	28.2%
Pigs	0.07 x WC $^{0.99}$	12	0.93	18.6%

BN_c, is the harmonic mean number of animals of each category during the 10 years prior to the project start date, calculated as below. The harmonic mean conservatively weights lower values of methane emissions in a sample. This must be calculated using equation (2). The harmonic mean BN_c for n censuses of $N_{c,i}$ animals in each category c during census i is given by:

$$BN_c = \left(\frac{1}{n}\right) x \left(\frac{1}{\sum_{i=1}^{n} \frac{1}{N_{c,i}}}\right)$$

(Equation 3)

where

BN_c	= Harmonic mean baseline number of animals of category *c* (head)
n	= Number of counts
Nc,i	= Animals in category *c* during count *i* (head)

Historical livestock numbers for the project area were estimated from more than 1,000 household surveys in the project area, distributed in proportion to population in each participating community. Participants were asked to estimate livestock numbers for cattle, goats, sheep, and donkeys, and the average per household was then multiplied by the estimated number of households (obtained from membership rolls) for each community (Table 3-6). Cattle in the project area are predominantly of the Sahiwal breed and adult females weigh 425 kg, with weaning weight of calves at 170 kg[116]. Goats were mainly of the Galla breed, with average weights for kids of 16 kg and average adult weights of 40 kg[117].

[116] http://agtr.ilri.cgiar.org/kenyan_sahiwal
[117] https://backyardgoats.iamcountryside.com/goat-breeds/somali-goat-breed-profile/

Sheep are predominantly of the Dorper breed[118] and adults weigh on average 36 kg (Table 3-6) with lamb weaning weights of 12 kg. Donkeys' average adult weight is 150 kg, with weaning weight of approximately half of adult weight[119]. In addition, donkeys are non-ruminants, with lower per unit mass emissions of methane than the other ruminant species[120]. Adult dromedary camels in Kenya weigh approximately 300 kg and juvenile weaning weight is approximately half that at 150 kg[121].

Uncertainty in methane emissions is calculated as the pooled uncertainty across all animal categories *c*,

$$UBEM = \frac{(\sum_{c=1}^{k}(BEM_c \times UBEM_c)^2)^{\frac{1}{2}}}{\sum_{c=1}^{k} BEM_c}$$

(Equation 4)

Where

UBEMc = Uncertainty in baseline methane emissions from animals in category c (%), which is itself a pooled uncertainty of uncertainty in daily emissions estimated from body mass ((Franz *et al.* 2010) and the uncertainty in the harmonic mean of animal numbers of each class.

BEM_c = estimated methane emissions for animals in category *c*.

$$UBEM_c = \frac{[UDMEF(W_c)^2 + (UBN_c)^2]^{1/2}}{DMEF(W_c) + UBN_c}$$

(Equation 5)

[118] https://cgspace.cgiar.org/items/e20a5d88-ebab-49bc-9ed6-af23480da726

[119] Mary Gichure et al., "Assessment of Phenotypic Characteristics and Work Suitability for Working Donkeys in the Central Highlands in Kenya," ed. Carlos Alberto Hussni, *Veterinary Medicine International* 2020 (October 16, 2020): 1–6, https://doi.org/10.1155/2020/8816983.

[120] R. Franz et al., "Methane Production in Relation to Body Mass of Ruminants and Equids," *Evolutionary Ecology Research* 12 (2010): 727–38, https://doi.org/10.5167/UZH-41217.

[121] James. C. Njanja and Gufu Oba, "The Turkana Camel Breed in North-Western Kenya: Lactation Characteristics," *Outlook on Agriculture* 39, no. 1 (March 2010): 49–55, https://doi.org/10.5367/000000010791170013.

Table 3-6: Estimation of average annual enteric methane emissions from livestock and their uncertainty for initially participating communities in the KRCP project area.

Grazing Animal Category					Animal Census (Number of Animals)										Methane Emissions				
Species	Sex/Age	Weight (kg)	Annual Methane Emissions/ Animal, tCO2e [1]	Per Animal Uncertainty% [1]	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Harmonic Mean	Uncertainty in Animal Counts %	Methane Emissions for Category (tCO2e)	Uncertainty in Methane Emissions %	Weighted Uncertainty
Cattle [2]	Cows	425	1.497	9.5	179,345	185,899	182,652	178,926	183,112	173,240	171,849	143,667	187,436	180,303	162,778	174,446	9.45	261,077	13.40	1.22366E+13
	Calves	170	0.615	9.5	67,572	68,040	68,178	65,903	65,978	58,317	60,701	50,130	64,565	64,268	53,520	61,868	3.35	38,069	10.07	1.47069E+11
Goats [3]	Adult	40	0.151	9.5	254,295	247,776	242,745	245,171	246,791	246,372	251,285	209,862	284,085	273,353	270,707	272,024	10.24	41,131	13.97	3.30221E+11
	Juvenile	16	0.062	9.5	103,600	98,679	96,809	95,889	94,950	93,642	93,967	80,096	104,082	102,118	96,735	99,354	9.01	6,177	13.09	6538676174
Sheep [4]	Adult	35	0.133	9.5	306,669	311,020	302,232	301,657	308,260	314,401	312,306	265,651	340,061	334,526	366,761	349,903	37.35	46,480	38.54	3.20872E+12
	Juvenile	12	0.047	9.5	120,142	115,471	111,352	110,696	110,917	108,267	109,562	92,221	120,365	118,765	125,107	121,853	37.35	5,731	38.54	48778884282
Donkeys [5]	Adult	150	0.149	28.2	25,145	26,329	24,420	24,206	23,424	24,153	22,526	19,439	24,398	23,652	23,859	23,755	10.72	3,531	30.17	11345654518
	Juvenile	75	0.076	28.2	11,593	12,356	11,682	11,109	10,263	9,947	9,641	8,198	10,624	9,779	9,401	9,586	9.47	727	29.75	468234553.9
Camels [6]	Adult	300	1.068	9.5	63	154	110	22	63	63	17	88	165	253	41	71	146.75	76	147.06	124344233
	Juvenile	150	0.545	9.5	39	135	110	28	88	63	28	41	113	96	41	58	72.75	32	73.37	5347096.53
															Total Animals	607,692	Total Emissions	403,030	Total Uncertainty	8.85 %

	1 Equation	Source: Franz, R., C. R. Soliva, M. Kreuzer, P. Steuer, J. Hummel, and M. Clauss. 2010. Methane production in relation to body mass of ruminants and equids. Evolutionary Ecology Research 12:727-738 https://www.zora.uzh.ch/id/eprint/41217/36/2569_re-rev_publisher_version.pdf
	2 Cattle	http://agtr.ilri.cgiar.org/kenyan_sahiwal
	3 Goats	https://backyardgoats.iamcountryside.com/goat-breeds/somali-goat-breed-profile/
	4 Sheep	https:/ /cgspace.cgiar.org/items/e20a5d88-ebab-49bc-9ed6-af23480da726
	5 Donkeys	M. Gichure, J. Onono, R. Wahome and P. Gathura Veterinary Medicine International 2020 Vol. 2020 Pages 8816983
	6 Camels	Njanja & Oba 2011. Outlook on AGRICULTURE Vol 40: 273–279

Measured
Transcribed
Calculated

Baseline Emissions from Biomass Burning

Methane emissions from biomass burning may be conservatively excluded if project activities do not affect or decrease annual emissions, in which case BEBB = 0. In this project, baseline conditions feature virtually no fire (see Section 2.2.1 **Conditions Prior to Project Initiation**) and fire is not considered a viable land management tool for savannas, as judged by the almost complete lack of fire in non-forested areas of Kenya over the past 15 years and the focus on fire prevention in integrated forest management efforts[122].

Changes in Soil Carbon Stocks

Despite evidence of ongoing decline in vegetation cover that would indicate ongoing declines in soil organic carbon (SOC) stocks, methodology VM0032 v 1.0, per VCS Standard 4.7, states that changes in SOC density are conservatively assumed to be zero in the baseline.

Characterizing Baseline Vegetation and Grazing

We will use MODIS Terra 16-day composite (MOD13Q1) satellite images to assess whether vegetation conditions in the project area improve during the project crediting period. Previous analyses have found NDVI to be more sensitive to the impacts of grazing at low ranges of production of 0-300 g/m^2 typical of the region's rangelands under high levels of continuous grazing. Higher NDVI scores are associated with greater perennial grass cover during grazing use, and with overall grazing intensity[123].

NDVI values, after controlling for the influence of mean annual rainfall on NDVI, have declined significantly on average during the 22 years prior to the project start date (Section 2.2.2, **Most Likely Scenario Justification**). This satellite database can serve as a baseline for evaluating impacts of the project activity, planned rotational grazing, per the requirements of the VCS VM0032 methodology.

NDVI measurements indicate that, where rapid rotational grazing will be implemented for more than two years, the project activities should result in significant rainfall-corrected increases in NDVI despite dry conditions in 2020-2023.

We anticipate that some Group Ranches may not be consistent in their enforcement of grazing restrictions and may only begin to implement rapid rotational grazing in 2024. Nevertheless, experience from Northern Kenya suggests that the chronic degradation of forage production in the project area over the past 10 or more years, combined with the ability of satellite measures such as NDVI to assess potential and realized forage production under different annual rainfall amounts, generated evidence that rapid rotational grazing can improve forage production even under low rainfall conditions[124].

Estimating Baseline Methane Emissions

[122] Kevin Nyongesa and Harald Vacik, "Fire Management in Mount Kenya: A Case Study of Gathiuru Forest Station," *Forests* 9, no. 8 (August 8, 2018): 481, https://doi.org/10.3390/f9080481.
[123] A Huete et al., "Overview of the Radiometric and Biophysical Performance of the MODIS Vegetation Indices," *Remote Sensing of Environment* 83, no. 1–2 (November 2002): 195–213, https://doi.org/10.1016/S0034-4257(02)00096-2.
[124] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.

Baseline methane emissions from grazing animals will be estimated from data on total numbers for different livestock categories that reflect species, age, sex and their respective sizes, in the project area. Calculations are based on estimating daily methane emissions as a function of the body weight of each major animal category and then multiplied by the number of animals in each animal category and 365 days in a year. Emissions from all categories can then be summed to provide the total annual methane emissions for the project area.

We anticipate using survey data to create a credible baseline estimate for livestock numbers for each of the participating communities. The data source for this baseline estimate will be a survey of livestock-owning households to assess past livestock holdings and thus obtain a historical estimate of livestock per household.

Modeling Baseline Soil Organic Carbon Stocks

Soil Carbon Dynamic Model. Baseline soil organic carbon for the proposed activity-based Modeled approach per the VCS VM0032 methodology requires the measurement of the necessary model parameters to test a model. The project will use the SNAPGRAZE model[125], v2.3, to estimate SOC dynamics.

Parameters for Model

The SNAPGRAZE model has the following parameters:

MAPLC = lignin and cellulose content of aboveground biomass, likely inferred from the type of dominant plant cover (bare ground, annuals, perennials, or mixed).

SAND% = percent of the soil comprised of sand

MAP = mean annual precipitation (mm) over the time period for which baseline management conditions have been employed

MAT = mean annual temperature (^{o}C) over the time period for which baseline management conditions have been employed.

FIRE = frequency of fire as mean percent of project stratum area covered by fire in previous 10 years.

DEPTH = depth at which soil is sampled

However, because fire is very rare in the project ecosystem and grazing animal reduction in potential fuel loads is likely to be strong even under new grazing management, FIRE will be set equal to zero in simulations with the model for the baseline scenario and the initial verifications. As perennial grasses become more abundant and a greater proportion of area has high grass biomass entering the dry season, natural wildfires may begin to occur. At that point, burned area maps based on MODIS satellite Burned Area Product (see Figure 3-1) will be used to assess fire frequency.

Number of livestock, adults and juveniles, of each species that use the project area or the season

[125] Ritchie, “Grazing Management, Forage Production and Soil Carbon Dynamics.”

Project area

Growing season days = days in which soil moisture is sufficient to support plant growth, typically estimated from temperature and rainfall estimates.

Grazing blocks = Different discrete locations used by livestock within the project area, such as seasonal ranges, pastures, paddocks, etc.

Model Validation. Model validation (not to be confused with carbon project validation) is the task of evaluating the appropriateness or accuracy of a given statistical or quantitative model using available data. The parameters needed to validate the SNAPGRAZE model are the proportion of the soil made up of organic carbon, expressed as a percent (SOC%) and the soil bulk density.

Soil carbon stocks and dominant vegetation were sampled at a minimum number of permanent sampling stations across all villages, with at least 20 stations in each community. Soils were sampled as described in Section 3.3.3 **Monitoring Plan**.

At each site, three 5-cm diameter cores were taken to a depth of 40 cm and mixed to form a composite sample, which was then dried and weighed and analyzed for total organic carbon using standard methods[126] to quantify levels of oxidizable organic matter (OM). A separate soil core (5 cm diameter x 40 cm depth) will be taken at each station to obtain a known volume (405.366 cm^3). Rocks and pebbles were removed and their volume measured by displacement of water in a graduated cylinder, and this volume was subtracted from the core volume to obtain a net volume. Soil remaining after rocks and pebbles were removed was dried and weighed and divided by net volume to obtain bulk density (g/cm^3) via standard methods[127]. Raw data will be available as Excel files on request.

Soil texture of a subset of samples was analyzed at the Crop Nutritional Services laboratory (in Nairobi, Kenya) to find the mean percent sand associated with each of the major strata. The mean percent sand from the stratum in which each station was located was used as the SAND% parameter in the model.

Lignin and cellulose content (MAPLC) of aboveground vegetation has already been estimated for Kenyan rangelands by collecting samples of the dominant types of herbaceous vegetation (annual grass, forb, and perennial grass) across 40 random sampling points (Figure 3-8). We gathered vegetation samples by clipping, drying (at 45°C for four days) and weighing the vegetation from two 0.125 m^2 quadrats clipped to the ground surface, followed by combining samples, grinding through a 0.9 mm sieve with a Wiley Mill, from digestion in acid detergent and sulfuric acid[128].

[126] D.W. Nelson and L.E. Sommers, "Total Carbon, Organic Carbon and Organic Matter," in *Methods of Soil Analysis: Part 2 Chemical and Microbiological Properties*, ed. A.L. Page, 1st ed., vol. 9, Agronomy Monographs (Wiley, 1982), 539–79, https://doi.org/10.2134/agronmonogr9.2.2ed.
[127] X. Hao et al., "Soil Density and Porosity," in *Soil Sampling and Methods of Analysis*, ed. M.R. Carter and E.G. Gregorich, 2nd ed. (CRC Press, 2007), https://doi.org/10.1201/9781420005271.
[128] Jensen et al., "Influence of Biochemical Quality on C and N Mineralisation from a Broad Variety of Plant Materials in Soil."

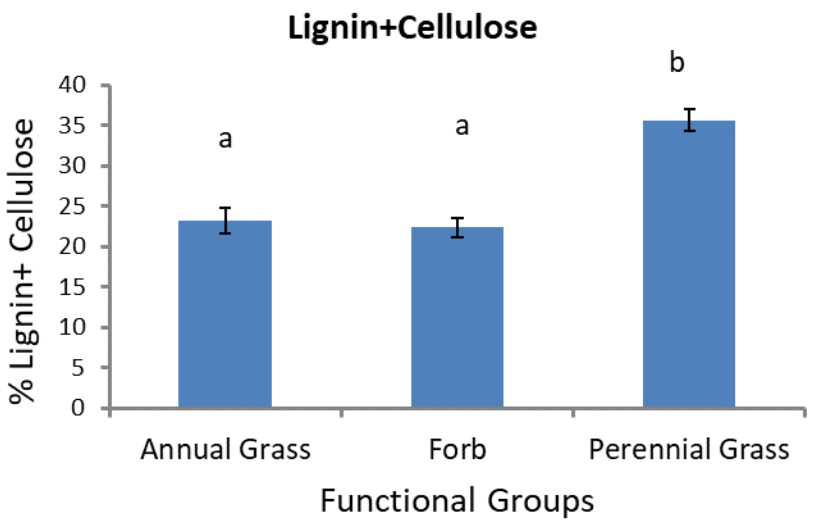


Figure 3-8: Percent lignin plus cellulose in annual grasses, forbs and perennial grasses.

Mean Annual Precipitation (MAP) will be estimated at individual sampling points from for the CHIRPs online satellite database[129].

Mean Annual Temperature (MAT) will be estimated at individual sampling points from CHIRTSmonthly online satellite database[130].

Estimation of Baseline Soil Organic Carbon. The SNAPGRAZE model conservative estimate of SOC at each station will be calculated by back-casting the model 10 years from current assumed equilibrium SOC under the same parameter values used in the validation of the model. The procedure is detailed in VM0032 v 1.0.

Uncertainty in Baseline Emissions. In accordance with the methodology, uncertainty in baseline methane emissions will be calculated as a function of the daily methane emissions of grazing animals of different categories, the uncertainty in the mean body weight of the grazing animals, and the uncertainty in the harmonic mean of animal counts.

Estimation of Baseline Emissions and Uncertainty. Following the methodology, the net baseline emissions and removals are in equilibrium under the assumption ΔSOC = 0.

3.2.2 Project Emissions (VCS, 3.15)

Calculation of Project Emissions and Removals

Net GHG emissions and removals under the project scenario are determined by the sum of methane emissions and net removals from the atmosphere due to sequestration in soil carbon.

129 CHIRPS: Rainfall Estimates from Rain Gauge and Satellite Observations | Climate Hazards Center - UC Santa Barbara (ucsb.edu)
130 CHIRTSmonthly | Climate Hazards Center - UC Santa Barbara (ucsb.edu)

3.2.2.1 Project Methane Emissions

According to the VCS VM0032 methodology, if project activities will reduce livestock numbers, then accompanying removals from reduced methane emissions must be conservatively excluded from project removals. This avoids potential leakage from shifting of animals to adjacent grasslands or from market leakage whereby other producers increase livestock numbers to replace project livestock reductions and meet market demand. However, whether or not methane emissions from livestock are reduced, calculations must be based on project data from animal counts or censuses and emission factor data based on project area-applicable body weight of each category. In the KRCP, we do not anticipate a reduction in livestock numbers.

The parameters are similar to those used for calculating baseline methane emissions. The number of grazing animals must be measured, because new animal categories may result due to project activities (e.g., a shift to using different breeds or species of livestock).

Ex ante methane emissions were calculated under the conservative assumption that livestock numbers would increase during the project lifetime by 50% above current density. This increase is anticipated in response to the expected improvement in range conditions and forage productivity associated with RRG. These expectations are consistent with observations from a similar northern Kenya project that demonstrated a 53% increase in livestock numbers (130,000 to 200,000 cattle equivalents across 2 million ha during the first 8 years of project activities), likely in response to improved forage conditions[131]. Thus, conservatively, we might expect livestock numbers to increase by that amount in our project.

3.2.2.2 Soil Carbon Removals

The KRCP follows the VCS VM0032 methodology, which allows emissions reductions and greenhouse gas removals to be credited on the basis of activity, with the link between activity and carbon dioxide removals estimated using a validated soil carbon dynamic model, in this case SNAPGRAZE[132], under methodology VM0032. Then the model is used to estimate the future equilibrium soil carbon under the assumption of long-term execution of altered grazing practices.

Calculation of Carbon Removals to Soil. This project will use the **Modeled Approach,** as defined in Methodology VM0032. As validated in section 3.1.4 **Baseline Scenario**, The SNAPGRAZE soil carbon model will be used to simulate anticipated project equilibrium soil carbon under the proposed project activities for each stratum. Carbon typically accrues in response to management changes with

[131] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[132] Ritchie, "Grazing Management, Forage Production and Soil Carbon Dynamics."

decreasing increments over time as equilibrium is approached[133],[134],[135]. Thus, the annual increment in SOC at each sampling point is determined by the difference in SOC between the conservative baseline maximum from 10 years prior to the project start and project equilibrium, divided by the model-estimated time necessary to achieve project equilibrium.

$$PRS_y = \frac{44}{12} \sum_{m=1}^{s} PA_{m,y} \sum_{j=1}^{z_m} \frac{\left(PSOC_{j,m} - MSOC_{j,m,0}\right)}{D_{j,m}}$$

(Equation 6)

Where

PRS_y = total project removals in year y, metric tons CO_2e ha^{-1} yr^{-1}.

$PA_{m,y}$ = project area in stratum m in year y in which project activities were conducted, ha (Note that strata in this project are the "instances" of the grouped project). Removals occur only when planned rapid rotational grazing occurs. We do not therefore count removals as having occurred in these subareas, such that $PA_{m,y} \leq PA_m$

m = stratum or instance of project activity

z_m = number of sampling stations in stratum m.

$PSOC_{j,m}$ = Expected equilibrium soil organic carbon density (metric tons/ha) at station j under project activities

$MSOC_{j,m,0}$ = maximum SOC density (metric tons/ha) at station j in the ten years prior to the project start date, as calculated with the SNAPGRAZE model, used to provide a conservative baseline estimate of initial soil carbon stocks.

$D_{j,m}$ = Number of years to reach equilibrium at station j in stratum m

Determination of $PSOC_{j,m}$. The SNAPGRAZE model will be run for each sampling station under expected project scenario conditions. Some parameters used for the project scenario will be the same as the baseline, such as mean annual rainfall, soil texture and fire frequency. However, forage plants would become dominated by perennials after 40 years, so plant lignin and cellulose content would increase to 35.8%. Livestock density is expected to increase, and we will assume by 50%, similar to conditions prior to degradation. The number of pastures livestock will rotate between during the plant growing season

[133] Keith Paustian, William J. Parton, and Jan Persson, "Modeling Soil Organic Matter in Organic-Amended and Nitrogen-Fertilized Long-Term Plots," *Soil Science Society of America Journal* 56, no. 2 (March 1992): 476–88, https://doi.org/10.2136/sssaj1992.03615995005600020023x.
[134] J Thornley and M Cannell, "Temperate Grassland Responses to Climate Change: An Analysis Using the Hurley Pasture Model," *Annals of Botany* 80, no. 2 (August 1997): 205–21, https://doi.org/10.1006/anbo.1997.0430.
[135] J. R. Williams et al., "The EPIC Crop Growth Model," *Transactions of the ASAE* 32, no. 2 (1989): 0497–0511, https://doi.org/10.13031/2013.31032.

will increase from 1 to 6, corresponding to the expected rotational grazing plans implemented by the participating communities.

Determination of $D_{j,m}$. The annual increments in SOC density calculated by the SNAPGRAZE model decline with year and are very closely approximated by a negative exponential decay function since the rate of decline each year is approximately constant across all years (Figure 3-9).

$$\Delta PSOC_{j,m,y} = \Delta PSOC_{j,m,1} e^{-k_{j,m} y}$$

(Equation 7)

Where

$\Delta PSOC_{j,m,y}$ = modeled annual increment in SOC stocks at station *j* in stratum *m* in year *y*.

$\Delta PSOC_{j,m,1}$ = modeled annual increment in carbon stocks at station j in stratum m in year 1.

e = the base *e*.

$k_{j,m}$ = the annual rate of change in $\Delta PSOC_{j,m,y}$ at station *j* in stratum *m*

y = year since scenario began.

The rate $k_{j,m}$ can be estimated from the ratio of model predicted increments of change divided by the number of years between estimated changes.

$$k_{j,m} = ln\left(\frac{\Delta \text{PSOC}_{j,m,Y}}{\Delta \text{PSOC}_{j,m,1}}\right)/\text{Y}$$

(Equation 8)

Where

Y = number of years separating the modeled estimates of $\Delta PSOC_{j,m,y}$

Carbon sequestration in the project scenario is then given by the integral of annual increments over the time from the start of the project (*y* = 0) to $D_{j,m}$ the time to equilibrium at station *j*

$$PSOC_{j,m} - MSOC_{j,m,0} = \int_0^{D_{j,m}} \Delta PSOC_{j,m,1} e^{-k_{j,m} y}\, dy$$

(Equation 9)

Evaluating the integral and solving for $D_{j,m}$ yields

$$D_{j,m} = \frac{ln\left[1 - \left(k_{j,m} \times \left(PSOC_{j,m} - MSOC_{j,m,0}\right) \Big/ \Delta \text{PSOC}_{j,m,1}\right)\right]}{k_{j,m}}$$

(Equation 10)

Given the exponential decay behavior of $\Delta PSOC_{j,m,y}$, there is actually no number of years at which $\Delta PSOC_{j,m,y} = 0$, and $\Delta PSOC_{j,m,y}$ approaches zero as $PSOC_{j,m,y}$ approaches but never quite reaches an asymptote of the equilibrium $PSOC_{j,m}$. To avoid including small increments in SOC density (removals) in the calculation of PRS_y that would occur decades to more than 100 years after he project lifetime, we chose to estimate $D_{j,m}$ as 2 x the half-life of $\Delta PSOC_{j,m,y}$ or the time for $PSOC_{j,m,Y}$ to reach half of $PSOC_{j,m}$

$$D_{j,m} = 2 \times \frac{ln\left[1 - \left(k_{j,m} \times \left(PSOC_{j,m} - MSOC_{j,m,0}\right) \Big/ \left(2 \times \Delta PSOC_{j,m,1}\right)\right)\right]}{k_{j,m}}$$

(Equation 11)

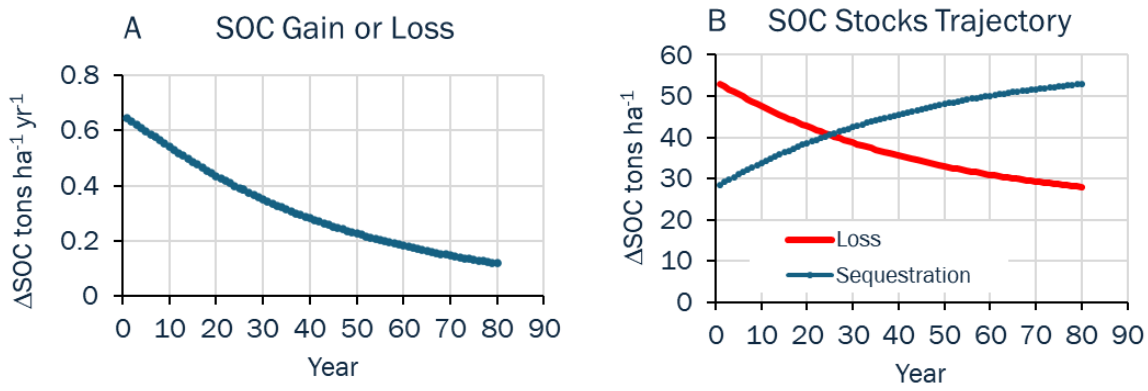


Figure 3-9. A. Example from the SNAPGRAZE model of the pattern of decline with year in annual incremental gains in SOC from a low baseline SOC stock or decline in annual incremental losses of SOC from an initially high SOC stock under degrading grazing activities. B. Corresponding decelerating increase in carbon stocks with sequestration (blue) or decelerating decline in carbon stocks with degradation.

Determination of $MSOC_{j,m,0}$. The VCS Standard 4.7 requires that, for modeled approaches, a conservative baseline shall be used, corresponding to the maximum SOC density at a sampling station in the 10 years prior to project start. Since SOC measurements did not occur in the project area prior to the project start, this value must be determined by the SNAPGRAZE model. Increments in carbon stocks decrease over time as a new equilibrium is approached. We estimated the difference in carbon stocks from year 30 to 40 in the forward iteration of SNAPGRAZE at each sampling station to mirror the changes in SOC that would occur in the time since rangeland degradation began to occur in the late 1970's[136], and then added that to the measured baseline SOC density at that sampling station.

The rate of decline in SOC density from pre-degradation conditions is very closely approximated by the negative of the rate of decline in $\Delta PSOC_{j,m,y}$. Thus, we can estimate the $PSOC_{j,m,-10}$, that is that going

[136] Lind, J., Sabates-Wheeler, R., Caravani, M. *et al.* Newly evolving pastoral and post-pastoral rangelands of Eastern Africa. *Pastoralism* **10**, 24 (2020). https://doi.org/10.1186/s13570-020-00179-w

backward 10 years from the measured SOC density $SOC_{j,m,0}$ as the measured SOC density plus the integral of $\Delta PSOC_{j,m,y}$ over the 10 years prior to the start of the project.

$$PSOC_{j,m,-10} = = SOC_{j,m,0} + \int_0^{10} \Delta PSOC_{j,m,1} \times e^{-k_{j,m} \times (-y)}\, dy$$

Which after evaluating the integral yields

$$MSOC_{j,m,0} = PSOC_{j,m,-10} = SOC_{j,m,0} + \left(\Delta PSOC_{j,m,1} \Big/ k_{j,m}\right) \times \left(e^{10k_{j,m}} - 1\right)$$

(Equation 12)

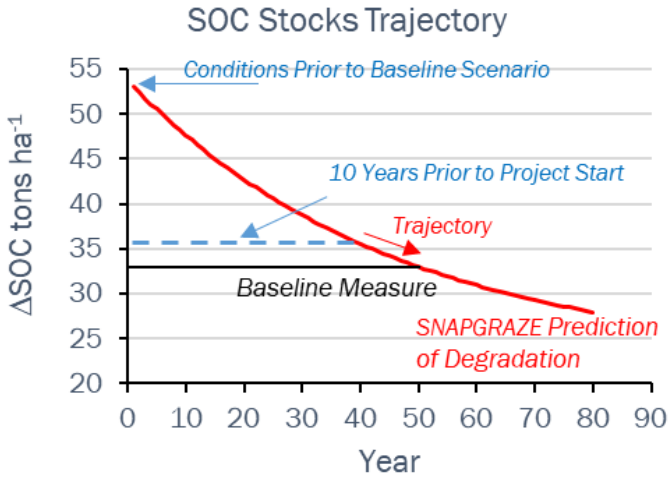


Figure 3-10. Example of hindcasting the trajectory of carbon stocks from stocks estimated to be present prior to degrading baseline scenario to the measured current carbon stocks. Assuming

Table 3-7: Ex ante removals of CO_2 to soil by initial PAI communities along with uncertainty for each.

Community	Samples	Removals tons CO2e ha^{-1} yr^{-1}	Uncertainty%	Area ha	Total Removals tons CO2e
Eselenkei	43	1.677	9.6%	59,233	99,318
Olgulului	49	1.459	9.5%	155,285	226,503
Olkeri	28	0.751	3.5%	26,949	20,242
Olkiramatian	21	0.271	14.6%	23,402	6,341
RAMAT East	36	1.665	11.7%	56,503	94,084
Shompole	38	0.322	18.5%	58,112	18,702
Total	215			379,483	465,189
	Mean tons CO2e $ha^{-1}yr^{-1}$	1.225			

3.2.2.3 Uncertainty in Project Emissions and Removals.

Total uncertainty can be calculated by weighting uncertainties according to the magnitude of emission or removal. In this case, uncertainty in net reductions and removals is driven by uncertainty in baseline emissions, project emissions and project net changes in carbon stocks.

For the calculation of baseline emissions and reductions, uncertainty arises in the calculation of methane emissions only, because all other net emissions are conservatively assumed to be zero, unless increasing fire frequency is a proposed management activity. These uncertainties in baseline emissions will be presented for each category of grazing animal.

Uncertainty in changes in soil carbon stocks under a Modeled approach is obtained from the calculated 95% confidence interval, as required by the current VCS Standard 4.7 and the VM0032 methodology from a Monte Carlo simulation. This interval is determined by iterated calculations that sample from hypothetical normal distributions of values of each parameter in the calculation, defined by the mean and standard errors of each parameter, for each stratum if stratified.

Repeated calculations, with random draws from the distributions from each parameter, give a distribution of calculation outcomes with an overall mean and standard error for the calculation. Such Monte Carlo simulations will be done by the SNAPGRAZE model software. The standard error for the SNAP SOC prediction, SE(PRS_m) for each stratum generated by the Monte Carlo simulations will then then be used to calculate 95% Confidence Intervals (95% CI) for SOC removals.

Table 3-8: Summary of baseline emissions and calculated project removals to soil organic carbon by year, 2024-2029.

Year	Area ha	Enteric Methane t CO_2e	Uncertainty	Project Removals t CO_2e	Uncertainty	Leakage t CO_2e	Leakage Uncertainty	Net Project Removals t CO_2e
2024	397,026	73,183	8.85%	502,306	3.60%	50,231	3.60%	452,075
2025	607,210	131,729	8.85%	768,224	3.60%	76,822	3.60%	691,402
2026	828,943	219,548	8.85%	1,048,754	3.60%	104,875	3.60%	943,879
2027	1,093,320	292,730	8.85%	1,383,236	3.60%	138,324	3.60%	1,244,912
2028	1,093,320	292,730	8.85%	1,383,236	3.60%	138,324	3.60%	1,244,912
2029	1,093,320	292,730	8.85%	1,383,236	3.60%	138,324	3.60%	1,244,912

Total Project Uncertainty

Per Methodology VM0032 v 1.0, total project uncertainty is the pooled uncertainty from methane emissions, removals to carbon stocks, and leakage. We do not anticipate leakage Uncertainty in biomass burning and non-enteric methane emissions is zero since the project activities do not include fire management and no fires are expected. Uncertainties for enteric methane and removals to SOC (Table 3-9) Updated Verra Methodology Requirements (v 4.5) require that uncertainty be calculated as the margin of error (of half-width of the confidence Interval) for 90% confidence, expressed as %.

Hence uncertainty in methane emissions, *UPEM*, is given by VM0032 v 1.0, equation 13:

$$UPEM = \frac{(\sum_{c=1}^{k}(PEM_c \times UPEM_c)^2)^{1/2}}{\sum_{c=1}^{k} PEM_c}$$

(Equation 13)

Where

PEM_c = project methane emissions by livestock of class *c*

$UPEM_c$ = uncertainty in methane emissions of livestock class *c* based on annual variation in numbers during the baseline period, or if there are multiple years of livestock counts during the monitoring period, from variation in those counts.

k = the number of livestock classes

c = index of livestock class

Uncertainty in project removals to SOC is given by two formulas, uncertainty in removals within strata, and pooled uncertainty in removals across strata.

$$UPRS_{m,y} = 1.64 \times 100 \times \frac{SDMOD\Delta SOC_{m,zm}}{z_m{}^{1/2}\left[\left(\sum_{j=1}^{z} MOD\Delta SOC_{m,j,y}\right)/z_m\right]}$$

(Equation 14)

And

$$UPRS_y = \frac{\left[\sum_{m=1}^{s}\left(MOD\Delta SOC_m \times UPRS_{m,y}\right)^2\right]^{1/2}}{\sum_{m=1}^{s} MOD\Delta SOC_m}$$

(Equation 15)

Where

$UPRS_{m,y}$ = uncertainty in removals to SOC across z_m sampling stations in stratum m in year y

$UPRS_y$ = pooled uncertainty in removals to SOC in year y across s strata

$MOD\Delta SOC_{m,j,y}$= modeled change in SOC at station j in stratum m in year y

$MOD\Delta SOC_m$ = mean modeled change in SOC across z_m stations in stratum m

$SDMOD\Delta SOC_{m,zm}$ = standard deviation in modeled change in SOC across z_m *stations in stratum* m

z_m = number of stations in stratum m

s = number of strata in project area

1.64 = t-score corresponding to 90% confidence in an estimate

100 = factor that converts a ratio into a percentage.

Therefore, to obtain overall project uncertainty in year y, we require an uncertainty calculation where the uncertainty contributed by methane emissions, removals, and displacement leakage are weighted by their respective values (combining equations 35, 44, and 52 in VM0032 v 1.0 with equation 6 above)

$$UT_y = \frac{\left[\left(PEM_y \times UPEM_y\right)^2 + \left(PRS_y \times UPRS_y\right)^2 + \left(LD_y \times UPEM_y\right)^2\right]^{1/2}}{PEM_y + PRS_y + LD_y}$$

(Equation 16)

Table 3-9 presents the calculations of total project uncertainty anticipated for the first five years of the project under the *ex ante* assumption that leakage will be 10% of removals and its uncertainty is the same as for removals, similar to outcomes in the northern Kenya Rangelands Carbon Project. Estimated total project uncertainty from this analysis is 8.16% which is less than the 10% threshold above which uncertainty deductions apply. This analysis will of course be updated at verifications.

Table 3-9: Ex ante determination of total project uncertainty.

Year	Area ha	Enteric Methane t CO2e yr-1	Uncertainty	Project Removals	Uncertainty	Leakage	Leakage Uncertainty	Pooled Uncertainty
2024	250,000	146,365	8.85%	238,008	11.60%	23,801	11.60%	8.16%
2025	450,000	263,457	8.85%	428,414	11.60%	42,841	11.60%	8.16%
2026	750,000	439,095	8.85%	714,023	11.60%	71,402	11.60%	8.16%
2027	1,000,000	585,460	8.85%	952,031	11.60%	95,203	11.60%	8.16%
2028	1,000,000	585,460	8.85%	952,031	11.60%	95,203	11.60%	8.16%
2029	1,000,000	585,460	8.85%	952,031	11.60%	95,203	11.60%	8.16%
								8.16%

3.2.3 Leakage Emissions (VCS 2.5, 3.2, 3.6, 3.15, 4.3)

Leakage can result from displacement of livestock off the project area (displacement leakage) and from replacement of livestock, reduced intentionally from project activities to reduce methane emissions by producers outside the project area to meet market demand (market leakage). Across the international border from Kajiado County lie the Tanzanian districts of Longido and Monduli, where CarbonSolve is working with sister company Soils for the Future Tanzania and local Tanzanian communities on another rangeland soil carbon project using the same VM0032 methodology (Verra ID#4924).

$$LE_y = LD_y + LM_y$$

(Equation 17)

Where:

LE_y = total leakage emissions in year y (tCO_2e)

LD_y = leakage emissions from displaced livestock in year y (tCO_2e)

LM_y = emissions from market leakage in year y (tCO_2e)

Displacement Leakage

Movement of livestock off the project area may result in increased grazing pressure elsewhere, leading to losses of carbon from higher levels of overgrazing – referred to as displacement leakage. Under VM0032, displacement leakage can be determined using either (a) a monitored approach via VMD0040 Leakage from Displacement of Grazing Activities, which requires monitoring of vegetation and soil carbon stocks offsite; or (b) a penalty approach, which applies a deduction based on the proportion of project livestock-days occurring outside the project area.

This project will use only the penalty approach. While the KRCP will monitor livestock movements off the project area through GPS-recorded grazing coordinator reports, it will not monitor vegetation or soil carbon conditions in offsite areas, as required for application of the monitored approach under VMD0040. Therefore, the conditions for using the monitored approach are not met and the penalty approach will be exclusively applied in all cases of offsite grazing. . However, excursions will not be treated as displacement leakage if the livestock can be shown – via grazing coordinator reports – to adhere to a community-approved RRG plan that extends into the area of use or if there is a formal agreement for that land's use (e.g., lease), such as with an adjacent carbon project area. This provides flexibility for managed cross-boundary grazing, such as seasonal use of leased grass banks, without automatically triggering leakage deductions.

Numbers and locations of encroaching livestock will be monitored and recorded by grazing coordinators, who will ensure compliance with the RRG plans of participating communities. It is expected that incursions would occur primarily during drought conditions, when grass banks become attractive to herders from outside of the project area. This approach allows for the continuation of traditional hospitality culture; however, the need to comply with community-implemented project grazing plans will act as a deterrent to persistent incursions. The monitoring approach will also allow for

tracking of off-project livestock in long distance migrations across the project area, as grazing coordinators are in communication and can alert the grazing coordinators in areas receiving in-migration the expected number and source of migrating livestock.

In all other cases, especially when livestock enter unmonitored areas like croplands or protected lands, displacement leakage will be calculated using the penalty approach. Specifically, displacement leakage in a given year will be computed as a proportion of project removals, using Equation 18.

To align with the practical realities of pastoral navigation and field conditions, the project has adopted a one-kilometer buffer (instead of the two kilometers referenced in VM0032) to determine whether livestock excursions constitute leakage. This deviation is based on interviews with herders across the project area, who consistently reported that they can confidently identify their location relative to landmarks and terrain features within one kilometer.

If leakage is not negligible, uncertainty in displacement leakage is conservatively assumed to be equal to the uncertainty in the estimate of net removals from SOC sequestration. We will use Equation 18 to estimate leakage emissions from displaced livestock.

$$LD_y = \frac{\Sigma_z^d \Sigma_{c=1}^k DN_{c,y}}{365 \times \Sigma_{c=1}^k PN_{c,y}} \times PRS_t$$

(Equation 18)

Where:

LD_y = Leakage emissions from displaced livestock (tCO_2e) in year *y*

$DN_{C,x}$ = Number of livestock of each category *c* that were off the project area on day *x* (head)

d = Total number of days livestock were off the project area

k = Total number of livestock categories

$PN_{C,y}$= Number of animals of each category *c* on the project area in year *y* (head)

PRS_y = Project removals due to changes in SOC stocks in year *y* (tCO_2e)

Market Leakage

Market leakage is expected to be negligible because livestock reductions are not a planned project activity and livestock numbers are driven by range capacity and rainfall[137,138,139,140] rather than markets.

In the case of methane emissions by livestock, the VM0032 methodology prohibits accounting for reduced methane emissions by livestock from reduced livestock numbers in order to avoid market leakage. In the case of the KRCP, Kenya is a beef exporter and herders in the project area technically do have access to international markets. In any case, international export is not a significant source of commerce in this part of Kenya, and changes in livestock numbers on the project area would be unlikely to affect the international beef market. Therefore, market leakage is expected to be negligible.

Total Leakage

Consequently, with market leakage expected to be negligible, total leakage will be equal to displacement leakage.

3.2.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals (VCS, 3.15, 4.1)

Net project emission reductions are estimated as the difference between project methane emissions and baseline methane emissions. Net change in carbon stocks is estimated as the total increase in soil carbon. The equations and calculations for baseline and project removals are shown in Sections 3.2.1 and 3.2.2.

Note that there is no term for changes in carbon stocks due to changes in woody plant biomass because there are no project activities that should result in declines in aboveground woody carbon, and any increases in aboveground woody carbon are conservatively excluded. Similarly, there is no term for fire because fire is very infrequent in the project area.

State the non-permanence risk rating (%)	19%
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes ☐ No

[137] DeeVon Bailey et al., "Livestock Markets and Risk Management Among East African Pastoralists: A Review and Research Agenda," *SSRN Electronic Journal*, 2001, https://doi.org/10.2139/ssrn.258370.
[138] Christopher B. Barrett, "Livestock Pricing and Markets Performance," *SSRN Electronic Journal*, 2001, https://doi.org/10.2139/ssrn.1142316.
[139] C. B. Barrett, "Livestock Pricing in the Northern Kenyan Rangelands," *Journal of African Economics* 12, no. 2 (June 1, 2003): 127–55, https://doi.org/10.1093/jae/12.2.127.
[140] Christopher B. Barrett et al., "Pastoralist Livestock Marketing Behavior in Northern Kenya and Southern Ethiopia: An Analysis of Constraints Limiting Off-Take Rates," *SSRN Electronic Journal*, 2004, https://doi.org/10.2139/ssrn.611064.

For ARR and IFM projects with harvesting, state, in tCO2e, the Long-term Average (LTA).	Not Applicable
Has the LTA been updated based on monitored data, if applicable?	☐ Yes ☐ No Not Applicable
State, in tCO2e, the expected total GHG benefit to date.	48,149,114 tCO2e (accounting for leakage) over the 40-year lifetime
Is the number of GHG credits issued below the LTA?	☐ Yes ☐ No Not Applicable

Table 3-10. Accounting of project net removals and net emissions reductions.

Vintage Period	Estimated Baseline Emissions (tCO2e)	Estimated Baseline Emissions (tCO2e)	Estimated Reduction VCUs (tCO2e)	Estimated Removal VCUs (tCO2e)	Estimated Leakage (t CO2e)	Estimated Buffer Pool Allocation (tCO2e)	Estimated Total VCU Issuance (tCO2e)
Year 2024	144,995	144,995	0	465,189	46,519	88,386	330,284
Year 2025	224,445	224,445	0	741,137	74,114	140,816	526,207
Year 2026	392,989	392,989	0	1,401,140	140,114	266,217	994,810
Year 2027	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2028	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2029	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2030	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2031	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2032	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2033	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2034	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2035	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2036	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2037	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2038	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2039	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2040	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2041	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2042	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2043	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2044	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2045	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2046	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2047	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2048	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591

Year 2049	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2050	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2051	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2052	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2053	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2054	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2055	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2056	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2057	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2058	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2059	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2060	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2061	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2062	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Year 2063	496,232	496,232	0	1,809,283	180,928	343,764	1,284,591
Total	19,123,013	19,123,013	0	69,550,943	6,955,094	3,214,679	49,381,169

3.3 Monitoring

3.3.1 Data and Parameters Available at Validation (VCS, 3.16)

Data / Parameter	$PA_{m,y}$
Data unit	ha
Description	Project Area in stratum *m* in year *y*
Source of data	Measured
Value applied	Measured from area of topologically corrected polygons of the participating communities
Justification of choice of data or description of measurement methods and procedures applied	Boundaries of PAIs were initially based on legal boundaries of group ranches or of registered community lands. These boundaries were then checked in Google Earth Pro to align with actual boundary roads or other landmarks. Finally ineligible areas within the community areas, such as roads, large settlements, forests and swamps were eliminated before determining the final area of each
Purpose of data	Modeling soil carbon density change; determination of carbon stocks

Comments	

Data / Parameter	GWP_{CH4}
Data unit	t CO_2e / t CH_4
Description	Global-warming potential for methane (CH_4)
Source of data	IPCC Fifth Assessment Report, 2014
Value applied	28
Justification of choice of data or description of measurement methods and procedures applied	Support arguments provided in the data source
Purpose of Data	Calculation of baseline and project emissions
Comments	

Data / Parameter	$W_{c,t}$
Data unit	kg
Description	Average body weight for animals of category c in year t
Source of data	Measured in project area or obtained from published sources relevant to the project area
Description of measurement methods and procedures to be applied	Project proponents should obtain accurate mean body weight for the animal class. In open pastoralist systems, livestock owners are not likely to know the weights of their animals and values may need to be taken from outside sources, such as peer-reviewed literature, reports from development projects or government sources for the breed of animal or area relevant to the project area (for example, country, continental region).
Frequency of monitoring/recording	Every 5 years or as necessary to accommodate changes in the use of different animal breeds
Value applied	As determined in/for the project area
Monitoring equipment	Scales placed at livestock markets or veterinary facilities

QA/QC procedures to be applied	If weights are directly measured, Data to be stored off-site (Cloud or data storage service), on paper, and in storage media directly controlled by the project proponent, including hard drives, flash drives, etc. Field crews will be trained and use tablets or other digital data entering devices for entering information so that data is automatically uploaded to the off-site storage as soon as wireless connections are available. This avoids errors in transcribing data. Digital data will later be printed for archival against loss of access to digital storage media (drives or offsite online storage)
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	

Data / Parameter	$N_{c,i}$
Data unit	number
Description	Baseline number of animals of category *c* in census *i*
Source of data	Measured in project area
Value applied	As determined by the project area
Justification of choice of data or description of measurement methods and procedures applied	Animal counts can be obtained in many different ways, including, but not exclusive to, direct ground censuses, ranch records, censuses of households for livestock numbers owned per household multiplied by number of households, aerial surveys, or government inventories
Purpose of Data	Calculation of baseline enteric methane emissions
Comments	

Data / Parameter	$DEPTH_{m,j,0}$
Data unit	cm
Description	Depth to which soil cores are taken at station *j* in stratum *m* at time *t* = *0* (i.e., at the start of the project or since last verification)

Source of data	Measured, maximum 40 cm in this project
Value applied	Measured
Frequency of measurement	During baseline soil sampling and again any year that soil is sampled to re-assess accuracy of soil carbon dynamic model.
Justification of choice of data or description of measurement methods and procedures applied	Many locations in the project area have shallow soils to bedrock at depths < 40 cm. Sampling to deeper levels is not feasible for remote field teams that must sample by hand and carry equipment > 10 km to access a single sampling station.
Purpose of data	Calculation of soil core volume for determination of carbon stock density.
Comments	

Data / Parameter	$SOC\%_{m,j,0}$
Data unit	Dimensionless proportion expressed as percentage
Description	Proportion of soil organic carbon at station *j* in stratum *m* at time *t = 0* (i.e., at the start of the project or since the last verification)
Source of data	Measured in the project area at permanent sampling stations
Value applied	Measured
Frequency of Measurement	During baseline sampling and again 5-10 years later after project activities have increased SOC density sufficiently to detect a change in SOC%
Justification of choice of data or description of measurement methods and procedures applied	Baseline for performance-based removals based on increasing SOC. Tracked at the level of individual sampling stations in each stratum because net removals will be based on this case, SNAPGRAZE, can successfully predict current SOC from past conditions at individual stations. Crop Nutritional Services (an internationally accredited laboratory in Nairobi analyzing the samples) uses the Walkley-Black method to determine soil organic carbon content (%).

Purpose of data	Calculation of baseline carbon stocks
Comments	

Data / Parameter	$BULK_{m,j,0}$
Data unit	Grams per cubic centimeter (g/cm^3)
Description	Soil bulk density at sampling station *j* in stratum *m* at time *t = 0* (i.e., at the start of the project or since the last verification)
Source of data	Measured
Value applied	Measured
Frequency of Measurement	During baseline sampling and again 5-10 years later after project activities have increased SOC density sufficiently to detect a change in SOC%
Justification of choice of data or description of measurement methods and procedures applied	Measured following standard protocols by taking a 40 cm soil core (known volume) at each sampling station, spreading the contents on a flat surface to identify and sieving through a 2 mm mesh screen to remove any stones or gravel, drying the soil core at 45°C to a constant weight, and weighing dried soil. Volume of removed rocks and pebbles will be subtracted from the core volume. Dry mass of sieved soil divided by the quantity core volume less rock volume yields bulk density.
Purpose of data	Necessary to convert proportion of SOC in soil to mass of SOC/area.
Comments	

Data / Parameter	$MAP_{m,j}$
Data unit	Mm/yr
Description	Mean annual precipitation at sampling station *j* in instance (stratum) *m*

Source of data	Integrated satellite and weather station databases
Value applied	Estimated
Frequency of Measurement	
Justification of choice of data or description of measurement methods and procedures applied	Satellite integrated with weather data provides estimates of mean annual temperature at locations of sample points. Examples WorldClim[141] or CHIRPs[142].
Purpose of data	Necessary to use soil carbon dynamic model to predict baseline soil carbon stocks and project carbon dioxide removals.
Comments	

Data / Parameter	$SAND\%_{j,m}$
Data unit	Dimensionless proportion expressed as percentage
Description	Percent of soil that is sand at station j in stratum m
Source of data	Measured at sampling station
Value applied	Measured
Frequency of Measurement	Once at the beginning of the project
Justification of choice of data or description of measurement methods and procedures applied	Initially, SAND% was estimated using the field-based "ball and ribbon" method[143] to classify soil texture. However, during the site visit, it was determined that this method is difficult to replicate consistently across testers. As a result, archived baseline soil samples from all sampling stations were sent for laboratory analysis at Crop Nutrition Services for more precise soil texture determination.

[141] https://www.worldclim.org/data/worldclim21.html
[142] CHIRPS: Rainfall Estimates from Rain Gauge and Satellite Observations | Climate Hazards Center - UC Santa Barbara (ucsb.edu)
[143] Jeremy A Giddings, "Determining Soil Texture Using the Ribboning Technique" (NSW DPI, 2015), https://doi.org/10.13140/RG.2.1.3876.6809.

Purpose of data	Calculation of baseline carbon stocks and ex ante carbon dioxide removals
Comments	

Data / Parameter	$MAPLC_{j,m}$
Data unit	Dimensionless proportion
Description	Mean proportion of aboveground plant material composed of the chemical compounds lignin and cellulose, which are resistant to microbial attack, at sampling plot *j* in stratum *m*
Source of data	Assigned on the basis of the dominant plant types in and near the permanent sampling station. These assignments were based on sampling of different plant species' roots and shoots in East Africa, namely the northern Kenya carbon project in Samburu and Isiolo Counties and in Serengeti National Park in Tanzania.
Value applied	

Plant type	Mean	SE
Annual Grass	23.25	1.56
Forb	22.33	1.14
Perennial Grass	35.30	1.42
Mixture	29.27	1.49

Justification of choice of data or description of measurement methods and procedures applied	This term is difficult to measure without access to a research laboratory. These compounds are slow to decompose in soil and make up most of particulate soil carbon. They also are the metabolic precursors to longer-lived carbon forms called humic acids that form bonds with minerals
Purpose of data	Modeling soil carbon density change; determination of carbon stocks
Comments	

Data / Parameter	$MSOC_{m,j,b}$
Data unit	tC/ha

Description	Modeled SOC at station *j* in stratum *m* for each year *b* during the baseline period
Source of data	SOC model
Justification of choice of data or description of measurement methods and procedures applied	SOC models applied must meet with the modeling requirements described in Section 8.1.3.4.
Purpose of data	Calculation of baseline emissions
Comments	

Data / Parameter	$PSOC^{eq}_{m,j,}$
Data unit	tC/ha
Description	Modeled SOC at equilibrium at station *j* in stratum *m*
Source of data	SOC model
Justification of choice of data or description of measurement methods and procedures applied	SOC models applied must meet with the modeling requirements described in Section 8.1.3.3.
Purpose of data	Calculation of project emissions
Comments	

Data / Parameter	D
Data unit	years
Description	Years required to achieve SOC equilibrium
Source of data	SOC model
Description of measurement methods and procedures to be applied	SOC models applied must meet with the modeling requirements described in Section 8.2.3.
Frequency of monitoring/recording	Once
Value applied	As determined in/for the project area
Monitoring equipment	N/A

QA/QC procedures to be applied	N/A
Purpose of Data	Calculation of project removals
Calculation method	Calculated from chosen project model at year L = project lifetime
Comments	

Data / Parameter	$VegClass_{m,j,0}$
Data unit	Category
Description	Category of dominant plant type, BARE; ANNUALS; MIXTURE; PERENNIALS corresponding to bare ground; annual grasses, forbs, or shallow-rooted perennials; mixture of annuals and shallow-rooted perennials. VegClass is assessed for stratum *m* at station *j* for time *t* = 0. The dominance of one of these classes is determined by a qualitative assessment in 4 quadrants of a 10 m radius circle surrounding the center point of a sampling station. This assessment is then checked by an expert looking at two photos taken from the center point facing north and south respectively.
Source of data	Measured at sampling station
Value applied	Category See MAPLC in **Data Available at Validation**
Frequency of Measurement	Annually
Justification of choice of data or description of measurement methods and procedures applied	Plant types serve as a surrogate variable to assess likely lignin and cellulose content. See MAPLC in **Data Available at Validation**

Purpose of data	Calculation of baseline carbon stocks and project carbon dioxide removals
Comments	

Data / Parameter	$MAT_{m,j}$
Data unit	^{o}C
Description	Mean annual temperature at sampling station *j* in instance (stratum) *m*
Source of data	Available raster climate data
Value applied	Estimated
Frequency of Measurement	It is a long-term measure and so needs to be updated if possible only every 5-10 years
Justification of choice of data or description of measurement methods and procedures applied	Satellite integrated with weather data provides estimates of mean annual temperature at locations of sample points. Examples WorldClim[144] or CHIRTs[145].
Purpose of data	Input to soil carbon dynamic model. Used to calculate baseline carbon stocks and project carbon dioxide removals.
Comments	

Data / Parameter	$N_{c,m,y}$
Data unit	animals

144 https://www.worldclim.org/data/worldclim21.html
145 CHIRTSmonthly | Climate Hazards Center - UC Santa Barbara (ucsb.edu)

Description	Number of animals of livestock species – age class c in stratum m in year y
Source of data	Measured in project area
Description of measurement methods and procedures to be applied	Determined from household surveys to assess average livestock holdings of that livestock class per household. Totals for each stratum are determined by multiplying livestock per household by number of households/stratum.
Frequency of monitoring/recording	annually
Value applied	measured
QA/QC procedures to be applied	Data collected on tablets is uploaded to the cloud and managed in Salesforce.
Purpose of data	Calculation of baseline enteric methane emissions
Comments	

Data / Parameter	$AWPB_{m,j,0}$
Data unit	Kg/ha
Description	Aboveground woody plant biomass at station j and stratum m for time t = 0.
Source of data	Measured at sample stations; modeled across project area
Description of measurement methods and procedures to be applied	Determined from field sampling at permanent sampling stations. Sampling will occur within circular quadrats, with quadrat size between 5 and 50 cm, as determined by woody stem density. Within quadrats, number and diameter at breast height (DbH) will be measured. A remote sensing approach meeting criteria from VM0047 will be used to quantify AWPB change between project area and control plots.

Frequency of monitoring/recording	Measured at sample stations at least once during every verification cycle.
QA/QC procedures to be applied	Procedures must follow those detailed in reference [46]
Purpose of data	Calculation of project scenario carbon dioxide removals
Purpose of data	Though aboveground woody plant biomass sampling is not required for this project under current VM0032 methodology because the project does not intend to manage fire or use fire to eliminate unwanted woody biomass for stimulation of SOC sequestration, we intend to measure as it will be required in version 2 of VM0032.
Comments	

Calibration of NDVI to forage biomass

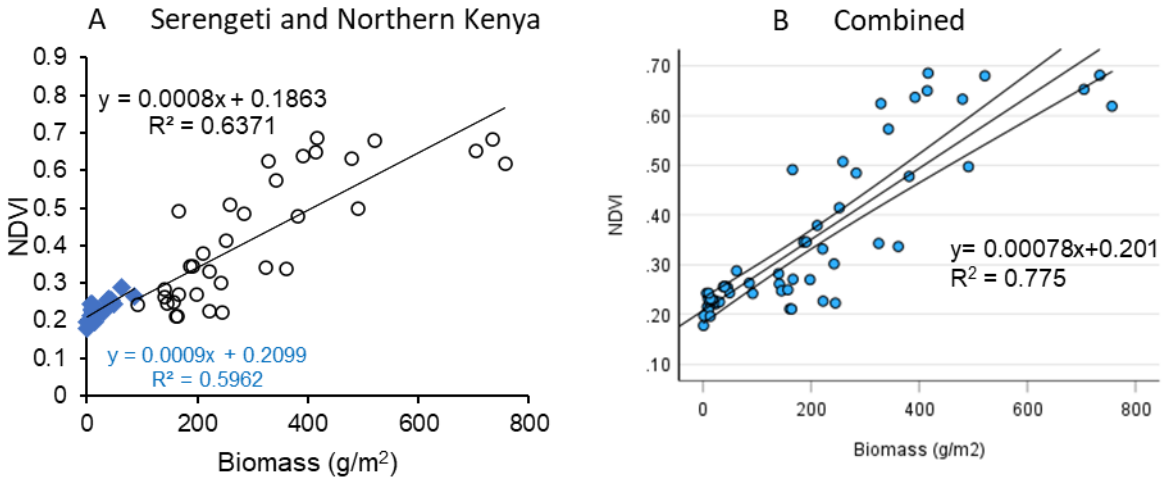


Figure 3-11: Relationships between NDVI measurements from individual pixels (250 x 250 m) of 16-day composite MODIS NDVI (MOD13Q) and measured mean forage biomass (shrub leaves and herbaceous plant biomass). A. Shown and regressed separately for the northern Kenya study area (blue) and Serengeti National Park (open symbols). B. Combined data with 95% CL for NDVI values.

3.3.2 Data and Parameters Monitored (VCS, 3.16)

Data / Parameter	$PA_{m,y}$

Data unit	ha
Description	Project Area in stratum *m* in year *y*
Source of data	Measured
Value applied	Measured from area of topologically corrected polygons of the participating communities
Justification of choice of data or description of measurement methods and procedures applied	Boundaries of PAIs were initially based on legal boundaries of group ranches or of registered community lands. These boundaries were then checked in Google Earth Pro to align with actual boundary roads or other landmarks. Finally ineligible areas within the community areas, such as roads, large settlements, forests and swamps were eliminated before determining the final area of each
Purpose of data	Modeling soil carbon density change; determination of carbon stocks
Comments	

Data / Parameter	$PN_{c,t}$
Data unit	number
Description	Number of animals of category *c* in the project area during year *t*
Source of data	Measured in project area
Description of measurement methods and procedures to be applied	
Frequency of monitoring/recording	Annual
Value applied	As determined in/for the project area
Monitoring equipment	N/A
QA/QC procedures to be applied	Based on records of livestock numbers, interviews of grazing managers, coordinators, herders, or other administrative staff. Records should be kept as paper and electronic copies.

Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	The project description must provide a table, similar to that for calculating baseline methane emissions, of counts or estimates of numbers of grazing animals, PN_c, for each year during the monitoring period, sorted by the k categories in the project area: species, breed (if applicable), sex, and age, plus the respective live body weights (W_c) of each category, with 95% percent CI and uncertainties. The table must also contain the uncertainty in daily methane emissions and the uncertainty in the arithmetic mean count based on the equations in Section 8.4.2.2.1. Table 10 below may be used as a template.

Data / Parameter	$DN_{c,x}$
Data unit	head
Description	Number of livestock of each category c that were outside the project area (outside the fence defining the boundary of the project area, or, in the case of open grazing lands e.g. pastoralist areas, beyond 2 km from the mapped project area boundary on day x)
Source of data	Measured
Description of measurement methods and procedures to be applied	Determined from records of livestock distributions, as recorded from interviews with grazing managers, coordinators, herders, or other administrative staff. For additional details see Section 9.3.3.
Frequency of monitoring/recording	Monthly
Value applied	As determined in/for the project area
Monitoring equipment	
QA/QC procedures to be applied	Records should be kept as paper and electronic copies
Purpose of Data	Calculation of leakage
Calculation method	N/A
Comments	

Data / Parameter	d
Data unit	days
Description	Total number of days livestock were off the project area
Source of data	Measured
Description of measurement methods and procedures to be applied	Based on records of livestock numbers and their distribution on and off the project area, based on interviews of grazing managers, coordinators, herders, or other administrative staff. For additional details see Section 9.3.3.
Frequency of monitoring/recording	Weekly to monthly
Value applied	As determined in/for the project area
Monitoring equipment	N/A
QA/QC procedures to be applied	Records should be kept as paper and electronic copies, with at least one electronic copy kept off the project as an online database
Purpose of Data	Calculation of leakage
Calculation method	N/A
Comments	

Data / Parameter	$N_{c,m,t}$
Data unit	animals
Description	Number of animals of livestock species – age class *c* in stratum *m* in year *t*
Source of data	Measured
Description of measurement methods and procedures to be applied	Determined from household surveys to assess average livestock holdings of that livestock class per household. Totals for each stratum are determined by multiplying livestock per household by number of households/stratum
Frequency of monitoring/recording	annually
Value applied	Data collected on tablets is uploaded to the cloud and managed in Salesforce.

Monitoring equipment	*N/A*
QA/QC procedures to be applied	Data collected on tablets and then uploaded to cloud. Data in field also collected on paper as backup.
Purpose of data	Calculation of baseline enteric methane emissions
Comments	

Data / Parameter	$AWPB_{m,j,Y,}$
Data unit	Kg/ha
Description	Aboveground woody plant biomass at station j and stratum m in year Y of the monitoring period.
Source of data	Measured at sample stations; modeled across project area
Description of measurement methods and procedures to be applied	Determined from field sampling at permanent sampling stations. Sampling will occur within circular quadrats, with quadrat size between 5 and 50 cm, as determined by woody stem density. Within quadrats, number and diameter at breast height (DbH) will be measured. A remote sensing approach meeting criteria from VM0047 will be used to quantify AWPB change between project area and control plots.
Frequency of monitoring/recording	Measured at sample stations at least once during every verification cycle.
QA/QC procedures to be applied	Procedures must follow those detailed in reference [46]
Purpose of data	Calculation of project scenario carbon dioxide removals
Purpose of data	Though aboveground woody plant biomass sampling is not required for this project under current VM0032 methodology because the project does not intend to manage fire or use fire to eliminate unwanted woody biomass for stimulation of SOC sequestration, we intend to measure as it will be required in version 2 of VM0032.
Comments	

Data / Parameter	n
Data unit	Pastures or grazing blocks
Description	Number of pastures in grazing zone or community
Source of data	Management decision variable
Description of measurement methods and procedures to be applied	Determined by community grazing committees as stated in grazing plans. Livestock use of planned grazing blocks is confirmed from direct observation by grazing coordinators. Departures from grazing plans may result in alteration of this value
Frequency of monitoring/recording	Bi-weekly
Value applied	Decided by communities but generally 4-12
Purpose of data	Calculation of project scenario carbon dioxide removals
Calculation method	N/A
Comments	

Data / Parameter	Forage Biomass
Data unit	Kg/ha
Description	Forage biomass available for livestock
Source of data	Inference for MODIS (or other satellite) NDVI, EVI or other vegetation index
Description of measurement methods and procedures to be applied	Forage biomass inferred from vegetation index, using calibration between ground-truthed measurements and index values at the same satellite pixel and time of year. See Figure 3-11 in section 3.3.1 **Data and Parameters Available at Validation**
Frequency of monitoring/recording	Ground-truthed once, download satellite imagery every 16 days

Value applied	Variable
Purpose of data	Calculation of project scenario carbon dioxide removals and demonstration of successful adoption of project grazing practices.
Calculation method	N/A
Comments	

Data / Parameter	$FIRE_{m,j}$
Data unit	Proportion (0-1)
Description	Proportion of years with fire at soil sampling station *j* in stratum *m* during the baseline scenario
Source of data	MODIS Burned Area Product (for baseline fire frequency); MODIS and BIIRS (NASA FIRMS) for ongoing fire monitoring
Justification of choice of data or description of measurement methods and procedures applied	Fire is extremely rare in the project area, with >99% of the area never burned during the baseline period (Figure 3-1). The potential for fire will be continuously monitored throughout the project using remote sensing tools (MODIS, VIIRS) to track changes in fire frequency and determine if fire management interventions are needed. If fire begins returning annually or biennially, fire management programs may be implemented to shift fire regimes toward lower intensity, patchy, early-season fires, which have been shown to benefit soil carbon retention[146].
Frequency of monitoring/recording	Assessed at least at each soil sampling event during verification cycles. If fire frequency increases significantly, additional real-time monitoring may be conducted using NASA FIRMS.
Value applied	Variable
Purpose of data	Used in the SNAPGRAZE soil carbon model to simulate fire effects on soil carbon and ensure project activities do not increase fire frequency.
Calculation method	N/A

[146] Adam F. A. Pellegrini et al., "Soil Carbon Storage Capacity of Drylands under Altered Fire Regimes," *Nature Climate Change* 13, no. 10 (October 2023): 1089–94, https://doi.org/10.1038/s41558-023-01800-7.

Comments	

3.3.3 Monitoring Plan (VCS, 3.16, 3.20)

Livestock in this project must be monitored for multiple purposes. Two types of livestock monitoring are used in the project.

1) **Household Surveys**. As part of annual surveys of individual households made in the community each year ask a number of different questions, but one of them relates to the number of livestock of different species and ages that are owned by the household. Households within communities are sampled randomly so as to include those without livestock or without cattle. Numbers from these surveys are averaged and then multiplied by the number of households in the community (known from membership records) to determine $N_{c,m}$, the number of livestock of each species and age class in community (stratum) *m*. These livestock numbers are used to estimate a) baseline and project livestock enteric methane emissions (sections 3.2.1.1 and 3.2.2.1), b) inputs on livestock density, expressed as cattle-equivalents using standard Tropical Livestock Unit conversions (cow = 1, sheep and goats = 0.18, donkeys = 0.7)(Jahnke 1982), into the SNAPGRAZE soil carbon dynamic model, c) as reference expected livestock numbers for grazing coordinators in each community to determine compliance with grazing plans, livestock encroaching from other communities, and livestock from the community that left either the grazing lands in that community and/or the project area altogether (potential leakage)

2) **Bi-weekly surveys of livestock in grazing areas**. Grazing coordinators in each grazing zone in each community will visit every two weeks all designated grazing "blocks" in each community's grazing plan. Each visit, if there are livestock in the block, coordinators will identify groups of animals (collections of animals whose edge individuals are > 50 m from the edge animals of other collections), count their numbers, move to the center of the group and take a GPS coordinate, and then with rangefinders measure the distance from the center of the group to the individual farthest from the center. These data will be collected for all the livestock groups in the block, including sheep and goats, and then later used to assess livestock movements and spatial aggregation, which are important for determining the number of "pastures" used by livestock during a season, an input to the SNAPGRAZE model.

Additionally, monitoring will occur for fire, plant species composition, and aboveground woody biomass:

3) **Fire**. Fire is very rare (>99% never burned during the baseline period) in the project ecosystem (Figure 3-1) and grazing animal reduction in potential fuel loads is likely to be strong even under new grazing management. Fire (*FIRE*) will be set equal to the proportion of years with fire during the baseline scenario for each soil point for simulations with the model for the baseline scenario and the initial verifications. As perennial grasses become more abundant and a greater proportion of area has high grass biomass entering the dry season, natural wildfires may begin to occur. As a result, the fire frequency in the project area will continue to be monitored going forward using the MODIS Burned Area Product, allowing continual assessment to understand if there is a change in the likelihood of fire due to project activities.

Fire frequency will be assessed at least each time soil sampling occurs to re-assess the accuracy of soil carbon dynamic model. If MODIS Burned Area Product analysis indicates increased fire frequency requires fire management at later stages of the project (fire returning annually or every other year), the NASA FIRMS (Fire Information for Resource Management System) provides near real-time fire data on active fires aggregating data from both MODIS and VIIRS satellite data. This system allows teams on the ground to identify hotspots early and intervene before fires spread when appropriate. The focus of a fire management program, if needed, would be shifting the fire regime from higher intensity late season fires to lower intensity, patchy, early season fires. There is substantial evidence that this has significant impacts on soil carbon and that fire management interventions can be successful[147].

4) **Plant species composition.** Plant species composition will be monitored in two ways. At repeat visits to permanent sampling stations, the plant community based on dominant plant functional groups and plant community structure will be assigned based on qualitative assessment of these indicators within a 10 m plot subdivided into four quadrants. The qualitative assessment made in the field is corroborated by an expert who will later review two photos taken from the center point of the sampling station facing north and south, respectively, at the time of assessment. Grouping plant species by functional traits can help provide a mechanistic view of plant communities (Gondard et al. 2003; Wainwright et al. 2019). At a subset of permanent sampling stations, an established methodology developed for monitoring rangeland health[237] will be employed to quantitatively determine plant species composition. Within four 2x2 m quadrats per monitoring plot (n = 4), plant species will be identified to the highest taxonomic specificity possible. Additionally, percent cover of each plant species identified will be recorded. Plant species composition monitoring will cooccur with collection of additional indicators of plant community composition and structure including percent cover of vegetation functional groups based on growth habit (e.g., shrub, grass, forb), perennial grass biomass, basal cover, and percent bare ground, to fully understand plant community responses to new management activities. Data collection to monitor changes in plant composition will occur every three to five years over the lifetime of the project, and reporting will occur annually with verification.

5) **Aboveground woody biomass.** Aboveground woody biomass will be sampled at each permanent sampling station. Sampling will occur as per VM0032 guidelines, within circular quadrats centered at each sampling station *j.* Number and diameter at breast height (DbH) of each woody stem within a specified diameter will be recorded. The diameter of the quadrat will be determined by woody stem density, with smaller radii appropriate where woody vegetation is dense. Though aboveground woody biomass sampling is not required under VM0032 version 1 for projects that do not intend to manage fire or use fire to eliminate unwanted woody biomass to stimulate sequestration of SOC, we intend to measure aboveground woody biomass as it will be required in VM0032 version 2. Additionally, aboveground woody biomass will be quantified using a remote sensing approach that pairs GEDI lidar data with Landsat multispectral imagery in a trained regression model to predict spatial coverage of aboveground biomass. The remote sensing biomass estimates will be used to compare change in vegetative stocking index between project plots and matched control plots (as per VM0047), and will be calibrated with sampled data.

[147] Pellegrini et al.

3.3.3.1 Measurement of baseline carbon stocks

Stratification. The project area was stratified only by administrative strata – the areas governed by the different participating communities. We did not stratify by any climate, soil or other environmental variables but instead allowed the effect of these variables, many of which like soil type and vegetation class vary over short distances < 10 m, to be accounted for by difference in model inputs among sampling stations. In northern Kenya, stratifying by soil type increased uncertainty because the expected difference in SOC density over time did not differ much among soil types[148].

Stratification beyond the administrative stratification of community was evaluated based on two criteria – identifying drivers of SOC density across the project area and reducing uncertainty. Identifying drivers was performed by using Generalized Linear Models in SPSS 27. Generalized, rather than General, Linear Models was used because the distribution of measured SOC density (Mg/ha) across sites was not normal, even when SOC density was ln-transformed.

Drivers of potential stratification were

1. Estimated livestock density.
2. VegClass – Dominance of understory plant communities by Bare Ground, Annuals, Mixture of annuals and Perennials, and Perennials
3. Mean Annual Rainfall (mm/yr) interpreted from the WorldClim GIS layer.
4. Mean Annual Temperature (°C) interpreted from the WorldClim GIS layer
5. Sand % or percent sand in soil to a depth of 40 cm

These five variables, along with community identity (already a stratum) were assessed for their ability to explain both SOC Density (Table 3-11 panel A) and anticipated changes in SOC density from the calibrated SNAPGRAZE model (see Section 3.1.4 **Baseline Scenario**).

Table 3-11: Statistical analyses to identify key drivers of baseline SOC Density and expected changes in SOC Density under the project scenario.

A Generalized Linear Model SOC Density

Source	Type III Wald Chi-Square	df	Sig.
(Intercept)	8.175	1	.004
Community	12.092	6	.060
VegClass	498.861	5	<.001
Sand%	34.008	1	<.001
Mean Annual Rainfall mm	.198	1	.656
Mean Annual Temp oC	.003	1	.957
Animals/ha	.284	1	.594

[148] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.

Dependent Variable: SOC Density
Model: (Intercept), Community, VegClass, Sand%, Mean Annual Rainfall mm, Mean Annual Temp oC, Animals/ha

B Anticipated Change in SOC Density

Source	Type III Wald Chi-Square	df	Sig.
(Intercept)	11.831	1	<.001
Community	9.511	6	.147
VegClass	166.053	5	<.001
Sand%	39.721	1	<.001
Mean Annual Rainfall mm	6.655	1	.010
Mean Annual Temp oC	10.601	1	.001
Animals/ha	.539	1	.463

Dependent Variable: PreddSOC
Model: (Intercept), Community, VegClass, Sand%, Mean Annual Rainfall mm, Mean Annual Temp oC, Animals/ha

SOC Density Sensitivity to Model Inputs and Other Factors

The dominant factors driving both metrics were vegetation class and soil texture. Other factors – such as climate and community identification had significant effects but the sensitivity of the metrics was much less than soil and vegetation. However, vegetation class is not a good candidate variable for stratification because it changes over such short distances that it is difficult to capture in polygons. Soil texture could be polygonised, but in practice this is difficult because boundaries between soil types are often finely interdigitated (fractal), and in deep history sand has blown on top of old lava flows (source material for heavy clay soils), thus producing a variety of sandy and clay loams throughout the project area that change over short distances. The most sensitive parameter explaining baseline SOC Density was VegClass, which is associated with factors such as season length, lignin and cellulose content and belowground production. Climate variables and animal density were not important.

A slightly different set of factors explained the variation in expected removals, as calculated by the SNAPGRAZE model. Dominant vegetation type (VegClass) was still the most important, but mean annual temperature was very important as well. Habitat explained some variation, but expected removals were not sensitive to factors such as soil texture, rainfall, fire and woody carbon. This analysis suggests that mean annual temperature and dominant vegetation type are by far the most important model inputs.

Since carbon dioxide removals will be based on SNAPGRAZE model projections in the first five years of the project and model inputs include all of the most important factors driving soil carbon density,

we choose not to stratify the project area beyond the administrative boundaries of the participating communities

Sampling Stations. A Modeled Approach for soil carbon removal accounting will be used in this project.

Sample Size Determination. As outlined in the VCS VM0032 methodology, page 22, the total number of sampling stations, n, for the project area under a Modeled Approach must be determined by using an online calculator. However, in practice, sampling stations must be representative of the project area and thus placed at random, with additional samples selected, if needed, to encompass additional variability in SOC density to evaluate the soil carbon dynamic model (see Section 8.1.3.3 of the VCS VM0032 v 1.0). In a Modeled Approach, the total number of sampling stations should be sufficient to ensure representation of the full range of soil carbon densities found in the project area.

To determine the minimum number of samples required to detect a change in SOC consistent with modeled removals, we used the Statulator[147] online calculator for paired-sample analysis. The expected mean difference in SOC was derived from the ex ante carbon removal estimate of 1.28 tCO_2e/ha/year, which corresponds to approximately 0.349 tSOC/ha/year, using a molecular weight conversion of 44/12. Over a six-year interval (our intended sampling frequency), this equates to an expected SOC difference of 2.094 t/ha, rounded to 2 t/ha for the purposes of input to the Statulator tool.

The calculator additionally required input for the expected standard deviation in SOC change, as well as the desired statistical power (90%) and alpha level (α = 0.10, associated with 90% confidence intervals). Using these parameters, the minimum required number of paired sampling stations was estimated at n = 38 (see Figure 3-12). However, at the time of field planning, VM0032 v1.0 was in force, and the VCS Methodology Requirements had not yet been updated to require 90% confidence intervals for uncertainty deductions. The field sampling plan was thus based on a 95% confidence level and 80% power, yielding a slightly lower sample size estimate of n = 35. Given the grouped nature of the project, we targeted 35 samples per community, across the six initial PAIs: Olgulului Trust, Eselenkei Cooperative, Shompole, Olkeri, Olkiramatian, and Ramat East. This resulted in a total of 210 samples. In practice, 224 stations were sampled, with station counts per community ranging from 20 to 50, reflecting differences in area and accessibility.

All stations were visited; however, a small number were excluded from final analysis due to incomplete data or missing photo documentation. The final count of usable stations in analysis is consistent with the 224 cited in ex ante calculations.

Note that this Statulator tool was used instead of the CDM A/R Methodological Tool “Calculation of the number of sample plots for measurements within A/R CDM project activities.” The CDM tool is focused on uncertainty in estimating mean carbon stocks with the intention of comparing mean carbon stocks (and their uncertainty) across time. However, VM0032 focuses on comparing matched (paired) measurements at each sampling station and thus requires a different calculation

of minimum sample size based on the needed mean difference required to match the change in SOC density predicted by the SNAPGRAZE model.

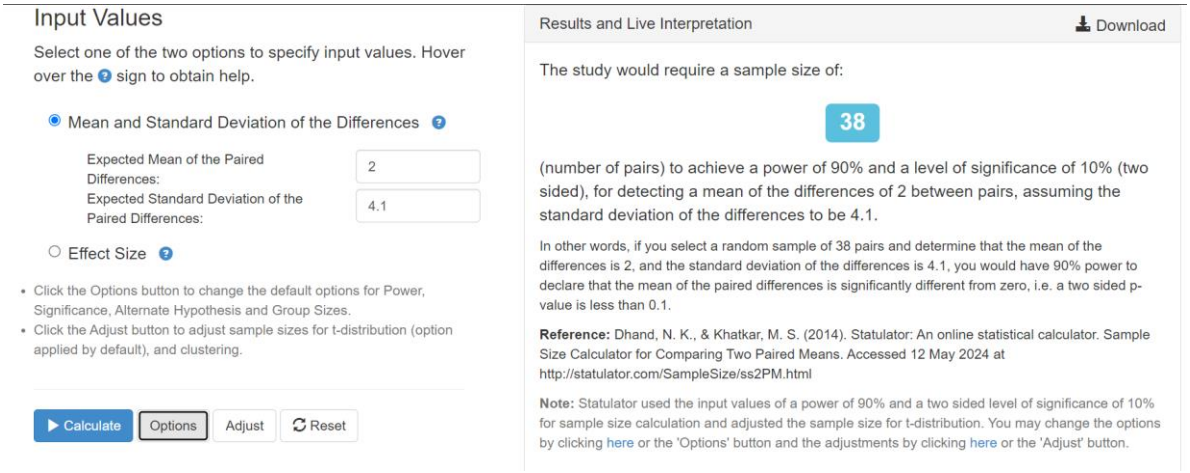


Figure 3-12: Screenshot of Statulator output page for calculating minimum sample size from expected difference in SOC density (2) and the standard deviation in differences observed in sequential SOC density measurements at permanent sampling stations in northern Kenya[149].

Location of Sampling Stations

Since the project is not stratified by any environmental variables, we assigned sampling stations for Phase I of the grouped project at random within each of the participating communities. **Figure 3-13** shows the distribution of the sampling stations.

[149] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.

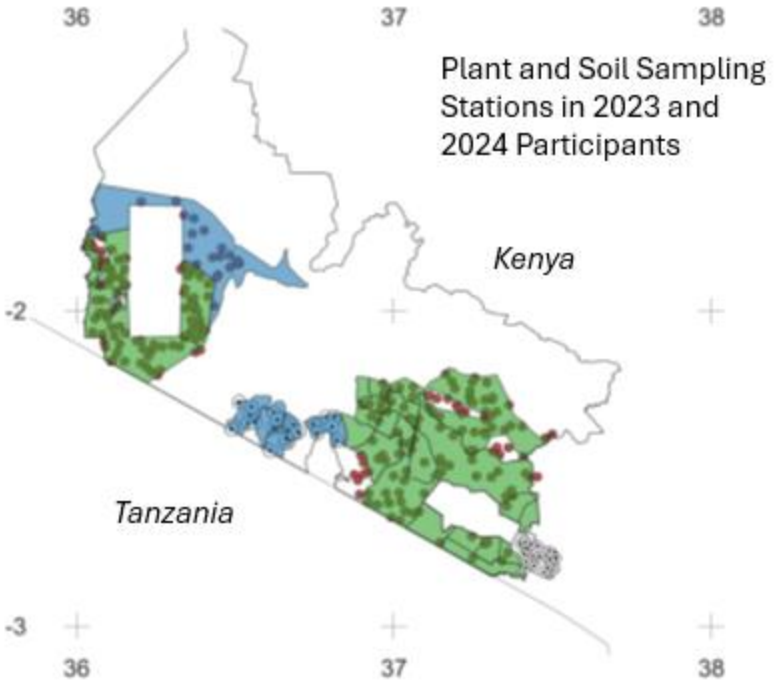


Figure 3-13: Distribution of 247 random sampling points, of which we used data from 224, in the project area for which baseline SOC and vegetation classification are available.

Soil sampling protocol. Details of soil sampling are available in the KRCP Standard Operating Procedure, "*African soil sampling protocol*" available in supporting documents. Cores were collected by hammering a 5.6 cm diameter steel pipe to a depth of 40 cm or to bedrock. Each sample point featured sampling of three soil cores 4 m from the sampling station central point. Sampling points were also assessed for vegetation class based on the dominant vegetation cover – bare ground (BARE), annual grasses and forbs plus shallow-rooted perennials (ANNUALS) a mixture of annual and perennial grasses (MIXTURE), or deep-rooted perennial grasses (PERENNIALS). This vegetation assessment was based on qualitative observation of the vegetation community in the field, subsequently corroborated by an expert consulting two photos taken at the sample point, one facing north and one facing south. Photos taken during the peak dry season in 2023, when plants were not expressed, were re-taken in February – May 2024 when plants expressed and were easy to identify.

Two of the three cores were mixed and subsampled for soil to be sent to the Crop Nutrition Services lab[150] for soil organic carbon content measurement using the standard Walkley-Black method. This method quantifies the amount of oxidizable organic matter (OM) in which OM is oxidized with a known amount of chromate in the presence of sulfuric acid. The remaining chromate is determined spectrophotometrically at 600nm wavelength. The calculation of organic carbon assumes that organic matter contains 58% carbon.

[150] Crop Nutrition Services, Nairobi, Kenya, http://cropnuts.com, an internationally accredited soil testing laboratory.

A third core, used to determine bulk density was removed by digging around the side of the core to slide a metal plate underneath and then lifting the core and its contents out of the soil. The contents were removed, air-dried at 40-45°C for 3-6 days or to a constant weight, and then sieved to remove rocks and pebbles out of the soil through a 2 mm mesh screen. Volume of removed rocks and pebbles was determined by displacement of water in a graduated cylinder or measuring cup. Bulk density at station j in statum m is calculated as

$$BD_{m,j} = DM_{s,m,j}/(V_{c,m,j} - V_{r,m,j})$$

(Equation 19)

Where:

$DM_{s,m,j}$ = dry mass of sieved soil (g),

$V_{c,m,j}$ = volume of core (Depth x π x (1/2) x diameter)^2

$V_{r,m,j}$ = volume of rocks and pebbles

Baseline soil carbon density at each sample point j was then determined as

$$SOC_{0,m,j} = BD_{m,j} \times Depth_{m,j} \times SOC\%_{0,m,j}$$

(Equation 20)

Organizational Structure, Responsibilities, and Competencies

The monitoring of project activities, consequences of these for vegetation and soils will be administered and coordinated by SftFA personnel. All soil and vegetation data used in the SNAPGRAZE model is being collected by SftFA and stored in spreadsheets on both project hard drives as well as a cloud-based storage system for duplication and ease of access on a server supported by the Biodiversity Research Institute (BRI) and Soils for the Future LLC (USA). Field data collected on tablets are uploaded to a cloud-based data management program called Salesforce[151] which automates generation of reports and integrates data on community free, prior, and informed consent, social survey data, as well as grazing reports of counts and location of livestock within communities. Soil, vegetation, and biodiversity data are maintained on the BRI server and, to achieve redundancy, with Soils for the Future USA. All field data are checked by supervisors and SftF USA and Converge before posting to the cloud and site visits to sample stations or communities are routinely conducted to clarify discrepancies. Soil carbon contents are measured by Crop Nutrition Services, an internationally accredited soils analysis lab that analyzes samples from projects all over Africa.

The structure of data collection and monitoring protocols have been established by project partners Soils for the Future USA (Mark Ritchie) and Converge (Deepali Gohil). Soils for the Future benefits from Dr. Ritchie's 30+ years research on grassland ecosystems. He is also the author of this document and author of the SNAPGRAZE model and the VM0032 Methodology used by this project. Converge has engaged in social livelihood monitoring for the last 12 years including the Northern Kenya Rangelands

[151] http://www.salesforce.com

Carbon Project, the world's largest soil carbon project[152]. All policies for oversight and management of personnel and data are contained in the SftFA Employee Handbook.

3.3.4 Dissemination of Monitoring Plan and Results (VCS, 3.18; CCB, CL4.2)

Public dissemination of the monitoring plan occurs in several ways. First, the monitoring plan is shared on social media, posted on project websites, and printed and posted on kiosks in major towns (Kajiado, Kimana, Selengei, Bisil, Namanga) in or near the project area. Secondly, monitoring of livestock use of grazing areas is reported to community grazing committees during their scheduled quarterly meetings, and the committees know the intended weekly activities of the grazing coordinators. planned and monitoring results are still being determined at this date. Third, intended social survey work, which supports the annual livestock census and evaluation of status and well-being of community members, occurs in October – December each year and is cleared in advance with community leaders. Fourth, soil, vegetation, and biodiversity surveys are planned together with community leaders and involve temporary hires of local community members, when possible. Finally, project results are communicated at semi-annual AGMs (large community meetings held every six months and attended by 30-60% of all community members).

3.4 Optional Criterion: Climate Change Adaptation Benefits

3.4.1 Regional Climate Change Scenarios (CCB, GL1.1)

Studies of recent climatic history in Kenya have identified a distinct warming trend since the 1960s and increasing extremes in dry periods and intense precipitation events[153,154]. Another nearby sub-national study showed an increasing trend in dry-season precipitation in the Serengeti ecosystem to the west of the project area[155]. Projections of near-future climate change indicate that temperatures will rise 1.7 degrees C by midcentury, and 3.5 degrees C by 2100 (estimated as the median annual temperature anomaly across CMIP5 ensemble projections), and precipitation will increase by 3.5 mm by midcentury and 10.5 mm by 2100 (estimated as the median annual precipitation anomaly across CMIP5 ensemble projections)[156]. Projected precipitation changes are much more variable seasonally and geographically, while temperature is more uniformly projected to rise across the board; notably, precipitation is expected to increase during the short rains (October to December)[157]. Of great importance to the

[152] https://www.northernkenyacommunitycarbon.org/
[153] Victor Ongoma and Haishan Chen, "Temporal and Spatial Variability of Temperature and Precipitation over East Africa from 1951 to 2010," *Meteorology and Atmospheric Physics* 129, no. 2 (April 2017): 131–44, https://doi.org/10.1007/s00703-016-0462-0.
[154] Brian Ayugi et al., "Evaluation of Meteorological Drought and Flood Scenarios over Kenya, East Africa," *Atmosphere* 11, no. 3 (March 21, 2020): 307, https://doi.org/10.3390/atmos11030307.
[155] Mark E. Ritchie, "Global Climate Change and the Serengeti," in *Sinclair, A.R.E., Packer C., Mduma S.A.R., and Fryell, J.M. (Editors) Serengeti III: Human Impacts on Ecosystem Dynamics.* (Chicago (Ill.): University of Chicago Press, 2008).
[156] "Climate Risk Profile: Kenya" (The World Bank Group, 2021), https://climateknowledgeportal.worldbank.org/sites/default/files/2021-05/15724-WB_Kenya%20Country%20Profile-WEB.pdf.
[157] "Climate Risk Profile: Kenya."

project area, precipitation in the arid regions of Kenya is expected to decrease overall, which affects the entirety of Kajiado County but especially the low-lying areas of the Great Rift Valley that are already hotter and dryer (**Figure 3-14**). In savanna ecosystems, past studies have shown that deeper and longer dry periods punctuated by more intense rains exacerbate the effects of overgrazing on soil carbon, vegetation condition, and water availability, resulting in increased degradation of overall rangeland condition[158,159].

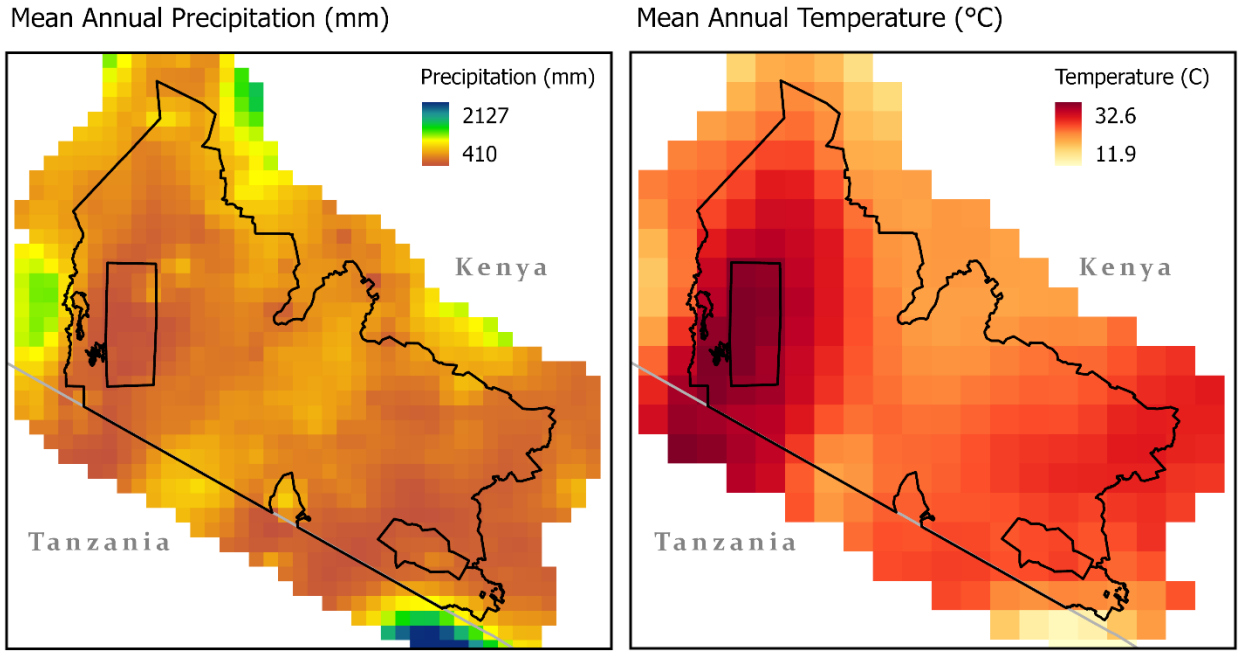


Figure 3-14: Mean annual precipitation and temperature for the project geographical area.

The likely effects of future climate change on land use in the project geographical area are difficult to predict. On one hand, drying arid areas will make conversion of rangelands to rainfed crop agriculture even more difficult or impossible without access to borehole water[160]. On the other hand, as discussed in section 2.2.2 above, in recent drought combined with changes in land tenure on formerly communal rangelands has caused devastating losses of livestock and driven herders to crop agriculture; a future of increased drought may only deepen the incentives to expand crop agriculture.

3.4.2 Climate Change Impacts (CCB, GL1.2)

Climate change in the project zone is currently exacerbating the impacts of normal seasonal drought on local communities, their livestock, and local biodiversity. With the projected changes described in

[158] David Western and D.L. Manzolillo Nightingale, "Environmental Change and the Vulnerability of Pastoralists to Drought: A Case Study of the Maasai in Amboseli, Kenya," in *Chapter 3 of Africa Environment Outlook: Past, Present and Future Perspectives* (United Nations Environment Programme, 2003).
[159] Yongfei Bai and M. Francesca Cotrufo, "Grassland Soil Carbon Sequestration: Current Understanding, Challenges, and Solutions," *Science* 377, no. 6606 (August 5, 2022): 603–8, https://doi.org/10.1126/science.abo2380.
[160] Government of the Republic of Kenya, "National Climate Change Action Plan 2018-2022."

Section 3.4.1 above, the impacts will only intensify in the absence of local climate change adaptation strategies.

Impacts on Community Well-Being

Two recent drought events highlight the severe consequences of climate variability for local livelihoods. The 2017-2018 drought plunged 3.4 million Kenyans into food insecurity and left 500,000 without access to water[161]. The 2020-2023 drought, which a 2023 study scientifically linked to human-caused climate change[162], displaced nearly a million people across East Africa and cast millions more into food insecurity.

Vulnerability to drought has long been recognized as a driver of poverty in Kenyan pastoralist communities, exacerbated first by social and land tenure changes and second by climate change[163]. As described in Section 2.2.2, land subdivision on parts of the Maasai rangelands has constrained livestock management to smaller, fragmented parcels, making them more vulnerable to seasonal drought[164,165,166]. This has increased food and economic insecurity, forcing some communities to shift from livestock production to subsistence agriculture or to sell off parcels of land, creating a negative feedback loop of resource depletion and economic instability[167,168].

Further, the loss of access to traditional water sources during dry seasons has led to high livestock mortality rates[169,170,171], disproportionately affecting poorer households with limited mobility[172]. More details on water resource limitations are provided in Section 4.1.1.

Impacts on Biodiversity Conservation

Climate change is significantly altering the biodiversity of the Maasai rangelands, particularly through habitat degradation, changing species distributions, and increased ecosystem stress. Some key anticipated and observed impacts include:

1. Shifts in Vegetation Composition & Habitat Loss

[161] Government of the Republic of Kenya.
[162] Kimutai et al., "Human-Induced Climate Change Increased Drought Severity in Horn of Africa."
[163] Western and Nightingale, "Environmental Change and the Vulnerability of Pastoralists to Drought: A Case Study of the Maasai in Amboseli, Kenya."
[164] Martin et al., "How Much Climate Change Can Pastoral Livelihoods Tolerate?"
[165] Turner, McPeak, and Ayantunde, "The Role of Livestock Mobility in the Livelihood Strategies of Rural Peoples in Semi-Arid West Africa."
[166] Brottem et al., "Biophysical Variability and Pastoral Rights to Resources."
[167] Kinuthia and Wahome, "Attitudes on Land-Use Systems and Social Mindset Transformations after Group Ranch Subdivision in Kenya."
[168] Boone et al., "Quantifying Declines in Livestock Due to Land Subdivision."
[169] Peter D. Little, *The Elusive Granary: Herder, Farmer, and State in Northern Kenya*, African Studies Series 73 (Cambridge [England] ; New York: Cambridge University Press, 1992).
[170] Pd Little, H Mahmoud, and Dl Coppock, "When Deserts Flood: Risk Management and Climatic Processes among East African Pastoralists," *Climate Research* 19 (2001): 149–59, https://doi.org/10.3354/cr019149.
[171] Little et al., "Challenging Orthodoxies."
[172] Little et al.

- Increased temperatures and erratic rainfall patterns are driving a shift from perennial grasses to more drought-tolerant, annual, and woody invasive species, which reduces forage availability for both livestock and wild herbivores[173],[174].
- Encroachment by invasive woody species such as *Acacia mellifera* and *Prosopis juliflora* has been linked to reduced biodiversity and loss of critical grazing lands[175].
- Prolonged drought conditions accelerate land degradation, decreasing vegetation cover and exposing soil to higher erosion rates, further reducing habitat quality for wildlife[176].

2. Increased Wildlife Mortality & Altered Migration Patterns
   - Large-scale droughts have been documented to cause mass mortality events among wildlife species in Kenya. The 2009 drought led to widespread die-offs of elephants, zebras, and buffaloes in Amboseli and Tsavo National Parks due to lack of water and forage (Ogutu et al., 2016).
   - More frequent and prolonged droughts are also disrupting seasonal migration routes of key herbivore species such as wildebeest (*Connochaetes taurinus*), and Thomson's gazelle (*Eudorcas thomsonii*), increasing human-wildlife conflicts as wildlife seeks food and water near settlements[177].

3. Impacts on Carnivore Population
   - Declining prey populations due to habitat loss and reduced grazing lands for wild herbivores negatively impacts carnivore populations such as lions (*Panthera leo*) and cheetahs (*Acinonyx jubatus*), increasing livestock predation rates as carnivores turn to domesticated animals for food[178].
   - Retaliatory killings of carnivores by livestock owners have increased in recent years, further threatening apex predators and disrupting ecosystem balance[179].

[173] David J. Augustine, "Response of Native Ungulates to Drought in Semi-arid Kenyan Rangeland," *African Journal of Ecology* 48, no. 4 (December 2010): 1009–20, https://doi.org/10.1111/j.1365-2028.2010.01207.x.
[174] Ogutu et al., "Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya."
[175] P. R. Mbaabu, U. Schaffner, and S. Eckert, "INVASION OF SAVANNAS BY PROSOPIS TREES IN EASTERN AFRICA: EXPLORING THEIR IMPACTS ON LULC DYNAMICS, LIVELIHOODS AND IMPLICATIONS ON SOIL ORGANIC CARBON STOCKS," *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* XLIII-B3-2021 (June 28, 2021): 335–40, https://doi.org/10.5194/isprs-archives-XLIII-B3-2021-335-2021.
[176] Fangli Wei et al., "Responses and Feedbacks of African Dryland Ecosystems to Environmental Changes," *Current Opinion in Environmental Sustainability* 48 (February 2021): 29–35, https://doi.org/10.1016/j.cosust.2020.09.004.
[177] David Western et al., "Predicting Extreme Droughts in Savannah Africa: A Comparison of Proxy and Direct Measures in Detecting Biomass Fluctuations, Trends and Their Causes," ed. Xuhui Zhou, *PLOS ONE* 10, no. 8 (August 28, 2015): e0136516, https://doi.org/10.1371/journal.pone.0136516.
[178] Paul Schuette, Scott Creel, and David Christianson, "Coexistence of African Lions, Livestock, and People in a Landscape with Variable Human Land Use and Seasonal Movements," *Biological Conservation* 157 (January 2013): 148–54, https://doi.org/10.1016/j.biocon.2012.09.011.
[179] B. M. Kissui, "Livestock Predation by Lions, Leopards, Spotted Hyenas, and Their Vulnerability to Retaliatory Killing in the Maasai Steppe, Tanzania," *Animal Conservation* 11, no. 5 (October 2008): 422–32, https://doi.org/10.1111/j.1469-1795.2008.00199.x.

4. Wetland & Water Resource Degradation
    - Climate change-driven reductions in rainfall and increased evapotranspiration rates are drying up key wetlands and waterholes, which serve as vital refuges for birds, amphibians, and aquatic biodiversity.
    - Loss of wetland habitat has led to population declines in water-dependent species such as the endangered Grey Crowned Crane (*Balearica regulorum*) and declining amphibian diversity in the region.

3.4.3 Measures Needed and Designed for Adaptation (CCB, GL1.3)

The project activities will provide exceptional benefits for climate adaptation in the project area. At its core, RRG as a tool to restore rangelands provides climate change adaptation benefits to communities and biodiversity alike through increased soil carbon[180,181], improved vegetative condition[182], and enhanced soil water retention capacity[183], allowing rangeland vegetation to persist through increasingly extreme drought. Rapid rotational grazing implementation has the capacity to reverse the drivers of overgrazing in the project area[184] by utilizing grazing commons and rapid livestock rotation restoration of perennial grasses and other livestock forage, which counteracts the effects of drying on vegetation growth and forage quality in arid areas[185,186]. Increased vegetation growth and soil carbon will directly benefit the climate adaptability of local communities[187] and wildlife due to the availability of better forage and the increased water storage capacity of more carbon-rich soils[188]. Better soil water retention is expected to increase surface water availability and counteract the effects of drying on intermittent and perennial water sources, benefiting both local communities (and their livestock) and wildlife[189,190,191].

	Expected climate, community, and/or biodiversity	

[180] Chaplot, Dlamini, and Chivenge, "Potential of Grassland Rehabilitation through High Density-Short Duration Grazing to Sequester Atmospheric Carbon."
[181] David C. Johnson et al., "Adaptive Multi-Paddock Grazing Management's Influence on Soil Food Web Community Structure for: Increasing Pasture Forage Production, Soil Organic Carbon, and Reducing Soil Respiration Rates in Southeastern USA Ranches," *PeerJ* 10 (July 19, 2022): e13750, https://doi.org/10.7717/peerj.13750.
[182] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[183] Apfelbaum et al., "Vegetation, Water Infiltration, and Soil Carbon Response to Adaptive Multi-Paddock and Conventional Grazing in Southeastern USA Ranches."
[184] Western, Groom, and Worden, "The Impact of Subdivision and Sedentarization of Pastoral Lands on Wildlife in an African Savanna Ecosystem."
[185] Apfelbaum et al., "Vegetation, Water Infiltration, and Soil Carbon Response to Adaptive Multi-Paddock and Conventional Grazing in Southeastern USA Ranches."
[186] Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12."
[187] Rumpel et al., "The Role of Soil Carbon Sequestration in Enhancing Human Resilience in Tackling Global Crises Including Pandemics."
[188] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.
[189] Bossio et al., "The Role of Soil Carbon in Natural Climate Solutions."
[190] Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12."
[191] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.

Activity description	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	Relevance to project's objectives
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Increased storage of C in soil as soil organic carbon (SOC)	Removals of CO2 from atmosphere, which provide revenues to support grazing coordinators and for community development projects (exceptional community benefits).
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Increase in soil water holding capacity, providing moisture for plant growth beyond the usual dates of the onset of the dry season	Greater water retention in soils which supports hydrological subsurface flow to support longer lasting and more common surface water sources, which will reduce the time necessary for community members to acquire water and provide more surface water options during drought. These changes provide exceptional adaptation to climate change benefits.

Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Increase in soil water holding capacity, providing moisture for plant growth beyond the usual dates of the onset of the dry season	Greater water retention in soils, which supports plant production and regrowth following grazing over a greater proportion of the year. This will allow animals to be in better condition and to reproduce and produce milk over a greater proportion of the year. These changes provide exceptional climate adaptation and community benefits
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Provide forage to support greater wildlife populations	Greater wildlife populations support existing ecotourism operations in the project area and in adjacent conservation lands, providing exceptional community benefits and supports conservation of at least 9 trigger species, providing exceptional biodiversity benefits

Shift livestock management from continuous grazing to rotational or migratory grazing	Allow establishment of grass banks	Provides grazing refuges during drought	Reduces need for community members to take long migrations during droughts	Reduces physical risks to herders from moving animals to conflict areas, a community benefit, and provides the ability to mitigate the impacts of drought, a climate change adaptation benefit

4 COMMUNITY

4.1 Without-Project Community Scenario

4.1.1 Descriptions of Communities at Project Start (CCB, CM1.1)

The Maasai are a semi-nomadic community who practice pastoralism. Livestock and livestock health are central to the culture, economy and spirituality of the Maasai.

Studies indicate that the Maasai people originated from the Nile Valley which is the present Sudan and migrated downwards following the Great Rift Valley between the 16th and 18th centuries. The Maasai community speaks Maa language which is believed to be a sub-group of the Nilotic languages. Historically, they lived in Manyatta bomas that consisted of small houses approximately 15 in number that were built of cow dung and soil primarily by women. The group settled in Southern Kenya and parts of Northern Tanzania while occupying some of the fertile and productive places which were known as the Maasailand. These areas were host to a diverse ecosystem that offered contiguous grazing spaces for seasonal livestock movement.

The Maasai community move their livestock across vast grazing areas as seasons changed from the availability of water, grass, and even salt licks. This grazing method allows pasture to regenerate and helps control overgrazing and overexploitation of natural resources within the ecosystems. Elders made decisions on when livestock would move from one place to another while warriors protect and take livestock to grazing fields. Table 4-1 describes in detail the roles and responsibilities of the age-groups in the Maasai society.

Table 4-1. Maasai Age-Groups and Related Responsibilities

Age-Group	Age Bracket	Notes

Illayiok	7-17	These are boys before circumcision. They are responsible for herding and protecting livestock from predators. At the age of 7 years, boys are given training by their fathers on how to herd kids and lambs. They progressively move to herd larger groups of goats and sheep and then all livestock including cattle. They migrate with livestock with the help of Morans (the circumcised) to different places depending on pasture and water availability.
Ilmuran/Iltuati/Moran	18-34	These are the Maasai warriors. They are responsible for protecting livestock and their families from predators and intruders who may raid livestock. In families where *Illayiok* are not available due to schooling, they take the responsibility of herding livestock. Part of their responsibility is to assess pasture sizes before livestock migrate to a new area and provide reports on land structure and accessibility. The Morans are allowed to marry several wives and have a family and livestock of their own. No one is allowed to separate own livestock from the household herd but stay together as a family for easy management.
Irkiruju/Irsederi/Irkorea	35-45	These are senior warriors. They are responsible for protecting livestock and the community alongside warriors. They keep a watch over the junior warriors and ensure everything is in order, from livestock movement to helping in financial capabilities. They are allowed to marry as many wives as they wish but stay together under the leadership of *Iseuri* or *Irkeleani* who are the overall head of the family.
Irkeleani/Irkidotu	46-60	These are the elders in the community. They look after the younger generations and help in decision-making. They decide when livestock migrate, which areas and for how long depending on rainfall and pasture availability. They are responsible for the finances and well-being of families.
Irkishumu	61-70	These are senior elders. They are only responsible for decision-making processes. They advise on livestock breeds, livestock diseases, and how to treat them. They have experience in using stars and environmental signs for predicting rain and droughts, and their advice is well-respected.

Iseuri	71-99	They are the senior most elders in the Maasai community. They are referred to as wise men in the society. They share stories about the community history and the transformations. They are exempted from any physical duties. They are also part of the decision-making process with their word being final.
Irnyang'usi	100+	These are the Maasai forefathers and are believed to have lived for 100+ years. They played a role in guarding the Maasailand territories before colonialism and lived to tell stories of generations and the Maasai culture.

Women are the fabric of the Maasai Community. At an early age, the girl-child is taught how to cook and take care of a family with the hope of one day getting married and being able to raise their own. One of the wealth measures in the Maasai culture used to be the number of wives a man has. This is because marriage created strong social linkages, through the giving of livestock as a bride price, the responsibility the wife's maternal family would have towards her all of her life, and the resultant social support structures that result in affinity bonds with the woman's' children and the sharing of livestock in times of hardship. Although women have not historically played a part the decision-making process or actively herding livestock, they are increasingly gaining a voice through education and economic empowerment. Traditionally, women's role in in livestock keeping was limited to milking and looking after sick and weak livestock. A study of pastoralist livestock herders in southern Ethiopia in the 1980s demonstrated that dairy sales by women accounted for 20% of a household's annual income[192]; this proportion depends on the season and a household's distance to the market. Women now also herd livestock in certain families with no boys or in cases where they are in school.

Historically, land was communally owned, with any land disputes arising within the community settled by elders. Each member had equal rights to use land for grazing as long as they adhered to set customary rules and regulations governing the land. The laws were established by elders, and ensured the community understood that each person was responsible for the environment and its resources for the common good. Land did not belong to individuals, but the whole community which fostered solidarity and unity among the Maasai people. This made it easy to manage grazing and livestock movement from one area to another promoting for conservation and sustainability. Individual members had no right to sell or lease community land, but they all defended their land against intruders and other forms of encroachment. Notably, under customary laws, elders professed that land did not have any monetary value and should never be given away. The impact of the failed group ranch systems and the ensuing replacement with community lands act, has exerted a high pressure to sub-divide the communal lands into individual parcels. These pressures arise from historic mismanagement and elite capture, a need to have a title deed for collateral to obtain loans for other economic activities, and

[192] D. L. Coppock, "Constraints to Development of Extensive Livestock Systems: Experiences from Southern Ethiopia," *BSAP Occasional Publication* 16 (1993): 87–92, https://doi.org/10.1017/S0263967X00031098.

most pressingly the need to pay for school fees and other basic needs due to increasingly poor returns and low-liquidity from livestock.

Despite the various land tenure laws that have impacted their ways of life, the Maasai have continued to seasonally move from one place to another in search of pasture and clean water. Their movement and duration of stay in any particular area is determined by the presence or absence of rain across their grazing lands. Since the formation of group ranches the Maasai sections (oloshon) have created seasonal movements from permanently located settlements to grazing blocks that are defined for the short dry season, long wet season, long dry season and short rains. Wet and dry season grazing blocks are determined by factors such as closeness to permanent water sources and the quantity and quality of forage. Dry season grazing areas are selected in a manner that allows livestock to access to water and grass remains available during the entire dry season. Establishment of temporary home settlement areas (*Ronjo*), usually in the dry season, is determined by proximity of grazing blocks to permanent homes. Livestock enclosures or corrals (bomas) are used occasionally to protect livestock from predators and confine animals that are unwell for quarantine and treatment. The more the distance livestock have to cover to get pasture and water, the more likely elders will advise herders and warriors to temporarily migrate with livestock so as to maintain and add to a livestock's body condition. When a drought persists for long period of time, then livestock will keep migrating further from permanent settlement areas. Livestock health thereby determine where a household lives and the duration of their stay. Anthropological studies have documented that Kenyan herders of the central and southern Rift Valley are especially constrained during droughts due to a lack of access to former dry season grazing areas in river basins and highland zones, making devastating losses much more likely[193,194,195]. Poorer households with limited mobility are the most affected by these extreme conditions and may lose over 50% of the flock in an event[196].

As the need to educate children and access social services heightens, households have increasingly formed permanent settlements where mostly women, children and the elderly reside. This allows them to access social services for health and education, while also protecting their lands from illegal encroachment and outright usurpation.

Maasai wellbeing has historically been measured by the number of cattle, goats, sheep, wives and children a man has. Although these seem straightforward measures, the context and perception of wellbeing is much more deeper-rooted and complex. In the context of historic practice of pastoralism, larger individual livestock ownership could be supported due to larger pastoral movements (more connectivity and more reciprocity in sharing of grasses), and strong social capital systems that allowed for the giving of livestock in times of need such as drought, disease, marriage, and traditional graduations. This also created a sense of peace and unity with the community. Furthermore, Maasai pastoralists have extended family and kinship networks that span over the landscape provide social capital and insurance against cases of drought and disease. One of the single most resilience factor,

[193] Little, *The Elusive Granary*.
[194] Little, Mahmoud, and Coppock, "When Deserts Flood."
[195] Little et al., "Challenging Orthodoxies."
[196] Little et al.

outside of the availability of grass and water in wet and dry season grazing, has been reciprocal relationships and the "giving" nature of the community. To this day, interactions with all community members will result in a saying "today we will share ours, tomorrow will be our turn to share theirs". This is a central tenet to their social capital. In cases of drought, impoverished households will be given a milking cow, or a few goats and sheep to sustain them. Wealthier household will also "give" their brothers, wife's family and other age-set members a few livestock to look after as an insurance strategy, knowing the same favor will be returned to them in times of need. The spread of these livestock over space reduces their vulnerability to unpredictable weather and disease. An extensive study of traditional pastoralist practices in the 1970s estimated that 30-40% of each Maasai man's livestock would be dispersed among friends[197]. This is however changing within the Maasai society as modern economics predominates decisions, and the need to educate children and ensure there is enough to provide for their wellbeing within a context of changing land tenure system and persistent recurrent extreme drought conditions. It may be that improved household development and resilience to small shocks in the short term is being paid for by reduced household and community resilience to larger shocks in the longer term[198].

4.1.2 Interactions between Communities and Community Groups (VCS, 3.19; CCB, CM1.1)

As described earlier, the Maasai community have strong affinities to their clans, sections, age-sets, age-groups and group ranches. All exert a level of influence and guidance in role-playing and decision-making already described in the sections above.

Between the group-ranches there is a strong sense of landscape level collaboration. Within section and clan linkages lead to strong social ties. These are amplified by landscape level development activities, in particular mobilization through NGOs, CSOs and other regional bodies that bring these community structures together for various purposes including conservation and development. This is highlighted in the history of the management of Amboseli Ecosystem. Group ranches have been and continue to be central to the ecosystem management plan.

4.1.3 High Conservation Values (CCB, CM1.2)

High Conservation Value 1	Open, Connected Grasslands that Support Maasai Pastoralism
Qualifying Attribute	These rangelands represent some of the last remaining contiguous grazing lands in Southern Kenya that have historically formed the core of Maasailand. The Maasai pastoral way of life, which has withstood globalization

[197] Gudrun Dahl and Anders Hjort, *Having Herds: Pastoral Herd Growth and Household Economy* (Stockholm: Dep. of social anthropology, Univ. of Stockholm [Socialantropologiska inst., Stockholms univ.], 1976).
[198] Timothy D. Baird and Clark L. Gray, "Livelihood Diversification and Shifting Social Networks of Exchange: A Social Network Transition?," *World Development* 60 (August 2014): 14–30, https://doi.org/10.1016/j.worlddev.2014.02.002.

	pressures for over 200 years, is under increasing threat due to land subdivision, individualization, and climate-related disasters. Approximately 1.1 million Maasai live in Kenya, with nearly 40% residing in Kajiado County. As described in Section 2.2.3, these landscapes face severe pressure from rangeland privatization, expanding agriculture, conservation schemes, and human-wildlife conflict. These pressures are further exacerbated by repeated climate catastrophes (e.g., the 2021-2023 droughts, which decimated over 80% of livestock populations) and by misinformation regarding the Community Land Act (CLA, 2016). Major drivers of pastoral poverty include decreasing livestock-to-human ratios, increasing sedentarization, and loss of communal structures, which once enabled adaptation to change[199]. Research suggests a decline in youth engagement in pastoralism, raising concerns about the future viability of Maasai livelihoods[200]. The survival of the Maasai pastoral communities depends on the finite capacity of the environment to provide forage and water, as well as on the continuation of communal land management structures that enable adaptive responses to ecological and economic shocks. However, current trends in climate vulnerability and land individualization are rapidly eroding these adaptive mechanisms. Beyond supporting forage production, the conservation of open rangelands improves water access as a secondary benefit. Healthy grasslands promote soil infiltration, reducing surface runoff and enhancing groundwater recharge. This process helps maintain water availability in dry seasons, ensuring that critical water points retain moisture longer. Sustainable grazing reduces soil erosion, protecting water sources from sedimentation and ensuring their long-term viability.
Focal Area	Restoring value to pastoral livelihoods through: • Improved livestock production practices that enhance grazing efficiency and rangeland regeneration.

[199] Western and Nightingale, “Environmental Change and the Vulnerability of Pastoralists to Drought: A Case Study of the Maasai in Amboseli, Kenya.”
[200] Woodhouse and McCabe, “Well-Being and Conservation.”

	• Incentives for communal land management, strengthening traditional Maasai grazing structures. • De-risking strategies for pastoral livelihoods, ensuring seasonal forage availability within community lands and reducing vulnerability to climactic shocks. • Strengthening water resource availability by reducing soil degradation and improving groundwater recharge through sustainable rangeland management.
High Conservation Value 2	Amboseli Ecosystem for Wildlife Conservation and Tourism Income
Qualifying Attribute	The Amboseli Ecosystem is a critical wildlife corridor where Maasai pastoralists have co-existed for centuries with iconic wildlife such as Elephants, Lions, Zebra and Giraffes. Research has demonstrated that over 60% of Kenya's wildlife exists in non-protected community lands[201,202]. Without proactive conservation efforts, the continued subdivision, fencing, and conversion of communal rangelands into agriculture and housing developments will significantly reduce habitat connectivity, threatening both biodiversity and pastoral livelihoods. For many Maasai households, tourism revenue provides one of the few stable sources of monetary income, offering employment in lodges, conservancies, and wildlife monitoring programs. Conservation-based land-use strategies ensure that large mammals continue to thrive, preserving wildlife-related income opportunities for the community.
Focal Area	Enhancing livestock herd resilience for Maasai households through: • Improved forage availability, preventing land sales due to economic hardship. • Maintaining wildlife habitat connectivity, ensuring continued tourism revenues.

[201] Western, Russell, and Cuthill, "The Status of Wildlife in Protected Areas Compared to Non-Protected Areas of Kenya."
[202] Phil Shaw et al., "African Savanna Raptors Show Evidence of Widespread Population Collapse and a Growing Dependence on Protected Areas," *Nature Ecology & Evolution* 8, no. 1 (January 4, 2024): 45–56, https://doi.org/10.1038/s41559-023-02236-0.

	• Supporting community-based conservation initiatives, strengthening the economic sustainability of wildlife tourism.

4.1.4 Without-Project Scenario: Community (CCB, CM1.3)

Without the proposed carbon project, livestock management in the region likely will continue to drive a cycle of impoverishment associated with continuous grazing, declining soil organic matter, and loss of forage productivity. This cycle will disproportionately impact vulnerable community groups, including landless pastoralists, youth, and women, who already have limited access to land, economic opportunities, and social capital.

As rangeland productivity declines, the shift from cattle to sheep and goats – which exerts greater grazing pressure on vegetation – will accelerate. This shift will further degrade the land, leading to more frequent long-distance migrations by herders to higher-rainfall areas in neighboring Tanzania and Kenya, including protected areas and privately held lands.

Community Group Impacts in the Without-Project Scenario

- Landless Pastoralists: Households that have already lost land due to subdivision and sales will be further marginalized, with reduced access to grazing lands. Without a formalized grazing plan, these groups may be forced into urban migration, leading to destitution and loss of traditional livelihoods.
- Women & Youth: The loss of productive rangelands will disproportionately burden women and youth, as women depend on milk production for household nutrition and income and youth may be forced into unpaid herding labor, reducing access to education.
- Small-Scale Herders: Pastoralists with limited herd sizes will struggle to maintain livestock productivity, leading to greater economic inequality between wealthier and poorer herders.
- Elderly Community Members: As migration increases, elderly individuals who cannot travel long distances will face increased food insecurity and social isolation.

Impacts on Ecosystem Services in the Without-Project Scenario

- Forage Availability & Rangeland Health: Degraded lands will reduce grazing capacity, making rotational grazing more difficult and increasing overgrazing in remaining productive areas.
- Water Resources: Increasing land privatization and agricultural expansion will likely lead to greater water abstraction, reducing available water for livestock, wildlife, and domestic use. While water access is not currently listed as a community HCV, the loss of productive grazing lands will indirectly limit access to traditional water sources as herders are displaced from key watering areas.
- Wildlife Conservation & Tourism: Land subdivision and encroachment will fragment critical wildlife corridors, reducing connectivity between Ambosseli, the South Rift, and other protected areas. The subsequent decline in wildlife populations will undermine tourism income, which is essential for many communities.

- Soil Carbon & Climate Resilience: Without improved grazing management, soil erosion and loss of organic matter will continue, reducing carbon sequestration potential and increasing land vulnerability to drought and desertification.

Longterm Consequences

Without intervention, climactic catastrophes will further weaken communities' ability to recover from shocks. Research shows that pastoralists require 10-15 total livestock units (TLU) per household to recover from droughts, yet without access to seasonal pastures, social capital, and diversified incomes, households will face permanent economic collapse.

Furthermore, the loss of Maasai pastoral livelihoods will result in land-use transitions that are unsuitable given rainfall patterns. Agricultural expansion will fail due to low and unpredictable precipitation and urban development – the alternative trend – cannot coexist with wildlife conservation.

4.2 Net Positive Community Impacts

4.2.1 Expected Community Impacts (CCB, CM2.1)

Community group	Maasai Communities of Kajiado County
Impact(s)	The project will help sustain the livelihoods of Maasai residents of Kajiado County by restoring sustainable rotational grazing practices that mimic traditional semi-nomadic rangeland management. This approach counteracts the decline of pastoral livelihoods due to land subdivision, sedentarization[203], and climate-related degradation. By improving forage availability, the project reduces livestock mortality during droughts, supports marketable livestock production, and strengthens income security. Grazing-based livelihoods will remain viable despite increasing land-use pressures, ensuring long-term sustainability for the community. In addition to supporting livelihoods, the project will provide significant ecosystem services. Sustainable grazing prevents land degradation and enhances soil carbon sequestration, contributing to improved rangeland conditions and maintaining water availability for livestock. Carbon sequestration through enhanced soil management further mitigates climate change,

[203] Michael Norton-Griffiths and Mohammed Y. Said, "The Future for Wildlife on Kenya's Rangelands," in *Chapter 14 in Wild Rangelands: Conserving Wildlife While Maintaining Livestock in Semi-Arid Ecosystems, Edited by Johan T. Du Toit, Richard Kock, and James C. Deutsch*, Conservation Science and Practice 6 (Chichester, West Sussex, UK: Wiley-Blackwell, 2010), 424.

	making this project a valuable global ecosystem service. The restoration of rangelands also strengthens Maasai cultural identity, reinforcing traditional herding practices and reducing land sales due to economic distress. Improved grazing governance minimizes conflicts over land use, fostering greater household stability and long-term economic security. Beyond its ecological and cultural benefits, the project will generate revenue through carbon credit sales, supporting reinvestment in sustainable grazing management and conservation efforts. Additionally, it will create employment opportunities for grazing coordinators, conservation rangers, and carbon project staff, further improving economic stability within the community. The overall well-being of participating communities is expected to improve through enhanced food security, increased income opportunities and strengthened cultural practices.
Type of benefit/cost/risk	The project is expected to yield predominantly direct and beneficial impacts by enhancing food security, stabilizing incomes, preserving cultural traditions, and ensuring environmental sustainability. However, there are potential risks that require careful management. One such risk is overstocking, as improved rangeland conditions may lead to an increase in livestock numbers, potentially exceeding the carrying capacity of the land if not actively managed. Another key consideration is the equitable distribution of carbon revenue. Ensuring that all community members benefit from project-related income will require continuous monitoring and engagement to prevent unintended disparities.
Change in well-being	The project will contribute positively to community well-being by strengthening livestock-based livelihoods, improving economic security, and enhancing access to critical ecosystem services such as water availability and forage production. Measures are in place to mitigate the potential risks, particularly concerning overgrazing and revenue distribution, ensuring long-term success and equitable benefits for all participating communities.

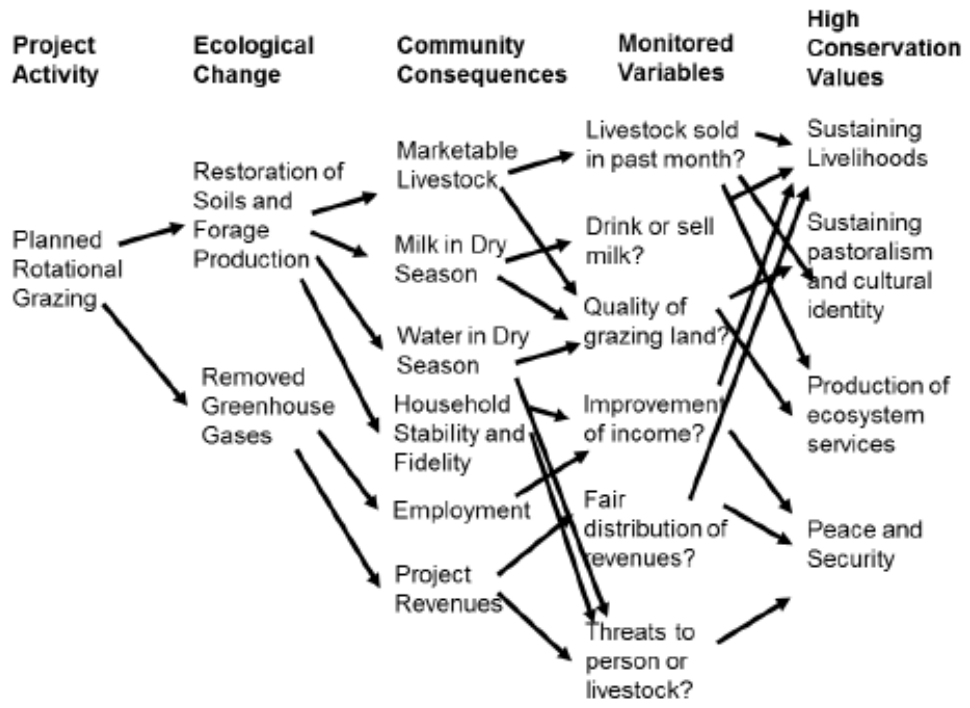


Figure 4-1. Causal model of the project activities – planning and implementing rapid rotational grazing - and their impact on community High Conservation Values.

4.2.2 Negative Community Impact Mitigation (VCS, 3.19; CCB, CM2.2)

While potential negative community impacts from the project are limited, there are concerns that improved rangeland conditions could lead to an increase in livestock numbers, potentially reversing gains in grassland restoration – these concerns are typically raised by critics of RRG. However, the project's grazing management framework (RRG plans and monitoring of grazing activities by grazing coordinators) prevents overstocking and ensures sustainable land use, and so represents measures designed to mitigate this risk. Rapid rotational grazing has proven to increase carrying capacity while improving vegetative condition and soil carbon storage. In the Northern Kenya project, rainfall-corrected increases in forage biomass and soil carbon density occurred in the locations that had successfully implemented RRG in six or seven years of the seven year study period, despite increases in human population and stocking rates during that time period, while other locations that did not achieve the same level of successful implementation did not see similar changes in vegetation and soil carbon[204].

For marginalized groups:

- Poorest 25% - People with Few or No Livestock – may struggle to access economic benefits from improved grazing, as they lack sufficient herds. However, the project's benefit-sharing model (including bursaries and financial support) ensures alternative means of participation in economic improvements.

[204] Ritchie et al., "Increased Pastoralist Livestock Mobility Is Associated with Large-Scale Rangeland Restoration and Soil Carbon Sequestration.," February 20, 2024.

- Female-Headed Households and Women in General – traditionally face barriers to decision-making in pastoralist governance structures. To address this, the project requires women's representation in grazing planning committees and revenue-sharing decisions, ensuring financial disbursements support education and healthcare – key concerns for female-headed households.

By integrating these risk mitigation measures, the project ensures that community members, regardless of economic standing or gender, have equitable access to benefits and are not negatively impacted by project activities. These measures are consistent with the precautionary principle, which is typically formulated as taking preventive action to mitigate potential harm in the face of scientific uncertainty. The implementation of RRG itself is a preventive action to stop further degradation in the without-project scenario.

4.2.3 Net Positive Community Well-Being (VCS, 3.19; CCB, CM2.3, GL1.4)

As indicated earlier, the Maasai pastoral community that comprises 99% of the project population have livestock-based livelihoods. Although there are demonstrated patterns of diversification into agro-pastoralism and employment, livestock keeping and trading remain the most important

Not only is net positive impact to community well-being anticipated, but project activities will also help the participating communities adapt to the impacts of climate change (see Section 3.4.3 and references therein). Access to deep-rooted perennial grasses and abundant soil carbon will increase the climate adaptability of local communities because soils with more carbon store more water and sustain greater forage production through dry periods. The prolonged practice of rapid rotational grazing in the project will restore grass and other livestock forage, which will provide buffers against variable rainfall and reduce the need for long and risky migrations during droughts. Water retained in soils will have the added benefits of improving surface water availability and making intermittent water sources more reliable and longer lasting, and of protecting perennial water sources from vulnerability to extreme drought.

4.2.4 High Conservation Values Protected (CCB, CM2.4)

Project activities will enhance rather than negatively impact High Conservation Values (HCVs) identified in PD Section 4.1.3. The project will benefit the persistence of the indigenous Maasai cultural and linguistic identity by reinforcing pastoralist practices across the landscape. By restoring rangeland health through rotational grazing, the project strengthens ecosystem services that sustain Maasai pastoralist livelihoods without degrading any critical areas identified as HCVs.

The project will improve three key dimensions of pastoral well-being: materials assets (including access to grazing and agricultural lands and healthier livestock herds), perceptions of future security (particularly land tenure security), and social cohesion. These well-being benefits, while crucial to community resilience, do not meet the criteria for HCVs under CM1.2, as they are socioeconomic in nature rather than conservation-specific.

Additionally, the project aims to expand economic opportunities for marginalized groups. Project revenues will provide bursaries and greater forage access for small livestock holders, ethnic minorities, and women, helping to sustain diversified livelihood options. Women, as the primary drivers of children's education, will benefit from increased access to livestock-derived income (e.g., milk and egg sales), enabling greater school enrollment – particularly for girls. These benefits, while central to community development, are not geographically distinct conservation areas requiring formal HCV designation.

Ecologically, the project will increase grass cover, enhance seed and insect abundance, and indirectly support grassland bird species and raptors. These effects are an extension of improved rangeland conditions and not distinct HCVs requiring independent conservation measures. The Amboseli ecosystem HCV provides a framework for wildlife conservation and tourism-related economic benefits that will continue to support communities.

Given these factors, no HCVs identified in PD Section 4.1.3 are negatively impacted by the project. Rather, the project enhances ecosystem services and strengthens community resilience while aligning with existing conservation priorities. Additional community values and benefits described in PD Section 4.2.4, while important, do not meet the HCV definition and are instead key social and economic outcomes of the project.

4.3 Other Stakeholder Impacts

4.3.1 Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.1)

The KRCP engages a diverse group of stakeholders whose rights, interests, and activities intersect with project implementation. The following stakeholder groups have been identified based on Appendix 1, with a summary of their potential positive and negative impacts associated with the project.

Impacts on Maasai Communities

The project will support the well-being of Maasai pastoralist communities, particularly through grazing management, soil restoration, and increased land tenure security. KRCP aligns with traditional Maasai governance structures, which include sections, clans, and age-set hierarchies, ensuring culturally appropriate decision-making and dispute resolution processes.

- Positive Impact: Improved access to grazing resources, reduced risk of forced land sales, and strengthened social capital and economic resilience.
- Potential Negative Impact: The regulation of grazing movements within the project area may require adjustments for pastoralists accustomed to unrestricted movement. To mitigate this, KRCP is coordinating with grazing committees and group ranch leadership to facilitate communication and fair land-use agreements.

Impacts on Offsite Pastoralist Groups

The project recognizes offsite pastoralist groups who may traditionally access grazing lands in the project zone during times of extreme drought. While the project intends to improve pasture conditions for participating Maasai communities, it also maintains pathways for seasonal grazing access.

- Positive Impact: Improved rangeland conditions may allow for the bestowal of grazing access to offsite pastoralists in critical times, continuing a long-standing Maasai tradition of mutual support.
- Potential Negative Impact: Some offsite groups may face reduced informal grazing access due to improved regulation of pasture use. KRCP is collaborating with Amboseli Ecosystem Trust (AET) and local grazing task forces to ensure fairness and uphold Maasai traditions.

Engagement with Conservation Organizations & Conservancies

KRCP partners with key conservation groups that support wildlife protection, ecosystem connectivity, and sustainable land use. These include:

- Amboseli Ecosystem Trust (AET) – Coordinating grazing management and pastoralist well-being in the Amboseli Ecosystem Management Plan.
- Kenya Wildlife Service (KWS) – Managing wildlife conservation and human-wildlife conflict mitigation in Amboseli National Park.
- Big Life Foundation, Lion Guardians, Peregrine Fund, and Kenya Brid of Prey Trust – Protecting threatened species, including vultures and large carnivores and addressing wildlife poisoning risks.
- Positive Impact: Strengthened wildlife conservation efforts, improved grazing planning, and alternative economic benefits through eco-tourism and conservation partnerships.
- Potential Negative Impact: Possible restrictions on grazing in certain wildlife corridors. KRCP is working with KWS and conservancy groups to balance conservation goals with pastoralist needs.

Engagement with Local and National Government

KRCP aligns with county and national development goals, particularly in climate resilience, land-use planning, and pastoralist livelihood support. Key partners include:

- Kajiado County Government – Integrating grazing management into county development planning.
- State Department of Environment and Climate Change & NEMA – Ensuring compliance with environmental and carbon market regulations.
- Positive Impact: Strengthened climate adaptation policies, carbon finance investments, and pastoralist inclusion in policy-making.
- Potential Negative Impact: Potential delays in land-use policy integration. The project will continue to engage government entities to streamline grazing regulations and permit processes.

Engagement with Private Sector & Infrastructure Stakeholders

KRCP interacts with private sector entities in tourism, conservation, and resource management. These include:

- Tata Chemicals Magadi Ltd & Magadi Soda Foundation – Supporting water supply infrastructure critical for local communities.

- Tourism and hospitality enterprises – Benefiting from improved wildlife habitats and conservation efforts.
- Positive Impact: Enhanced eco-tourism potential, water infrastructure improvements, and greater private-sector investment in sustainable rangeland management.
- Potential Negative Impact: Any land-use adjustments may require collaboration with private landholders. KRCP will ensure continued engagement with affected stakeholders.

4.3.2 Mitigation of Negative Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.2)

The principal offsite stakeholders are herders from other group ranches or trust lands outside the project area, and these stakeholders may be negatively impacted by two primary consequences. To address these potential issues, the project has taken proactive steps to mitigate risks and promote cooperative solutions.

1. Enforcement of Project Boundaries

Although the group ranch system has historically operated with clearly defined and demarcated boundaries and seasonal grazing blocks, communal sharing of these resources has traditionally occurred based on mutually agreed terms[205,206]. The formalization of planned grazing areas under the project may lead communities to enforce boundaries more strictly, potentially reducing historic grazing-sharing opportunities in favor of maximizing carbon sequestration potential. To mitigate this impact, the project reinforces the Maasai identity and traditional sharing practices while incorporating structured grazing plans that promote rapid rotational grazing. This ensures that grazing access continues for offsite pastoralists, provided that they adhere to sustainable land management practices. Additionally, community-led governance structures support ongoing negotiations for grazing access under agreed conditions.

2. Potential Escalation of Conflicts over Grass and Water Resources

As communities formalize their rights to resources and implement planned rotational grazing, disputes over grass and water access may arise. To mitigate such conflicts, the project relies on strong community structures, including the traditional group ranch governance system and land tenure agreements, to manage resource allocation.

The project has actively facilitated the organization of entities that regulate grazing, formalize boundaries, and coordinate grazing plans among neighboring communities. By strengthening cooperation among group ranches in Kajiado County, the project creates a structured approach to resolving grazing-related disputes. While the term “framework” is used informally, it refers to the institutional motivation provided by the project to encourage structured decision-making processes and proactive conflict resolution.

[205] Simon K. Seno and W. W. Shaw, “Land Tenure Policies, Maasai Traditions, and Wildlife Conservation in Kenya,” *Society & Natural Resources* 15, no. 1 (January 2002): 79–88, https://doi.org/10.1080/089419202317174039.
[206] Kinuthia and Wahome, “Attitudes on Land-Use Systems and Social Mindset Transformations after Group Ranch Subdivision in Kenya.”

4.3.3 Net Impacts on Other Stakeholders (VCS, 3.18, 3.19; CCB, CM3.3)

These potential negative effects will be balanced by positive effects: fewer excursions of livestock from the project area onto lands used by neighboring pastoralist groups. Likewise, at least some conserved grazing land will be shared with offsite stakeholders.

It may take a decade or more for these net benefits to be realized. In the meantime, mitigation of these negative effects will be ongoing. Negotiated agreements among grazing committees of different communities both on and off the project area will allow continuance of cultural traditions while maintaining the integrity of the project. They will also enhance social cohesion because acceptance of off-project livestock will be easier once sufficient grass banks are established.

While these are the ideal goals of the project, until significant improvements in soil carbon and forage productivity are experienced across most of the project area, a result that may take more than 10 years, conflicts over shared grazing are likely to continue to occur in the first years of the project. Strengthening the legitimacy and management capacities of the communal land management structures across the region remains critical for fair agreements to be reached between the various parties.

An alternative objective would be to create administrative response structures to deal with local conflicts in the short term, such as the following examples:

Regional rotational grazing plans

It is possible to develop regional rotational grazing plans that use near real-time information on rainfall in the previous 1-3 months from USDA-USAID Famine Early Warning System (FEWS) http://earlywarning.usgs.gov/fews/ and from the University of Reading's (UK) Tropical Applications of Meteorology using Satellite data, or TAMSAT http://www.met.reading.ac.uk/~tamsat/data/ . These data identify areas experiencing drier and/or wetter than normal conditions, and then could be used to design a large-scale cross-district rotation of livestock that eases grazing pressure in drier areas while sustainably using forage available within the project area. Regional rotational grazing plans should be reviewed each year in an annual meeting of rangeland coordinators and then in semi-annual meetings of grazing committee representatives.

4.4 Community Impact Monitoring

4.4.1 Community Monitoring Plan (CCB, CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The Community Impact Monitoring Plan evaluates the effectiveness of project activities in maintaining or enhancing high conservation values (HCVs) related community well-being. This is done through socio-economic surveys, focus groups, and grazing monitoring, tracking how project interventions contribute to the persistence of pastoralist livelihoods, sustainable grazing practices, and community resilience. Additionally, the methods assess well-being perceptions across demographic groups (elderly men, middle aged men, women, youth, poorest 25% - people with few or no livestock, and female-headed households) and measure changes over time.

Monitoring Indicators & Their Link to Community-Related HCVs

The project has identified two HCVs (Section 4.1.3):

- HCV 1: Open, Connected Grasslands that Support Maasai Pastoralism
- HCV 2: Amboseli Ecosystem for Wildlife Conservation and Tourism Income

To ensure the effectiveness of measures taken to maintain or enhance these HCVs, the following monitoring indicators have been explicitly aligned with each HCV:

HCV 1: Open, Connected Grasslands that Support Maasai Pastoralism

This HCV represents the cultural, economic, and ecological importance of rangelands to the Maasai pastoralist way of life. The project promotes sustainable grazing and community cohesion to preserve these rangelands. Monitoring indicators tracking the effectiveness of these interventions include:

1. Livelihood Resilience Indicators
    a. Household livestock numbers over time to assess grazing sustainability and forage availability.
    b. Percentage of households engaging in additional income-generating activities (e.g., livestock product sales) to track economic resilience of pastoralist households.
    c. Access to water sources and seasonal water availability, measuring sustainability of rangelands for both livestock and people.
    d. Food security and nutrition indicators, evaluating how stable livestock numbers contribute to household well-being.

2. Grazing & Land Use Adaptation Indicators
    a. Household perceptions of RRG effectiveness, ensuring that grazing interventions maintain pasture health.
    b. Number of grazing blocks participating in planned rotations, reflecting adherence to sustainable land-use practices.
    c. Community compliance with rotational grazing plans, tracking the success of conservation strategies.

3. Social & Economic Well-being Indicators
    a. Community perceptions of improved governance, measuring the impact of strengthened grazing management institutions.
    b. Use of carbon revenue for education, healthcare, and drought relief, assessing the effectiveness of benefit-sharing mechanisms.
    c. Participation of women and marginalized groups in decision-making, ensuring inclusivity in conservation and grazing management efforts.

HCV 2: Amboseli Ecosystem for Wildlife Conservation and Tourism Income

This HCV represents the economic and ecological value of wildlife conservation and tourism for local communities. The project supports conservation-based livelihoods and tourism benefits. Monitoring indicators tracking the effectiveness of these interventions include:

1. Livelihood Resilience Indicators
    a. Percentage of households benefiting from tourism revenue streams linked to conservation incentives.
    b. Changes in household participation in community conservancies, indicating long-term commitment to wildlife-friendly land use.

2. Grazing & Land Use Adaptation Indicators
    a. Adoption of land-use zoning and grazing restrictions that support wildlife corridors and conservation tourism initiatives.
    b. Community compliance with sustainable land management practices, preventing habitat degradation.

3. Social & Economic Well-being Indicators
    a. Revenue from carbon credits or tourism partnerships used for community benefit projects (e.g., education, infrastructure, conservation incentives).
    b. Increased employment in tourism and conservation-related enterprises, reflecting the viability of conservation-linked income sources.

Community Data Collection & Analysis

To quantify the effectiveness of conservation measures supporting HCV 1 and HCV 2, the following methodologies will be used:

- Focus Groups: conducted every three years at the village level to capture longitudinal changes in well-being. Villages will be selected using proportional random sampling to ensure a representative understanding of adaptation outcomes. Discussions will be conducted in Kiswahili and facilitated through group ranch leadership.
- Socioeconomic Surveys: will include structured adaptation-related questions to assess how KRCP has improved community resilience to climate change. These surveys will be CAPI-based, conducted in Maasai, and facilitated by trained local community members.
- Livestock & Grazing Monitoring: grazing coordinators will conduct an annual livestock census across project sites to track changes in herd composition and survival rates under shifting climate conditions. Additionally, grazing committees will monitor how well-planned grazing rotations sustain pasture availability, contributing to climate adaptation efforts.

Community Feedback & Continuous Adaptation

To ensure that adaptation benefits are effectively tracked and incorporated into future project planning, the following measures will be taken:

- Weekly Reports: analysis of grazing and livestock movement reports will be shared with grazing coordinators and committees.
- Seasonal Feedback Meetings: KRCP monitoring teams will meet with grazing committees and coordinators twice a year to review data, discuss adaptation progress, and incorporate necessary adjustments to grazing plans.

- Annual Adaptation Review: socioeconomic data and grazing adaptation metrics will be analyzed at the end of the year to assess whether community adaptation goals are being met. The results will inform adaptive management strategies for future project goals.

By incorporating these adaptation-related indicators and monitoring methods, the community monitoring plan effectively tracks adaptation benefits and ensures that the KRCP project enhances resilience to climate change within participating communities.

4.4.2 Monitoring Plan Dissemination (CCB, CM4.3)

Summary results of the socio-economic monitoring plan are shared annually with grazing committees and group ranch leadership for discussion. This includes an analysis an overview of demographics, livestock ownership and sales, livestock movement patterns, visiting livestock numbers, and perceptions towards the community leadership on governance and the project. During the review workshops, attention will be made on ensuring for improvement of livelihoods and equal distribution of benefit share and/or any perceived governance issues.

Annual livestock numbers, weekly, seasonal and annual grazing reports will be discussed with the grazing committees. There will be an annual presentation and review of the grazing reports with the community leadership and other stakeholders such as government and NGOs.

4.5 Optional Criterion: Exceptional Community Benefits

The project proponent intends to achieve validation at the Gold Level for demonstrating Exceptional Community Benefits. Extensive investments in detailed socioeconomic surveys in partnership with Converge are testimony to the project's commitment to achieve Gold Level status.

4.5.1 Exceptional Community Criteria (CCB, GL2.1)

The pastoral communities in the project area own the carbon rights based on the constitution of Kenya. These pastoralists will be changing their herding behaviors to create a new system we are referring to as Rapid Rotational Grazing (RRG) practices that will largely remove livestock from continuous grazing in areas near settlements, thereby reducing grazing pressure on forage in these areas. This activity is what creates the carbon credits that accrue as carbon removals to the soil based on the VM0032 methodology.

Two key vulnerable and marginalized groups within these pastoral communities are women and the poorest 25%, who should benefit from this drastic reduction in grazing pressure. Furthermore, within the women demographic, widowed women are disproportionately marginalized. Women, together with their male children aged 8-12, typically are responsible for husbanding small livestock, mainly sheep and goats, to provide milk and meat for families. Women should benefit from longer-lasting green forage because it would drive more sustainable milk production and less time required for herding livestock long distances from the family boma to find suitable forage. These outcomes should provide more time for their children to attend school, and more time and resources (from selling milk) to

engage in alternative livelihoods, such as making crafts to sell through wildlife-based tourism, sewing, etc.

The poorest 25% of households may benefit for similar reasons, as they typically own less than 5 livestock and no cattle. In addition, carbon revenues from the project will likely be spent on community-wide infrastructure projects identified as priorities by each community, such as rainwater collection and storage, increasing access of the children of this group to schools and health care. In particular, carbon revenues may also increase outlays from bursaries, which support school fees and other needs for the poorest 25% in participating communities. The benefits of employment, cash revenues, and peace and security extend to all ethnic and socioeconomic groups.

Revenues are dispersed to communities on the basis of submitted proposals and awarded from the net revenues of the KRCP once carbon credits are sold and expenses covered. Net revenues from the project will not be dispersed based on number of livestock or area of village/grazing lands, but instead on the amount of viable rangeland habitat the community has entered into the carbon project, and the effectiveness of grazing plan implementation (based on grazing reports and satellite imagery assessment).

As discussed previously, these benefits help preserve a number of High Conservation Values in the project zone (Fig. 2.2):

1. Preservation of traditional lifestyles and cultures. The traditional pastoral lifestyle and migratory movements of pastoralists are increasingly threatened by privatization and further sedentarization. Villages that can develop restored rangelands, livestock production (rather than keeping) economies, and alternative livelihoods have the opportunity to preserve community-managed lands; and

2. Conservation of Imperiled species. The overall improvement of rangeland habitat will include a reduction in soil erosion and improved nutrient cycling along with increased moisture retention in soils all directly due to increases in soil carbon. These benefits to soils are anticipated to result in increased productivity in vegetation. Improved vegetation health is similarly expected to directly benefit the larger mammalian herbivores in the area (e.g., wildebeest, zebra, gerenuk, Thompson's and Grant's gazelles, giraffe and elephants) of which some are trigger species in the area. Improvements in mammalian herbivores – both small (e.g., rodents) and large, are also anticipated to have trophic benefits to predators in the project area, including several avian trigger species (e.g., raptors) and large carnivores (e.g., lions, wild dogs, striped hyaena, and even leopard and cheetah).

4.5.2 Short-term and Long-term Community Benefits (CCB, GL2.2)

The project will generate numerous community benefits, discussed at length in Sections 4.2.1, 4.2.3 and 4.2.4. Below, we categorize short-term and long-term benefits while also addressing potential negative impacts and net benefits.

Short-Term Community Benefits (First 5 Years)

- Improved Grass Production & Soil Health:

    - Rapid rotational grazing will enhance soil carbon levels, restoring perennial grass production and improving forage quality.
    - Healthier soils and grasses will lead to better water infiltration, increasing availability of underground and surface water for livestock and community use.
- Livestock Health & Productivity:
    - Increased forage availability supports larger and healthier livestock numbers, which directly improves income generation for Maasai households dependent on livestock sales.
    - Healthier livestock will fetch higher market prices, enhancing access to necessities such as food, education, and healthcare.
- Nutritional Improvements:
    - Milk and meat are the primary dietary staples for Maasai communities, providing essential nutrients such as vitamin A and iron. Improved forage increases milk yields, benefitting vulnerable populations (children and elders).
- Community Governance & Cultural Strengthening:
    - The project strengthens traditional Maasai governance structures related to grazing management, enhancing community cohesion and promoting rangeland conservation.

Long-Term Community Benefits (Beyond 5 Years)

- Livelihood Resilience & Poverty Reduction:
    - Pastoralists require a minimum TLU (Tropical Livestock Unit) of 10-15 per household to withstand economic shocks such as drought. Sustainable grazing ensures households maintain livestock above this welfare threshold, improving economic security.
- Land Conservation & Rangeland Connectivity:
    - The project maintains interconnected rangelands, fostering wildlife conservation and climate resilience by preventing land fragmentation and conversion to agriculture.
- Drought Resilience & Climate Adaptation:
    - Increased grass availability during drought periods will reduce livestock mortality and enable quicker ecosystem recovery, preventing long-term degradation.
- Carbon Revenue for Community Development:
    - The measured sequestration of soil carbon will generate carbon credit revenues, with 70% of profits distributed to the community under a mutually agreed benefit-sharing mechanism.

Potential Negative Impacts & Mitigation Measures

While the project is designed to provide net positive benefits, some short-term negative impacts may arise:

- Enforcement of Project Boundaries & Reduced Open Access to Grasslands:
    - Some neighboring pastoralists may face restricted grazing access due to grazing management plans.

    - Mitigation: Community-led agreements will ensure equitable access during extreme conditions, balancing carbon sequestration goals with customary shared grazing practices.
- Risk of Unequal Benefit Distribution:
    - Without proper governance, some households may benefit more than others based on herd size or land access.
    - Mitigation: The grazing committees and benefit-sharing framework will ensure equitable distribution, including targeted support for vulnerable groups (e.g., small livestock herders and women).
- Market Shock & Dependency on Livestock:
    - If demand for livestock fluctuates, household incomes could be impacted.
    - Mitigation: The project will explore diversification strategies, such as integrating livestock with conservation tourism revenue streams.

Net Positive Well-Being Impact

Despite these risks, the long-term gains significantly outweigh any short-term challenges, ensuring sustainable pastoral livelihoods, rangeland conservation, and economic resilience for Maasai communities.

4.5.3 Community Participation Risks (CCB, GL2.3)

Risks to community members participating in project activities are minimal compared to those under the baseline scenario and have been previously discussed in Section 4.2.2. The project has incorporated a participatory process for identifying and managing risks through community engagement meetings, which allow households to discuss potential risks associated with grazing management and migration, such as wildlife encounters, forage competition, and seasonal resource availability.

Community members play an active role in risk identification through stakeholder consultations and participatory planning processes, as detailed in Section 2.3.10. These meetings provide forums for individuals to express concerns, evaluate mitigation options, and participate in grazing plans. The participatory framework ensures that risks are acknowledged, discussed, and addressed collaboratively before project implementation. Supporting documentation on community engagement activities and risk discussions has been incorporated to demonstrate stakeholder involvement in risk assessment.

To mitigate risks associated with wildlife encounters, the project engages with NGOs and local wildlife monitoring organizations to provide real-time movement tracking of key species. This collaboration allows communities to make informed decisions about livestock movement and adopt safety measures that minimize human-wildlife conflict.

For risks related to project employment, such as those encountered by grazing coordinators, the project has established comprehensive training programs and standard operating procedures (SOPs) to ensure

safe working conditions. These risk mitigation strategies align with the measures addressed in Indicators G3.9 and G3.12 and are designed to minimize workplace hazards.

Additionally, risks for smallholders and women have been incorporated into the community monitoring plan described in Section 4.4.1, ensuring that these risks are continuously tracked and addressed. These updates ensure that risk mitigation strategies are effectively implemented and monitored over time.

4.5.4 Marginalized and/or Vulnerable Community Groups (CCB, GL2.4)

Community Group 1	Poorest 25% - People with Few or No Livestock
Net positive impacts	Households in this category may not directly benefit from increased livestock productivity. However, they will receive indirect benefits through revenue disbursement mechanisms (e.g., bursaries for school fees, healthcare subsidies, and emergency support). Additionally, the project's grazing management will reduce overgrazing near settlements, improving forage availability for those relying on small livestock (sheep and goats) for sustenance.
Benefit access	The revenue-sharing plan is structured to ensure equitable allocation of funds, with community-driven processes identifying and supporting vulnerable households. Grazing plans will prioritize accessible areas for those with fewer livestock, ensuring they maintain some level of livestock-related livelihood security.
Negative impacts	The primary risk to this group is exclusion from decision-making on revenue distribution and grazing management. To mitigate this, financial oversight will be conducted annually by SftFA to ensure revenues are used appropriately. Additionally, local leadership structures include representatives from vulnerable groups to ensure their needs are considered in community decisions. If revenue misallocation occurs, appropriate corrective actions will be taken, including withholding benefits from non-compliant communities.
Community Group 2	Female Headed Households and Women in General

Net positive impacts	Female-headed households often have fewer economic opportunities, as livestock sales are traditionally managed by men. However, these households benefit from milk and egg sales, which will improve due to increased livestock productivity. Increased forage availability near settlements will enhance women's ability to manage small-stock for household consumption and income generation. Additionally, increased financial stability through equitable revenue-sharing mechanisms will reduce economic burdens, especially concerning household essentials and education costs for children.
Benefit access	Women are actively integrated into decision-making processes related to grazing planning and benefit-sharing. Each community development application for revenue distribution must include the endorsement of both a woman representative and a youth representative to ensure funds support diverse community needs. Additionally, grazing plans incorporate areas for small-stock herding closer to settlements, facilitating milk production and sales.
Negative impacts	The primary challenge for this group is limited participation in traditional planning meetings, which are often male-dominated. To address this, the project actively works with local leadership to increase women's participation in governance structures. Specific women-led forums have been established to ensure their voices influence land-use planning and financial decisions. Additionally, revenue allocations directed toward education and healthcare are structured to alleviate financial burdens that disproportionately affect female-headed households.

4.5.5 Net Impacts on Women (CCB, GL2.5)

The project will generate net positive impacts on women by improving food security, economic opportunities, and participation in decision-making.

- Household Benefits: Women will experience direct household benefits through increased food security from greater availability of meat and milk and shorter travel distances to water sources (see Section 4.2.1).
- Economic Empowerment: Women, especially female-headed households, will benefit from increased cash income from livestock-related sales, particularly milk and eggs, which are primarily controlled by women. Additional revenues from carbon payments and community

benefit-sharing mechanisms will help fund local development priorities, including education, healthcare, and livelihood diversification, with mechanisms in place to ensure that women directly benefit.

- Participation in Decision-Making: Women are actively involved in community-led decision-making through their representation in grazing committees, project governance structures, and benefit-sharing mechanisms. Specifically, women's participation is ensured in FPIC processes, grazing plan development, and benefit allocation decisions (see Section 2.5.7).

Addressing Potential Negative Impacts

To ensure net positive outcomes, the project acknowledges potential challenges that may disproportionately affect women, such as exclusion from decision-making or unequal access to benefits. The project mitigates these risks by:

- Mandating female representation in all community benefit-sharing discussions and financial planning committees.
- Ensuring women's voices are considered by requiring endorsement from female representatives in all community development applications for benefit distribution.
- Monitoring gender-specific outcomes through household surveys and focus groups (see Section 4.4.1) to track improvements in women's well-being and adjust project interventions accordingly.

4.5.6 Benefit Sharing Mechanisms (CCB, GL2.6)

Benefit sharing is described in Section 2.5.8 above. Briefly, to ensure that community members understand the information communicated regarding project benefits, costs, and risks, the following verification methods are used:

- **Focus Groups & Household Surveys:** These surveys include comprehension questions to assess whether community members accurately understand the financial and environmental benefits, risks, and expectations of participation.
- **Feedback Mechanisms:** Community members have the opportunity to raise concerns or request clarifications during grazing planning meetings, focus group discussions, and periodic consultations with grazing coordinators.
- **Tracking Participation & Engagement:** Attendance at grazing planning meetings, training sessions, and decision-making forums is monitored to confirm that information dissemination reaches a broad audience, including women and vulnerable groups.
- **Community-Based Monitoring Reports:** Reports prepared by local grazing coordinators and community leaders summarize key community discussions and highlight any areas where further clarification or additional outreach is needed.

4.5.7 Benefits, Costs, and Risks Communication (VCS, 3.18; CCB, GL2.7)

The project ensures that relevant and adequate information about predicted and actual benefits, costs, and risks is actively communicated to smallholders and community members through multiple channels (see Sections 2.3.4 and 2.3.10). This includes:

- **Community Meetings & Grazing Planning Discussions:** These meetings provide a platform for discussing key project aspects, including costs, benefits, and risks associated with grazing management. These meetings are documented and attendance records demonstrate community engagement.
- **Annual Reports & Periodic Updates:** An annual report summarizing project performance, benefit-sharing distributions, grazing management successes, and challenges will be distributed to all participating communities through established local governance structures.
- **Dedicated Training Sessions:** Community members, including women and youth, receive trainings on grazing planning, financial literacy, and benefit-sharing processes to ensure they are informed about the implications of project participation.
- **Household & Focus Group Surveys:** Conducted at regular intervals, these surveys assess awareness and understanding of project benefits, costs, and risks among different community demographics.
- **Women's Participation in Decision-Making:** Women are actively encouraged to participate in grazing planning and revenue-sharing meetings and their representation in decision-making structures is monitored. The project prioritizes gender-inclusive training for all herders, including women and youth, to enhance engagement in grazing planning and management.

4.5.8 Governance and Implementation Structures (CCB, GL2.8)

The initial PAIs are registered communities or legal entities that all represent self-governance structures used for aggregation of smallholders/community members. These governance structures hold the legal right to manage grazing and the carbon rights, and their participation in the project unfolds in a participatory, transparent FPIC process. These communities operate under a quasi-traditional hierarchical structure that facilitates communication, collaboration, and decision-making. For implementation, each initial PAI community has a preexisting internal structure called a Grazing Committee. Grazing Committees ultimately decide on the behalf of the communities they represent how many, or what type, and where livestock will graze on the project area, are informed by assessments conducted by herders. These committees will also be supported by grazing coordinators and the KRCP monitoring team that will review the guidelines for rapid rotational grazing. Regional grazing plans will be communicated by Grazing Committees to the Herders and Livestock Owners at seasonal and annual review meetings. Any changes or concerns will be communicated, captured and addressed during weekly engagements with grazing coordinators and community liaison officers, and if necessary, the KRCP Advisory Council/other related group.

4.5.9 Smallholders/Community Members Capacity Development (CCB, GL2.9)

The project actively builds the capacity of smallholders, community members, and relevant local organizations to effectively participate in project design, implementation, and management through structured training programs, employment opportunities, and participatory governance mechanisms.

Training & Employment of Community Members

One of the core ways the project develops community capacity is through the direct employment and training of local members. Community members have been hired and trained as grazing coordinators and monitoring staff, equipping them with critical skills for implementing and sustaining rotational grazing systems, tracking environmental changes, and reporting key data. These individuals receive training in grazing management, data collection, conflict resolution, and adaptive land-use planning, thereby increasing their technical expertise and ability to lead local conservation efforts.

Community Participation in Governance and Decision-Making

The project also strengthens local governance structures by engaging community members in grazing committees, land management groups, and benefit-sharing committees. These participatory bodies ensure that local stakeholders are actively involved in planning and decision-making.

Additionally, traditional governance structures, such as the group ranch committees, are integrated into project governance, leveraging their existing authority and knowledge in land and livestock management. This approach fosters community ownership and long-term project sustainability.

Capacity Building Through Knowledge Sharing & Workshops

The project organizes workshops and knowledge-sharing sessions to enhance the capacity of local organizations and institutions, particularly in areas related to:

- Sustainable rangeland management
- Climate adaptation strategies
- Financial planning for benefit distribution
- Conflict mitigation and resolution

These sessions empower local leaders and institutions to actively participate in project implementation, ensuring the integration of both traditional knowledge and scientific best practices.

Integration with Existing Institutional Structures

The project aligns with local county governments and conservancy organizations to ensure that capacity development efforts are reinforced at an institutional level. This alignment strengthens the role of local organizations in sustainable land-use planning, natural resource management, and climate resilience efforts.

Demonstrating Effective Participation in Project Management

The combined impact of hiring and training local staff, integrating community members into governance structures, and aligning with institutional frameworks ensures that smallholders, community members, and local organizations are not just passive beneficiaries but active participants in project management and decision-making.

This participatory approach directly supports the project's long-term success, ensuring that knowledge, skills, and governance mechanisms remain embedded within the community beyond the project's lifespan.

5 BIODIVERSITY

5.1 Without-Project Biodiversity Scenario

5.1.1 Existing Conditions (VCS, 3.19; CCB, B1.1)

The rangelands of Kajiado County are centrally located between some of East Africa's most iconic national parks and protected areas, from Tanzania's Serengeti National Park in the west to Kenya's Tsavo National Park in the east. The Kajiado plains currently serve as a connecting link for iconic migratory herbivore species such as African savanna elephant (*Loxodonta Africana*; hereafter elephant), Masai giraffe (*Giraffa tippelkirschii*; hereafter giraffe), wildebeest, and zebra. Though rare, large carnivore species occur here as well – lion, leopard, cheetah, wild dog, spotted hyena, and striped hyena. The project area borders Amboseli National Park, which is an internationally renowned biodiversity hotspot for mammals and birds. Hundreds of bird species occur in the project area as well.

Biodiversity Baseline Report

During baseline biodiversity surveys in April-May 2023, 17 wild mammal species and 202 bird species were observed, including nine threatened species listed as *Vulnerable, Endangered, or Critically Endangered* under the International Union for the Conservation of Nature (IUCN) Red List. A detailed summary of these baseline vegetation and wildlife surveys is provided in the KRCP Project Baseline Biodiversity Monitoring Report (April 26, 2024), which has been submitted under separate cover.

Threats to Biodiversity

The primary threats to biodiversity within the project zone and Kajiado County as a whole include:

- Land-use change from traditional pastoralism to sedentary agro-pastoralism, leading to habitat loss and fragmentation.
- Human-wildlife conflict, particularly around Amboseli National Park, where stable wildlife populations coexist with growing human settlements.
- Overgrazing and vegetation degradation, which contribute to declines in soil and rangeland health, reducing habitat quality for wildlife.
- Poaching and illegal hunting, affecting species such as African elephants and large carnivores.

These threats were confirmed through stakeholder interviews and are further detailed in supporting documentation (e.g., Baseline Biodiversity Monitoring Report and Kenya Wildlife Service National Wildlife Census).

Table 5-1 summarizes available information about trigger and high conservation value species in the project zone, both confirmed and potential. We highlight the nine species that were detected in the

surveys that are threatened, as well as 16 additional threatened species that are potentially in the project area but were not observed during the baseline surveys. The threatened species that were sighted include two mammals, African savanna elephant and Masai giraffe; and seven birds – 1) Bateleur (*Terathopius ecaudatus*), 2) Lappet-faced Vulture (*Torgos tracheliotos*), 3) Martial Eagle (*Polemaetus bellicosus*), 4) Ruppell's Vulture (*Gyps rueppellii*), 5) Secretarybird (*Sagittarius serpentarius*), 6) Tawny Eagle (*Aquila rapax*), and 7) White-backed Vulture (*Gyps africanus*). In addition to these nine threatened species we encountered, we include an additional 16 threatened species – many with declining population trends – that potentially occur based on our review of available species accounts, government wildlife census data, and scientific literature. The key data sources used to determine population status and trends of the threatened species in Table 5-1 were the Kenya Wildlife Service national wildlife census[207] (for most mammals), the IUCN Red List[208] (for several mammal species not covered by the national wildlife census), and the BirdLife International Datazone[209] (for birds).

Healthy rangelands – soil, vegetation, and the supported food web – are thus essential to the large migratory herbivore species and a host of other large carnivore species that depend on them, such as lion, leopard cheetah, wild dog, and both striped and spotted hyaena[210]. Declining rangeland health and continued conversion to other land uses are causing fragmentation of large habitat blocks, and crucially, increasing the risk that wildlife populations will become isolated in protected areas, cut off from genetic diversity, and thus even more vulnerable to local extirpation[211,212]. An example of a species that is isolated to nearby "islands" of isolated protected areas amid a landscape of degraded or converted rangelands is the eastern black rhino[213], which is present in Serengeti National Park to the southwest of the project area, and in Chyulu Hills National Park, east of the project area, but not in the project area or other unprotected areas nearby.

The project zone, and Kajiado County as a whole, has been subject to a wider phenomenon of wildlife declines across Kenya, both inside and outside protected areas, in the second half of the 1900s and

[207] John Waweru et al., "National Wildlife Census 2021 Report (Abridged)" (Wildlife Research and Training Institute (WRTI) and Kenya Wildlife Service (KWS), July 2021), https://kws.go.ke/content/national-wildlife-census-2021-report.
[208] IUCN, "The IUCN Red List of Threatened Species. Version 2024-1.," 2024, https://www.iucnredlist.org.
[209] BirdLife International 2024, "IUCN Red List for Birds. Downloaded from Https://Datazone.Birdlife.Org on 07/03/2024.," n.d.
[210] Timothy H. Tear et al., "Savanna Fire Management Can Generate Enough Carbon Revenue to Help Restore Africa's Rangelands and Fill Protected Area Funding Gaps," *One Earth* 4, no. 12 (December 2021): 1776–91, https://doi.org/10.1016/j.oneear.2021.11.013.
[211] BurnSilver, Worden, and Boone, "Processes of Fragmentation in the Amboseli Ecosystem, Southern Kajiado District, Kenya."
[212] Western, Groom, and Worden, "The Impact of Subdivision and Sedentarization of Pastoral Lands on Wildlife in an African Savanna Ecosystem."
[213] Yoshan Moodley et al., "Extinctions, Genetic Erosion and Conservation Options for the Black Rhinoceros (Diceros Bicornis)," *Scientific Reports* 7, no. 1 (February 8, 2017): 41417, https://doi.org/10.1038/srep41417.

the early 2000s[214,215,216]. The causes of these declining population trends for many of Kenya's most iconic and economically important species are complex and a matter of some debate among scientists. There is general agreement that human and livestock population growth – with an attendant large-scale shift in land use from traditional pastoralism to more intensive, sedentary agro-pastoralism across much of the rangelands – has played an outsized role in causing increased habitat loss, fragmentation, and human-wildlife conflict[217,218]. Amboseli National Park, adjacent to the project area in the southeast, is one bright spot where wildlife population trends have been stable since the 1970s, and even positive for elephant and giraffe[219]. In recent decades, Kenya's elephant and giraffe populations have rebounded somewhat from the steeply negative population trends that lasted from the 1970s to the late 1980s for elephants[220] and from the 1970s to the early 2010s for giraffe[221] (see Section 5.5.2 for more details on elephant and giraffe population status and trends in Kenya).

[214] Western, Russell, and Cuthill, "The Status of Wildlife in Protected Areas Compared to Non-Protected Areas of Kenya."
[215] Joseph O. Ogutu et al., "Herbivore Dynamics and Range Contraction in Kajiado County Kenya: Climate and Land Use Changes, Population Pressures, Governance, Policy and Human-Wildlife Conflicts," *The Open Ecology Journal* 7, no. 1 (June 13, 2014): 9–31, https://doi.org/10.2174/1874213001407010009.
[216] Ogutu et al., "Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya."
[217] Michael Norton-Griffiths and Mohammed Y. Said, "The Future for Wildlife on Kenya's Rangelands," in *Chapter 14 in Wild Rangelands: Conserving Wildlife While Maintaining Livestock in Semi-Arid Ecosystems, Edited by Johan T. Du Toit, Richard Kock, and James C. Deutsch*, Conservation Science and Practice 6 (Chichester, West Sussex, UK: Wiley-Blackwell, 2010), 424 p.
[218] Ogutu et al., "Herbivore Dynamics and Range Contraction in Kajiado County Kenya."
[219] David Western and Victor N Mose, "Bucking the Dismal Decline in Wildlife: Amboseli Numbers Are Going Up" (African Conservation Centre-Amboseli Conservation Program, 2020).
[220] Joseph M. Mukeka et al., "Long-Term Trends in Elephant Mortality and Their Causes in Kenya," *Frontiers in Conservation Science* 3 (September 9, 2022): 975682, https://doi.org/10.3389/fcosc.2022.975682.
[221] M Muruana et al., "Country Profile: A Rapid Assessment of the Giraffe Conservation Status in Kenya" (Giraffe Conservation Foundation, Windhoek, Namibia, March 2021), https://giraffeconservation.org/wp-content/uploads/2021/04/Kenya-Country-Profile-2021.pdf.

Table 5-1: Status and trends of potential trigger and high conservation value species for the Kajiado Rangeland Carbon Project. For each species, we provide the IUCN Red List status (CR=critically endangered, EN=endangered, VU=vulnerable), the number of individuals observed during baseline monitoring in April-May 2023 ("N Obs"), presence in the project area (detected = observed in baseline surveys [depicted in bold text], likely = not detected but likely occur in the project area based on literature review, unlikely = not detected and unlikely to occur in the project area instances but expected in the project zone), and the best available population estimate (within Kenya when available, otherwise global).

Common Name	Scientific Name	IUCN	Presence	N Obs	Population Estimate	Pop. Trend	Source
African Lion	*Panthera leo*	VU	Likely	0	2,489 ind. in Kenya	Stable	Waweru et al. (2021)
African Savanna Elephant	***Loxodonta africana***	**EN**	**Detected**	**1**	**36,280 ind. in Kenya**	**Increasing**	**Waweru et al. (2021)**
African Wild Dog	*Lycaon pictus*	EN	Likely	0	865 ind. in Kenya	Decreasing	Waweru et al. (2021)
Basra Reed Warbler	*Acrocephalus griseldis*	EN	Likely	0	1,500-7000 mature ind.	Stable	BirdLife Int'l (2024)
Bateleur	***Terathopius ecaudatus***	**EN**	**Detected**	**2**	**Unknown**	**Decreasing**	**BirdLife Int'l (2024)**
Fringe-eared Oryx	*Oryx beisa callotis*	VU	Likely	0	3,000-4,000 ind.	Decreasing	IUCN Red List (2024)
Cheetah	*Acinonyx jubatus*	VU	Likely	0	1,160 ind. in Kenya	Decreasing	Waweru et al. (2021)
Imperial Eagle	*Aquila heliaca*	VU	Likely	0	2,500-9,999 mature ind.	Decreasing	BirdLife Int'l (2024)

Common Name	Scientific Name	IUCN	Presence	N Obs	Population Estimate	Pop. Trend	Source
Egyptian Vulture	*Neophron percnopterus*	EN	Likely	0	18,600-54,000 ind.	Decreasing	BirdLife Int'l (2024)
Gray Crowned-Crane	*Balearica regulorum*	EN	Likely	0	17,700-22,300 ind.	Decreasing	BirdLife Int'l (2024)
Hippopotamus	*Hippopotamus amphibius*	VU	Unlikely	0	5,000-7,000 ind. in Kenya	Stable	Waweru et al. (2021)
Hooded Vulture	*Necrosyrtes monachus*	CR	Likely	0	197,000 ind.	Decreasing	BirdLife Int'l (2024)
Lappet-faced Vulture	***Torgos tracheliotos***	**EN**	**Detected**	**11**	**≥8,000 ind.**	**Decreasing**	**BirdLife Int'l (2024)**
Leopard	*Panthera pardus*	VU	Likely	0	Unknown	Decreasing	IUCN Red List (2024)
Masai Giraffe	***Giraffa tippelskirchi***	**EN**	**Detected**	**110**	**15,790 ind. in Kenya**	**Stable**	**Waweru et al. (2021)**
Maccoa Duck	*Oxyura maccoa*	EN	Unlikely	0	<50 ind. in Kenya	Decreasing	BirdLife Int'l (2024)
Malagasy Pond-Heron	*Ardeola idae*	EN	Unlikely	0	1,300-4,000 mature ind.	Decreasing	BirdLife Int'l (2024)
Martial Eagle	***Polemaetus bellicosus***	**EN**	**Detected**	**3**	**Unknown**	**Decreasing**	**BirdLife Int'l (2024)**
Rüppell's Vulture	***Gyps rueppellii***	**CR**	**Detected**	**29**	**22,000 mature ind.**	**Decreasing**	**BirdLife Int'l (2024)**

Common Name	Scientific Name	IUCN	Presence	N Obs	Population Estimate	Pop. Trend	Source
Scissor-tailed Kite	*Chelictinia riocourii*	VU	Likely	0	30,000-67,000 mature ind.	Decreasing	BirdLife Int'l (2024)
Secretarybird	***Sagittarius serpentarius***	**EN**	**Detected**	**3**	**<10,000 ind.**	**Decreasing**	**BirdLife Int'l (2024)**
Sooty Falcon	*Falco concolor*	VU	Likely	0	2,800-4,000 mature ind	Decreasing	BirdLife Int'l Datazone (2024)
Southern Ground-Hornbill	*Bucorvus leadbeateri*	VU	Likely	0	Unknown	Decreasing	BirdLife Int'l (2024)
Steppe Eagle	*Aquila nipalensis*	EN	Likely	0	<37,000 pairs	Decreasing	BirdLife Int'l (2024)
Tawny Eagle	***Aquila rapax***	**VU**	**Detected**	**25**	**73,860 pairs in Africa**	**Decreasing**	**BirdLife Int'l (2024)**
Temminck's Pangolin	*Smutsia temminckii*	VU	Likely	0	Unknown	Decreasing	IUCN Red List (2024)
White-backed Vulture	***Gyps africanus***	**CR**	**Detected**	**39**	**Unknown**	**Decreasing**	**BirdLife Int'l (2024)**
White-headed Vulture	*Trigonoceps occipitalis*	CR	Likely	0	5,500 ind.	Decreasing	BirdLife Int'l (2024)

African Lion – forest, savanna, shrubland, grassland, desert	The project will actively restore savanna and grassland vegetative condition. Forest, shrubland, and desert habitats are not part of the project area but some are located adjacent. Grassland restoration will make it highly unlikely herders will be incentivized to bring livestock to forest reserves for dry season forage, thus reducing impacts.
African Savanna Elephant – forest, savanna, shrubland, grassland, wetlands (inland), desert	The project promotes habitat restoration in savanna and grassland ecosystems, improving forage availability and reducing human-wildlife conflict. Wetlands, forests, and deserts are outside of the project scope, ensuring no negative impact on these areas.
African Wild Dog – forest, savanna, shrubland, grassland, desert	By restoring savanna and grassland habitats and reducing habitat degradation from overgrazing, the project supports prey populations critical to African wild dogs. Habitat fragmentation will not be exacerbated.
Basra Reed-Warbler – savanna, shrubland, wetlands (inland), artificial/aquatic & marine	This project does not impact wetlands or artificial water bodies and improvements to savanna and shrubland habitat quality will support potential stopover and breeding sites.
Bateleur – forest, savanna, shrubland, grassland	Restoration of savanna and grassland will enhance prey availability for Bateleurs. Forest habitats are outside the project scope, ensuring no disturbance to nesting areas.
Fringe-Eared Oryx – savanna, shrubland, grassland	Habitat degradation from overgrazing is a primary threat; the project will enhance savanna and grassland quality, supporting forage availability and population connectivity.
Cheetah – savanna, shrubland, grassland, desert	The project restores prey-rich ecosystems in savannas and grasslands, reducing human-wildlife conflict and maintaining connectivity between hunting and breeding grounds.
Imperial Eagle – forest, shrubland, grassland, wetlands (inland), artificial/terrestrial	The project does not affect forest or wetland habitats and restoration efforts in grasslands and shrublands will ensure prey availability without disrupting migration corridors.

Egyptian Vulture – savanna, shrubland, grassland, wetlands (inland), rocky areas (e.g. inland cliffs, mountain peaks), desert, artificial/terrestrial	Savanna and grassland restoration will increase carrion availability without impacting roosting or breeding sites in rocky areas and wetlands.
Grey Crowned-Crane – forest, savanna, grassland, wetlands (inland), artificial/terrestrial, artificial/aquatic & marine	No wetlands or aquatic habitats will be affected, and savanna and grassland restoration may enhance foraging areas near existing crane habitat.
Hooded Vulture – forest, savanna, grassland, wetlands (inland), desert, artificial/terrestrial	Restored savanna and grassland will improve carrion availability. Forest, wetland, and desert ecosystems will remain undisturbed.
Lappet-faced Vulture – forest, savanna, shrubland, grassland, desert	By restoring savanna and shrubland, the project will improve habitat quality and carrion availability without affecting forest and desert roosting areas.
Leopard – forest, savanna, grassland, rocky areas (e.g. inland cliffs, mountain peaks), desert, artificial/terrestrial	Savanna and grassland restoration will maintain prey populations and connectivity, reducing potential human-wildlife conflict and habitat fragmentation.
Masai Giraffe – forest, savanna, shrubland	The project will enhance forage availability in savanna and shrubland, improving habitat connectivity while ensuring forested areas remain undisturbed.
Martial Eagle – forest, savanna, shrubland, wetlands (inland)	Habitat restoration in savanna and shrubland will maintain prey populations, while wetlands and forests remain unaffected by project activities.
Rüppell's Griffon – savanna, shrubland, grassland, rocky areas (e.g. inland cliffs, mountain peaks), desert	Restoration of savanna and grassland will increase food availability without disturbing critical roosting sites in rocky and desert habitats.
Scissor-tailed Kite – forest, savanna, shrubland, grassland, wetlands (inland), desert	The project supports savanna and grassland health, ensuring no disruption to wetlands, forests, or desert nesting areas.
Secretarybird – savanna, shrubland, grassland, artificial/terrestrial	Habitat restoration efforts will improve open foraging areas and prey populations without interfering with breeding or nesting sites.

Sooty Falcon – forest, savanna, shrubland, rocky areas (e.g. inland cliffs, mountain peaks), desert, marine coastal/supratidal	No impacts on rocky or marine coastal habitats, and savanna restoration will not affect prey availability or migration routes.
Southern Ground-Hornbill – forest, savanna, shrubland, grassland, wetlands (inland), artificial/terrestrial	The project enhances savanna and grassland conditions while leaving wetland and forest nesting habitats undisturbed.
Steppe Eagle – forest, savanna, rocky areas (e.g. inland cliffs, mountain peaks), desert	Savanna restoration will increase prey availability, while rocky and desert habitats remain undisturbed.
Taita Falcon – forest, savanna, shrubland, rocky areas (e.g. inland cliffs, mountain peaks), artificial/terrestrial	No disturbances to rocky habitats; savanna and shrubland restoration will not interfere with prey or breeding areas.
Tawny Eagle – forest, savanna, shrubland, grassland, artificial/terrestrial	The project enhances prey abundance in savanna and shrubland, while forest and artificial habitats remain unaffected.
Temminck's Pangolin – forest, savanna, grassland	Improved savanna and grassland conditions will support insect prey populations without affecting forest habitat.
White-backed Vulture – forest, savanna, shrubland, grassland, desert, artificial/terrestrial	The project will increase carrion availability in savanna and shrubland, ensuring no negative impact on breeding or roosting sites.
White-headed Vulture – forest, savanna, shrubland, grassland, artificial/terrestrial	The restoration of savanna and shrubland ensures ample carrion availability while avoiding disturbances to roosting areas.
Wildlife Corridor – Kilimanjaro to Amboseli	The project will not negatively impact this important wildlife corridor, and will actively restore perennial vegetation and make habitat conversion and fragmentation less likely.
Wildlife Corridor – Ngorongoro to Arusha	The project will not negatively impact this important wildlife corridor, and will actively restore perennial vegetation and make habitat conversion and fragmentation less likely.

5.1.2 High Conservation Values (CCB, B1.2)

High conservation value	Amboseli National Park

Qualifying attribute	A 39,206-ha protected area in Kajiado County that borders the project area in the southeast. Significant concentrations of threatened species occur in Amboseli, including African lion, African savanna elephant, Masai giraffe, hippopotamus, Southern Ground-Hornbill, and Gray Crowned-Crane.
Focal area	The biodiversity of the project area is closely linked with this protected area due to free-ranging wildlife movements across its boundaries. Wildlife corridors within the project area facilitate this connectivity. The project activities aim to restore perennial grasses on rangelands, increasing forage for herbivores and strengthening wild food webs, thus maintaining or enhancing this HCV.
High conservation value	Chyulu Hills National Park
Qualifying attribute	A 74,100-ha protected area in Makueni County, Kenya, bordering the project area to the east. Significant concentrations of a number of threatened species occur in Chyulu Hills, including eastern black rhino (*Diceros bicornis michaeli*), African lion, African savanna elephant, and Masai giraffe.
Focal area	The biodiversity of the project area is closely linked with the biodiversity of this protected area by the movements of wildlife freely across protected area boundaries. Extensive wildlife corridors link protected areas across the project area. The project activities are expected to restore perennial grasses on rangelands, increasing forage for herbivores and strengthening wild food webs, thus maintaining or enhancing this biodiversity HCV.
High conservation value	Kilimanjaro National Park (Tanzania)
Qualifying attribute	A 168,800-ha protected area in Kiliamjaro Region, Tanzania, near the project to the southeast, across the international border. The national park, administered by the Tanzanian National Parks Authority, is home to Africa's highest peak and is a UNESCO World Heritage Site. Significant

	concentrations of a number of threatened species occur here, including African savanna elephant and leopard, and a number of endemic species are present in its montane forests and above timberline in its alpine environments.
Focal area	The biodiversity of the project area is closely linked with the biodiversity of this protected area by the movements of wildlife freely across protected area boundaries. Extensive wildlife corridors link protected areas across the project area. The project activities are expected to restore perennial grasses on rangelands, increasing forage for herbivores and strengthening wild food webs, thus maintaining or enhancing this biodiversity HCV.
High conservation value	Namanga Hills Forest Reserve
Qualifying attribute	A 11,800-ha protected area home to montane forests on the slopes of Ol Doinyo Orok, a 2,548-m peak. The area has had documented occurrences of rare, threatened, and endangered raptors, leopards, and occasional migrating elephants.
Focal area	The biodiversity of the project area is closely linked with the biodiversity of this protected area by the movements of wildlife freely across protected area boundaries. Extensive wildlife corridors link protected areas across the project area. The project activities are expected to restore perennial grasses on rangelands, increasing forage for herbivores and strengthening wild food webs, thus maintaining or enhancing this biodiversity HCV.
High conservation value	Enduimet Wildlife Management Area (Tanzania)
Qualifying attribute	A 75,200-ha protected area directly across the Kenya-Tanzania border from the project area, just west of Kilimanjaro National Park. Home to elephant, giraffe, leopard, and many migratory herbivore species.
Focal area	The biodiversity of the project area is closely linked with the biodiversity of this protected area by the

	movements of wildlife freely across protected area boundaries. Extensive wildlife corridors link protected areas across the project area. The project activities are expected to restore perennial grasses on rangelands, increasing forage for herbivores and strengthening wild food webs, thus maintaining or enhancing this biodiversity HCV.
High conservation value	Lake Natron Game Controlled Area (Tanzania)
Qualifying attribute	A 300,000-ha protected area directly across the Kenya-Tanzania border from the western portion of the project area, in the central Great Rift Valley. The protected area is home to Lake Natron, the most important breeding site for Lesser Flamingos (*Phoeniconaias minor*) and thus a home to a significant concentration of this IUCN Near Threatened bird species. Recognized under Ramsar, the international convention on wetlands, the Natron Basin is a Ramsar Site as a Wetland of International Importance
Focal area	To support this critical waterbird HCV, the project will: • Maintain sustainable rangeland practices to reduce sedimentation and nutrient loading into Lake Natron, which can disrupt Lesser Flamingo breeding. • Coordinate with conservation organizations to monitor and mitigate human disturbance to flamingo nesting sites. • Ensure controlled grazing near wetland areas to minimize vegetation degradation and disturbance to waterbirds.
High conservation value	Kwenia Important Bird Area/Key Biodiversity Area (KBA)
Qualifying attribute	Rocky escarpments at Kwenia are important breeding grounds for Rüppell's Vulture (*Gyps rueppellii*; IUCN CR), making this site a significant concentration of this critically endangered bird species.

Focal area	The project supports vulture conservation through: • Collaborating with conservation organizations such as Lion Guardians, Peregrine Fund, and Kwenia Conservancy to address major vulture threats, including poisoning and habitat loss. • Protecting nesting sites by reducing disturbance and working with local herders to prevent conflicts leading to vulture declines (See Section 5.4.1 for more details).
High conservation value	Lake Magadi Key Biodiversity Area
Qualifying attribute	Lake Magadi lies north of Lake Natron along the Great Rift Valley and is surrounded by the project area on all sides. Magadi is an important feeding area for Lesser Flamingo and is rarely a breeding site. It also hosts other waterbirds.
Focal area	The project will enhance habitat conditions for waterbirds by: • Managing rangeland practices to reduce erosion and prevent excess nutrient loading, which can degrade water quality and food resources for flamingos. • Preventing livestock encroachment into sensitive wetland areas through strategic grazing plans. • Supporting wetland monitoring programs in collaboration with conservation agencies.
High conservation value	South Nguruman Key Biodiversity Area
Qualifying attribute	This KBA is home to several endemic bird species only found in southern Kenya and northern Tanzania – Hunter's Cisticola (*Cicsticola hunter*), Jackson's Widowbird (*Euplectes jacksoni*), Red-throated Tit (*Parus fringillinus*), and Grey-crested Helmetshrike (*Prionops poliolophus*)
Focal area	The project will ensure continued viability of bird populations by:

	• Protecting key grassland and shrubland habitats used by endemic bird species through controlled grazing. • Avoiding habitat fragmentation that could disrupt nesting and foraging patterns. • Engaging with ornithologists and conservation partners to monitor and mitigate potential threats.
High conservation value	Wildlife Corridors
Qualifying attribute	The project area contains critical wildlife corridors connecting Amboseli, Chyulu Hills, Enduimet, and Kilimanjaro, allowing for the seasonal movement of large herbivores such as elephants and giraffes.
Focal area	The project actively manages and protects wildlife corridors by: • Preventing land fragmentation through community-driven conservation easements. • Supporting rangeland restoration to improve forage availability for migrating species. • Implementing participatory monitoring to track wildlife movement and habitat use.
High conservation value	Ecosystem Classification
Qualifying attribute	The project zone consists of arid to semi-arid savanna grasslands, which have been identified as increasingly vulnerable due to climate change and land-use pressures.
Focal area	While not currently classified as a threatened ecosystem, the project recognizes ongoing threats and actively works to mitigate degradation. The PD will continue assessing whether the savanna ecosystem should be designated as a threatened habitat based on emerging scientific data.

5.1.3 Without-project Scenario: Biodiversity (CCB, B1.3)

In the absence of the KRCP, the land use scenario is a continuation of recent historical continuous grazing and intensification of agro-pastoralism (see Section 2.2.1). Continuing this land use scenario will cause further degradation of vegetative condition in the Kajiado rangelands, leading to continued negative effects on biodiversity. It is also likely that rangelands will remain in their baseline degraded state and support few wildlife populations outside protected areas.

Large Mammals & Carnivores: Continued poor forage conditions will leave populations of endangered species critically small outside protected areas, slowing gene flow and threatening the genetic integrity of large herbivores and carnivores that use the project area (elephant, giraffe, wildebeest, zebra, lion, cheetah, leopard, wild dog, spotted hyaena). Degraded habitat outside protected areas can also increase grazing pressure on forage production and water resources inside protected areas, threatening their ability to act as refuges and population sources for these trigger species[222]. Small mammals that rely on rangeland forage and take refuge from predation in tall vegetation are also expected to decline with further rangeland vegetation decline.

Avian Species: The decline in rangeland condition also affects bird populations, particularly grassland-dependent taxa (such as granivorous birds, weavers, and Eastern Chanting Goshawk) and wetland-dependent taxa. Lesser Flamingos (*Phoeniconaias minor*), which rely on the Lake Magadi and Lake Natron wetlands, face increased siltation, water quality degradation, and habitat disturbance due to expanded human activity in the absence of sustainable rangeland management. Similarly, critically endangered vulture species such as Rüppell's Vulture (*Gyps rueppellii*) and White-backed Vulture (*Gyps africanus*) face increased poisoning threats as human-wildlife conflict escalates[221]. Retaliatory poisoning of predators using agrochemicals readily available in local stores has resulted in catastrophic vulture population declines. A single poisoning event can kill hundreds of adult vultures, which severely impacts breeding success and threatens overall population viability[222,223].

Invertebrates & Ecosystem Processes: Degradation of perennial grasses and loss of native vegetation cover disrupts the invertebrate communities that play critical roles in ecosystem function. Grasshoppers, dung beetles, and soil arthropods, which contribute to nutrient cycling, seed dispersal, and organic matter decomposition, decline as plant diversity is lost and soil structure deteriorates. These changes reduce soil fertility and exacerbate soil erosion, further impairing habitat quality for both invertebrate and vertebrate species. Insectivorous birds and small mammals also face declining abundance with decreases in the availability of insect prey.

Human-Wildlife Conflict & Biodiversity Declines: As human populations grow in the project zone, human-wildlife conflict is expected to increase, particularly involving large carnivores. Lions, for example, are known to occasionally take livestock, particularly as food sources dwindle – in part the result of decreasing rangeland quality. Retaliatory killing of lions using poison readily available in local stores has resulted in not only the loss of lions, but of other scavengers that feed on poisoned livestock carcasses[223] such as hyenas, jackals, and vultures. Currently there are notable conservation efforts by

[222] Michiel P. Veldhuis et al., "Cross-Boundary Human Impacts Compromise the Serengeti-Mara Ecosystem," *Science* 363, no. 6434 (March 29, 2019): 1424–28, https://doi.org/10.1126/science.aav0564.
[223] Didarali et al., "Awareness of Environmental Legislation as a Deterrent for Wildlife Crime."

organizations committed to addressing this threat in the project area and across the larger region (e.g., Kenya Wildlife Service, Peregrine Fund, Kenya Bird of Prey Trust), but so far the declining population trends have not reversed. The lack of coordinated conservation action outside protected areas further accelerates biodiversity loss, particularly for species that require large, connected landscapes to maintain viable populations.

5.2 Net Positive Biodiversity Impacts

5.2.1 Expected Biodiversity Changes (VCS, 3.19; CCB, B2.1)

Biodiversity element 1	Trigger Species - Vulture Abundance
Estimated change	Reverse declining trends and achieve stable to increasing population numbers.
Impact characterization	Predicted, positive, direct impact.
Justification of change	By increasing rangeland health and mammal density, there should be more carcasses for vultures to feed on. Additionally, partner organizations (Lion Guardians, Peregrine Fund, and Kwenia Conservancy) address the key sources of vulture declines, such as poisoning, habitat loss, and human-wildlife conflict. Because these combined efforts directly address limiting resources for and threats to vultures, we expect the project to directly reduce mortality rates and stabilize vulture populations. See Section 5.4.1 for more details.
Biodiversity element 2	Trigger Species – Elephant and Giraffe Abundance
Estimated change	Stable to Increasing populations.
Impact characterization	Predicted, positive, direct impact.
Justification of change	Improved rangeland health and strengthened wildlife corridors within the KRCP area should help sustain current stable trends in the short term and promote long-term population growth. Project activities will reduce habitat fragmentation and enhance forage availability, directly supporting elephant and giraffe movement and reproduction. See Section 5.4.1 for further discussion.
Biodiversity element 3	Rangeland Health – Vegetation Cover, Basal Gaps, and Evidence of Erosion

Estimated change	Increased vegetation cover, reduced basal gaps, and decreased erosion.
Impact characterization	Predicted, positive, direct impact.
Justification of change	Overgrazing reduces grass biomass, increasing bare ground and soil instability[224]. As vegetation cover declines, erosion increases, which in turn has negative consequences on rangeland productivity[224]. Bare ground also increases hot and dry conditions, increasing soil water loss and decreasing water availability for plants, having compounding effects on vegetation[225]. By implementing rapid rotational grazing, project activities will directly promote vegetation recovery, improve soil structure, and decrease erosion rates, supporting overall rangeland resilience.
Biodiversity element 4	Soil Carbon Indicator Insects – Dung Beetle Abundance and Distribution
Estimated change	Increased dung beetle abundance and a more even distribution across size classes.
Impact characterization	Predicted, positive, direct impact.
Justification of change	Dung beetles contribute to soil carbon by moving animal dung from above ground to below ground quickly and efficiently. Dung beetle abundance and biomass interact in complex ways due to the heterogeneity of species within the grouping. One large individual may have a biomass that exceeds the biomass of multiple smaller individuals dictating the need to monitor biomass across size classes. Dung beetle trends are compounded by other environmental conditions, along with many other patterns in East Africa. For example, abundance is highly correlated with rainfall[226]. However, project activities that increase vegetation cover, structural complexity, habitat condition, perennial grasses, soil organic carbon (SOC), and

[224] John Kioko, John Warui Kiringe, and Simon Ole Seno, "Impacts of Livestock Grazing on a Savanna Grassland in Kenya: Impacts of Livestock Grazing on a Savanna Grassland in Kenya," *Journal of Arid Land* 4, no. 1 (January 6, 2012): 29–35, https://doi.org/10.3724/SP.J.1227.2012.00029.
[225] Katja Irob, Niels Blaum, and Britta Tietjen, "Navigating Uncertainty: Managing Herbivore Communities Enhances Savanna Ecosystem Resilience under Climate Change," *Journal of Applied Ecology* 61, no. 3 (March 2024): 551–63, https://doi.org/10.1111/1365-2664.14573.
[226] Lavhelesani D. Simba et al., "Interactive Effects of Rangeland Management and Rainfall on Dung Beetle Diversity," *Biodiversity and Conservation* 31, no. 11 (September 2022): 2639–56, https://doi.org/10.1007/s10531-022-02448-z.

	diversity of herbivores will create resources and microhabitats that are better able to retain moisture in drought years, increasing the resilience of dung beetle populations. Because dung beetles in the project area will experience improved habitat and resources due to project activities, we expect the project to directly contributed to improvements in dung beetle abundance and distribution.
Biodiversity element 5	Soil Carbon Indicator Insects - Grasshopper Abundance and Diversity
Estimated change	Expected increase in grasshopper abundance and diversity, with higher variability between sites and years.
Impact characterization	Predicted, positive, direct impact.
Justification of change	Grasshoppers play a critical role in breaking down coarse and rank grasses that are less palatable to herbivores, and making these grass fragments more easily converted into soil organic material. In addition, grasshoppers are an important food source for several bird species. Grasshopper populations are expected to respond positively to increased grass biomass that will be a direct result of improved grazing management practices. However, grasshopper populations are particularly sensitive to environmental gradients and subject to population explosions and busts in certain conditions due to their fecundity and mobility. Previous studies in Nairobi National Park found the abundance of grasshoppers linked to rainfall, with the largest peak in abundance coinciding with the longest uninterrupted period of high rainfall[227]. As Kenya has experienced extended drought over the past few years, this may have acted to suppress grasshopper populations further, requiring a long recovery period. One potential indicator of improved grazing impacts under investigation is the diversity and abundance of grasshopper species in the dry season, as this could be a more sensitive indicator of increasing rangeland health during the most water-stressed time of the year. While we expect several factors to contribute to patterns in grasshopper abundance and diversity, we expect increases in grass biomass under the project to directly contribute to

[227] David L. Denlinger, "Seasonal and Annual Variation of Insect Abundance in the Nairobi National Park, Kenya," *Biotropica* 12, no. 2 (June 1980): 100, https://doi.org/10.2307/2387725.

	increases in the abundance and diversity of grasshoppers over time.
Biodiversity element 6	Bird abundance: Columbidae (Pigeons and Doves), Ploceidae (Weavers and Allies), Alaudidae (Larks), Eastern Chanting Goshawks
Estimated change	Increased abundance of Columbidae, Ploceidae, Alaudidae, and Eastern Chanting Goshawks as habitat conditions improve.
Impact characterization	Predicted, positive, direct impact.
Justification of change	Species that forage in grassy vegetation are negatively impacted by higher grazing pressure due to loss of habitat, while granivorous species also face a reduced seed supply[228]. Indeed, the density of ground-foraging granivores and insectivores in overgrazed savannah in Senegal is 84% and 64% lower, respectively, than in ungrazed savannah, although drought undoubtedly plays a role[229]. Eastern Chanting-Goshawk was the most numerous raptor species on baseline surveys and is expected to be sensitive to overgrazing[230]. It feeds on small reptiles, insects, small mammals and birds, and may be expected to benefit from increased prey abundance directly brought on by project activities. However, the predicted increase in ground cover may worsen hunting success in areas not recently grazed, which may constrain the benefits this species receives from the project . Overall relieving overgrazing should have a direct positive effect on populations of all of these taxa.
Biodiversity element 7	Mammal Species Diversity and Richness
Estimated change	Increased mammal species richness and abundance.

[228] Leo Zwarts et al., "Distribution and Numbers of Ground-Foraging Birds between the Hyper-Arid Sahara and the Hyper-Humid Guinea Forests," *Ardea* 111, no. 1 (July 5, 2023), https://doi.org/10.5253/arde.2022.a16.
[229] Leo Zwarts, Rob G. Bijlsma, and Jan Van Der Kamp, "Downstream Ecological Consequences of Livestock Grazing in the Sahel: A Space-For-Time Analysis of the Relations between Livestock and Birds," *Ardea* 111, no. 1 (July 5, 2023), https://doi.org/10.5253/arde.2022.a25.
[230] A.C. Kemp and G.M. Kirwan, "Eastern Chanting-Goshawk (Melierax Poliopterus), Version 1.0. In Birds of the World (J. Del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA.," *2020*, n.d.

Impact characterization	Predicted, positive, direct impact.
Justification of change	Not only should the predicted increase in perennial grass abundance provide improved foraging opportunities for herbivores, increasing grass cover should also benefit mid-sized grazers and carnivores[231]. The project activities are expected to counter the effects of overgrazing and restore vegetation structure heterogeneity and cover, which may lead to an increase in abundance of other small mammal species currently present in too low of densities to be detected during baseline monitoring – though dry season monitoring may not be suitable (e.g., reliable enough) to detect changes in diversity or richness in small mammals.

5.2.2 Mitigation Measures (VCS, 3.19; CCB, B2.3)

No negative impacts on biodiversity are anticipated as a result of project activities, and thus no mitigation measures have been designed to counter any effects of project activities. However, the project will implement an adaptive management approach to ensure that if any unforeseen negative impacts on biodiversity arise, appropriate mitigation measures will be designed and implemented to address them effectively.

To support the maintenance and enhancement of high conservation values (HCVs) in the project zone, the project recognizes and collaborates with organizations already working to protect biodiversity, including Lion Guardians, the Peregrine Fund, and the Kwenia Conservancy (see stakeholder descriptions in Appendix 1). These groups play a crucial role in reducing biodiversity threats, particularly concerning vulture conservation and human-wildlife conflict. The project will enhance these efforts by:

- Sharing baseline and monitoring data to strengthen conservation strategies for key HCV species.
- Engaging with local communities to support coexistence strategies that reduce retaliatory killings of predators.
- Encouraging sustainable land management practices that maintain habitat quality for key species.

For other HCV attributes identified in Section 5.1.2, the project will ensure that restoration of perennial grasses and improved grazing management contribute to habitat stabilization, erosion control, and forage improvement, benefiting both herbivores and their associated predators. Additionally, specific HCV monitoring activities will track biodiversity trends to assess the effectiveness of conservation measures.

[231] Jose R. Soto-Shoender et al., "The Importance of Grass Cover for Mammalian Diversity and Habitat Associations in a Bush Encroached Savanna," *Biological Conservation* 221 (May 2018): 127–36, https://doi.org/10.1016/j.biocon.2018.02.028.

The project aligns with the precautionary principle by ensuring broad public participation in decision-making. Community engagement through grazing committees and stakeholder meetings will help identify and address biodiversity concerns early, allowing for proactive adjustments in management strategies. Any future conservation interventions will be guided by ecological monitoring data, community input, and collaboration with conservation partners.

5.2.3 Net Positive Biodiversity Impacts (CCB, B2.2, GL1.4)

The expected biodiversity changes to occur with the project activities are described in Section 5.2.1, and they are all positive. No negative biodiversity impacts are expected, so the net biodiversity impacts are thus positive in comparison with the without-project scenario.

Project activities will also provide climate change adaptation benefits in the form of better vegetation condition, better water retention capacity on rangeland soils, and longer duration of surface water sources[232,233], all of which provide wildlife with crucial protection from longer and/or more extensive droughts, a projected climate change impact[234].

5.2.4 High Conservation Values Protected (CCB, B2.4)

No biodiversity HCVs identified in Section 5.1.2 will be harmed by the project. Instead, biodiversity HCVs will be maintained or enhanced by the restoration of perennial grasses, increased grass biomass, and improved rangeland condition as a result of project activities.

Under the without-project scenario, increasing pressures from overgrazing, land conversion, and climate-related stressors are expected to degrade rangeland conditions and threaten biodiversity HCVs. However, under the project scenario, wildlife and protected areas will experience reduced pressure from human activities due to:

- Increased livestock mobility under RRG, which ensures that grazing pressure is evenly distributed and does not lead to localized degradation.
- Decreased market incentives for sedentary agro-pastoralism, reducing land conversion pressures that would otherwise encroach on wildlife habitats.

The project will also enhance forage availability, benefiting native herbivore species identified as HCVs in Section 5.1.2 (e.g., wildebeest, zebra, and gazelles). Increased herbivore populations, in turn, support local predator populations, such as lions and cheetahs, by maintaining a healthy prey base. Additionally, community conservation efforts, including active anti-poaching programs and engagement with conservation organizations, will help reduce illegal hunting and human-wildlife conflict, benefiting native and endangered carnivore species (e.g., African wild dog, leopard). By increasing rangeland productivity and wildlife habitat quality, the project demonstrates that biodiversity HCVs will not be

[232] Bossio et al., "The Role of Soil Carbon in Natural Climate Solutions."
[233] Ritchie, "Northern Kenya Grassland Carbon Project Monitoring Report 2017-2020 v 1.12."
[234] "Climate Risk Profile: Kenya."

negatively impacted but rather enhanced through improved ecological conditions and conservation strategies.

5.2.5 Species Used (VCS, 3.19; CCB, B2.5, B2.6)

The project does not introduce any new species into the project area. However, existing livestock species are managed under RRG plans to improve rangeland conditions. The primary livestock species used in this project are: cattle (*Bos tauros*), sheep (*Ovis aries*), and goats (*Capra aegagrus hircus*).

While these species are commonly found within the project area, the VVB identified them as potentially invasive under the IUCN Global Invasive Species Database. However, their management under RRG does not increase their presence beyond natural grazing patterns nor does it contribute to land degradation. Instead, RRG enhances rangeland health by restoring perennial grass cover and reducing overgrazing pressure, thereby mitigating the spread of invasive plants. Table 5.2.5-1 lists all species used in this project and indicates their classification as native or non-native.

Table 5.2.5-1: Species Used in Project Activities

Species	Classification Status (Native/Non-Native	Justification for Use	Adverse Effects & Mitigation
Cattle (*Bos taurus*)	Non-Native	Managed grazing under RRG	Overgrazing can lead to land degradation and soil erosion if not properly managed. RRG ensures controlled grazing intensity, adequate rest periods for vegetation recovery, and promotes perennial grass regrowth to mitigate overgrazing impacts.
Sheep (*Ovis aries*)	Non-Native	Managed grazing under RRG	Sheep can contribute to vegetation loss and compact soil surfaces due to their grazing behavior. RRG limits grazing duration, maintains vegetation cover, and reduces soil compaction by rotating grazing areas.
Goats (*Capra aegagrus hircus*)	Non-Native	Managed grazing under RRG	Goats are browsers that can target shrubs and young trees, potentially altering plant community composition. RRG ensures that grazing pressure is evenly distributed, preventing excessive browsing in any one area and allowing for vegetation regeneration.

5.2.6 Invasive Species (VCS, 3.19; CCB, B2.5)

The project does not facilitate the introduction or spread of invasive species. RRG supports the recovery of native plant cover, which directly limits the establishment of invasive species.

The project activities do not involve bringing in livestock from other areas, so the risk of invasive species dispersal through long-distance livestock transport is not present. Similarly, none of the project activities would result in an increase in invasive species. In this region, one of the dominant sources of invasive species are ornamental plantings around tourist lodges[235]. This project's activities promote the increase in native plant cover, especially native perennial grasses, which serve as a direct counter to invasive species spread from other sources.

Table 5.2.6-1: Identified Invasive Species & Mitigation Measures

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
Ipomea kituensis (Broad leaved morning glory)	Called Oltiameleteki in Maa, this species is highly prevalent in the project area. It is preferable to be cut as opposed to being removed to prevent soil disturbance. Some villages have already started doing this around settlements where its density is highest due to severe overgrazing.
Parthenium hysterophorus (famine weed)	A widespread and aggressive plant, it is controlled by careful cutting and burning to prevent seed distribution. Planting of native grasses is an important option once the plant has been removed to prevent re-occurrence. This species may require a biocontrol agent should one be found to be effective. See https://www.thecitizen.co.tz/tanzania/news/national/how-invasive-weeds-threaten-pastoral-livelihoods-in-tanzania-4629960
Vachella (Acacia) reficiens (false umbrella thorn)	This tree is known to be allelopathic and therefore has no vegetation growing under its crown. Local communities have started to cut it down and reseed the barren land or simply leave it fallow and await natural seeding. Depending on when it is cut, it either dies or can resprout. Resprouting trees need to be treated again (cut).
Prosopis juliflora (Mesquite)	Known as Mathenge locally, it is removed by cutting.
Opuntia ficus (prickly pear)	Sometimes planted as a fence, this New World cactus has spread in and around many settlements. I can be cut to be removed, and there is a fungus that can be applied as a biocontrol agent – mostly cochineal insects have become preferred over mechanical removal due to the regenerative capacity of the species.

5.2.7 GMO Exclusion (CCB, B2.7)

The project will not introduce any GMOs into the project area. Primary project activities merely adjust the way in which livestock are herded and moved across the landscape.

[235] Arne B.R. Witt et al., "A Preliminary Assessment of the Extent and Potential Impacts of Alien Plant Invasions in the Serengeti-Mara Ecosystem, East Africa," *Koedoe* 59, no. 1 (May 22, 2017), https://doi.org/10.4102/koedoe.v59i1.1426.

5.2.8 Inputs Justification (VCS, 3.19; CCB, B2.8)

Project activities preclude the use of fertilizers to stimulate productivity and possibly carbon removals through applicability conditions. The project area necessarily excludes lands devoted to crop agriculture, and project activities are not applicable to agricultural land, so there is no way for project activities to lead to increased use of pesticides or herbicides.

Table 5.2.8-1: Fertilizers, Pesticides, & Other Inputs

Name	None
Justification of use	No inputs are used in project activities.
Potential adverse effect	Not applicable.

5.2.9 Waste Products (VCS, 3.19; CCB, B2.9)

Project activities do not involve generation of power, conversion of energy sources, or processing of materials and so will not increase or produce waste products.

5.3 Offsite Biodiversity Impacts

5.3.1 Negative Offsite Biodiversity Impacts (CCB, B3.1) and Mitigation Measures (CCB, B3.2)

Negative offsite impact	Mitigation measure(s)
Herders from outside the project area may be displaced due to the enforcement of project boundaries, leading to increased grazing pressure and biodiversity loss in adjacent lands.	The project incorporates an inclusion strategy that allows herders from outside the project area to graze within project boundaries under structured agreements, provided they follow rotational grazing plans. This measure prevents overgrazing outside the project zone and integrates these herders into sustainable grazing management.
Potential encroachment into forest reserves for emergency livestock forage, leading to degradation of forest ecosystems.	Implementation of RRG creates designated drought forage reserves (grass banks) within the project area, reducing the incentive for herders to seek forage outside the project zone. This measure is actively monitored through grazing reports and forest integrity assessment.

5.3.2 Net Offsite Biodiversity Benefits (VCS, 3.19; CCB, B3.3)

Positive effects of the project on biodiversity should be extensive and should affect species and offsite protected area habitats positively. Negative effects introduced by protection of project borders against encroaching herders, leading to local increases in grazing pressures just outside project borders, will be mitigated by conflict resolution methods and peace meetings and mitigation. Thus, positive biodiversity benefits are likely to far outweigh any negative effects and result in strongly net positive biodiversity benefits offsite.

5.4 Biodiversity Impact Monitoring

5.4.1 Biodiversity Monitoring Plan (CCB, B4.1, B4.2, GL1.4, GL3.4)

Baseline biodiversity monitoring for the initial PAIs was completed in 2023. The KRCP biodiversity monitoring plan and the results of the first year of biodiversity baseline monitoring (2023) are described in great detail in the supplemental report submitted under separate cover, entitled "Kajiado Rangeland Carbon Project Baseline Biodiversity Monitoring Report" (April 2024). Below is a summary of key information relevant to this document. For a more detailed analysis, please refer to the supplemental report.

Biodiversity Theory of Change

The project's Theory of Change recognizes that enhanced biodiversity is a key ancillary benefit alongside GHG removals and community resilience benefits (Figure 5-1). Over the lifetime of the project, biodiversity monitoring will be conducted alongside soil carbon storage and grazing pressure assessments, controlling for key environmental factors (e.g., precipitation, soil texture). This biodiversity monitoring will focus on species richness and diversity indices, tracking changes in:

- Forage quality and quantity (vegetation cover and species composition);
- Trigger species population trends;
- Abundance and distribution of focal taxa over time.

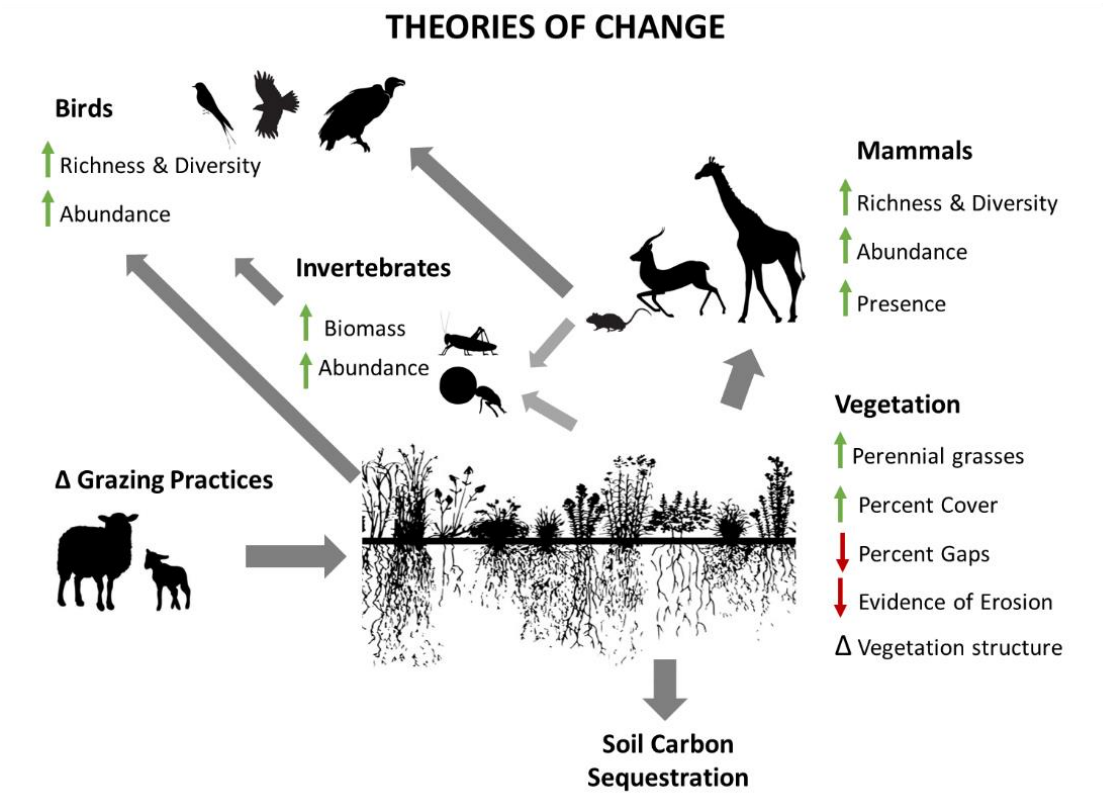


Figure 5-1: Theories of change of how changes in grazing practices for the Kajiado Rangeland Carbon Project may influence biodiversity at different levels, including vegetation, invertebrates, mammals, and birds.

In addition to monitoring overall bird and mammal abundance and diversity, the project will specifically track changes in populations of threatened and endangered species known or suspected to occur in the project area or zone.

Areas to be monitored

While the entire project geographical area is anticipated to be surveyed for baseline biodiversity, the first year of biodiversity survey efforts in 2023 focused on approximately one third of the project geographical area in which communities had granted permission in early 2023 (Figure 5-2). The locations of biodiversity sampling were determined by a subsample of the soil sampling sites (hereafter, 'sites'), which were identified throughout the area using a random stratified design, with 40-50 sites per Maasai community. Biodiversity variables were measured at the subsample of sites, or in the case of mammal surveys, driving transects between the sites. Additionally, the project will monitor biodiversity impacts by assessing the effectiveness of measures taken to maintain or enhance High Conservation Values (HCVs) identified in Section 5.1.2., including Amboseli National Park, Chyulu Hills National Park, Kilimanjaro National Park (Tanzania), Namanga Hills Forest Reserve, Enduimet Wildlife Management Area (Tanzania), Lake Natron Game Controlled Area (Tanzania), Kwenia Important Bird Area/Key Biodiversity Area (KBA), Lake Magadi Key Biodiversity Area, and South Nguruman Key Biodiversity Area.

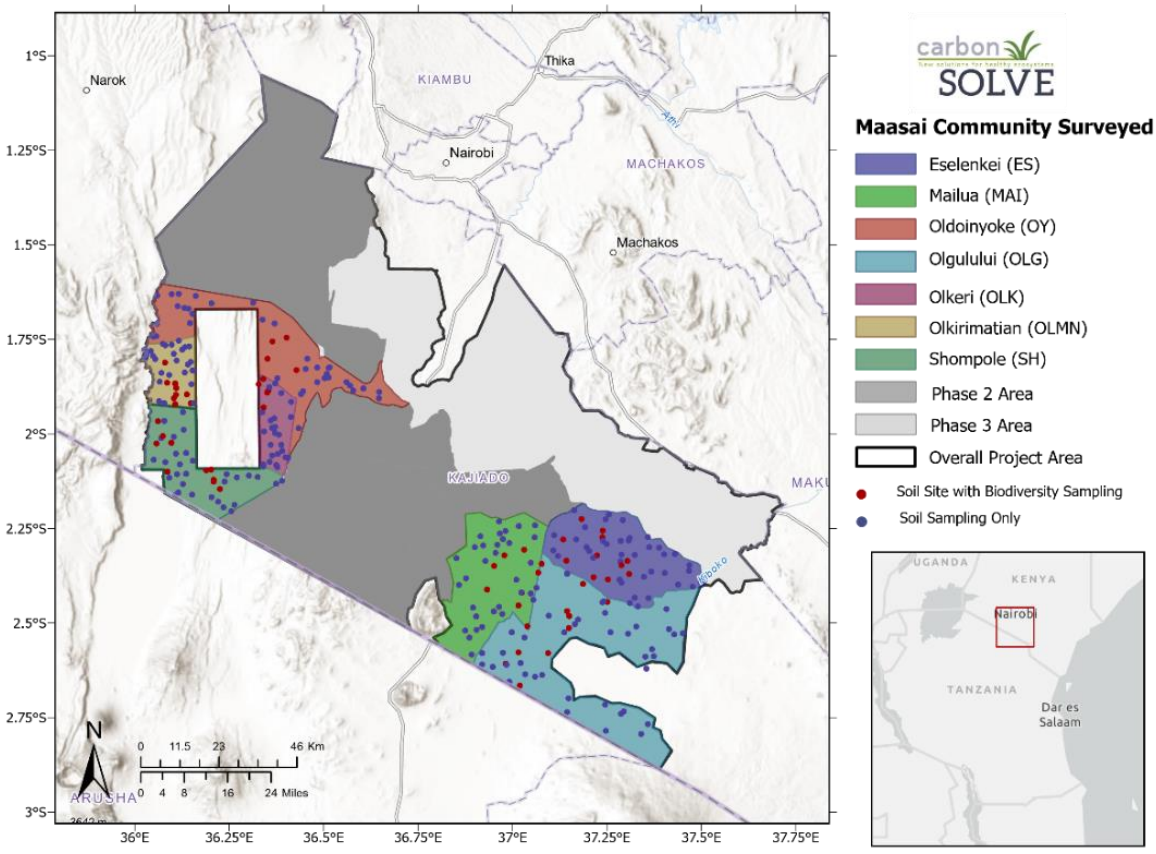


Figure 5-2: Study area for the Kajiado Rangeland Carbon Project including the boundaries of the Maasai communities which granted permission for biodiversity baseline surveys in 2023. Points (blue) represent sites where soil sampling will occur for the monitoring of carbon, with a subsample of those (red) having been monitored for biodiversity during the April-May 2023 period.

Biodiversity variables to be monitored

To monitor change in the project area in response to altered grazing practices, indicator metrics have been carefully selected (Table 5-2). While not all selected indicators may prove to be appropriate over the 40-year lifespan of the project, by identifying broad metrics such as overall species diversity and richness as well as focal families and individual species, we expect that some will be of greater value for detecting change than others. These same types of measures and sampling methods (or further refinements thereof, in keeping with advances in scientific methodology) will be used in future baseline and ongoing monitoring efforts.

Table 5-2: Sensitivity of different taxonomic indicator groups to changes in grazing management and the relative response rate, including the relationship with grazing practices (primary, secondary, tertiary), and predicted response rate including short term (1-5 years), medium-term (5-10 years), and longer-term (>10 years).

		Predicted Direction	

Indicator Metric	Influence of Grazing	of Change	Predicted Response Rate
Vegetation			
Perennial grasses abundance	Primary	+	Medium-term
Shrub abundance	Primary	-	Medium-term
Vegetation structure	Primary	Δ	Medium-term
Percent ground cover	Primary	+	Short-term
Percent plant cover	Primary	+	Short-term
Percent basal gaps	Primary	-	Short-term
Evidence of Erosion	Primary	-	Short-term
Invertebrates			
Dung beetle biomass	Secondary	+	Short-term
Dung beetle size class distribution evenness	Secondary	+	Short-term
Grasshopper biomass	Secondary	+	Short-term
Birds			
Bird species diversity	Secondary	Δ	Medium-term
Bird species richness	Secondary	Δ	Medium-term
Columbidae abundance	Secondary	+	Shorter-term
Ploceidae abundance	Secondary	+	Shorter-term
Cisticolidae abundance	Secondary	Δ	Shorter-term
Alaudidae abundance	Secondary	+	Shorter-term
Eastern Chanting-Goshawk abundance	Tertiary	+	Medium-term
Tawny Eagle abundance	Tertiary	stable	Long-term
Mammals			
Mammal species diversity	Secondary	+	Medium-term
Mammal species richness	Secondary	+	Medium-term
Unstriped Ground Squirrel abundance	Secondary	+	Medium-term

Grant's Gazelle abundance	Secondary	+	Long-term
Thomson's Gazelle abundance	Secondary	+	Long-term
Maasai Giraffe abundance	Secondary	+	Long-term
African Savanna Elephant abundance	Secondary	+	Long-term

Types of measurements, sampling methods, and frequency of data collection

Extensive methods descriptions are provided in the supplemental report, and an abridged version is provided here. Additional baseline data collection and follow-up monitoring efforts will be conducted using the same methods. Additional baseline biodiversity surveys are anticipated in 2024-2025 during Phases 2 and 3. For each PAI, baseline surveys will be conducted as soon as practicable, and follow-on monitoring will occur every three to five years thereafter, relative to the year the initial baseline data were collected for that PAI. As noted above, the same types of measures and sampling methods will be employed. The same type of comprehensiveness, in terms of spatial coverage and taxonomic diversity, will be employed. Reporting will occur annually with verification, as baseline biodiversity monitoring for new PAI instances in the grouped project is collected and re-doing comprehensive baseline surveys for older PAI instances continues.

Vegetation and habitat data were collected at each site using an established methodology developed for monitoring rangeland health[236]. This methodology is comprised of basic information including habitat structure, slope, and signs of recent grazing or erosion. Standardized photographs were also taken for reference. Ground cover was assessed using four 25 m transects laid out in cardinal directions from each site. This method uses a demarcated stick 1 m long to estimate cover of different vegetation types at every 5 m on each transect using line intercept principles. Plant species were identified within a 2 x 2 m vegetation plot was surveyed on each transect (n= 4 per site) where all plants within were identified to the highest taxonomic specificity possible and percent cover estimated.

Grasshoppers (Orthoptera) were sampled at each site by sweeping the vegetation along the four 25 m vegetation transects with a heavy-duty muslin net 25 times prior to vegetation assessments. The biomass of captured grasshoppers was recorded, and they were sorted by size-class.

Dung beetles (Scarabaeidae, Geotrupidae) were sampled using pitfall traps using methods from Stanbrook et al. (2021)[237]. Twelve pitfall traps per site were placed 4 m apart on a linear transect centered upon the soil sampling site (randomly along either the North-South or East-West cardinal directions). Each pitfall trap consisted of a 500 ml plastic tub sunk into the substrate up to its rim and a thin layer of water and detergent solution at the bottom. Traps were baited with ~40 g of fresh cow dung wrapped in fine cheesecloth suspended above the trap using twine and wooden stakes. Given

[236] Corrina Riginos and Jeffrey Herrick, "Monitoring Rangeland Health: A Guide for Pastoralists and Other Land Managers in Eastern Africa, Version II" (Nairobi, Kenya, 2010).
[237] Roisin Stanbrook et al., "Dung Beetle Diversity and Community Composition Along a Land Use Gradient in a Savannah Ecosystem of North Western Tanzania," *Tropical Conservation Science* 14 (January 2021): 194008292110087, https://doi.org/10.1177/19400829211008756.

lack of species identification information for southern Kenya, individuals were recorded in morphospecies groups and assigned to one of four size classes (<0.5 cm, 0.6-1.0 cm, 1.1-2.0 cm, 2.0-3.0 cm) and biomass was calculated by size class. Specimens were taken for all potential morphospecies groups and stored in ethanol for later identification by taxonomic experts.

Providing a relative measure of bird diversity and abundance with the power to estimate change and inform the choice of indicators and trigger species resulting from project activities were determined using well-established point count survey methodology[238]. Point count surveys began 30 minutes before dawn (approximately 6:00 am) and ended mid-morning (before 11:00 am) when bird activity declined, with a 4-5 hours survey per day. Additional data collection was done with acoustic recording units (see supplemental report for more details).

Species and location data for all identified raptors were recorded with GPS and datasheets developed for this purpose, both during and outside of bird-focused survey efforts (e.g., point counts). In addition, any raptors observed during mammal transects were recorded. Finally, a single assessment of raptor abundance and diversity was conducted using a pre-existing driving transect route and protocol developed by the Peregrine Fund[239,240] in order to contribute to a long-term dataset of raptors in the region.

Mammal surveys were conducted using transect count methodologies, primarily along roads and tracks to provide information on the abundance and distribution of wild mammals to inform the choice of indicator and trigger species. Distance-sampling methods were employed to allow for future modeling of density for species with high numbers of detections[241]. Road transects were driven at a steady speed not exceeding 20 kph. The GPS track of the route was recorded continuously during each transect as a measure of effort, while two co-operating observers used binoculars to observe on either side of the vehicle with a recorder. All mammals (wild and domestic) seen were recorded to species, and numbers of individuals, location (latitude and longitude), time, and distance were collected.

Adaptation benefits for biodiversity

At a fundamental level, restoration of perennial grass on Kajiado's rangelands is a benefit for biodiversity's adaptation to climate change. Perennial grass coverage corresponds to deeper roots,

[238] Colin Bibby, Martin Jones, and Stuart Marsden, "Expedition Field Techniques: Bird Surveys," 2000; Ally K. Nkwabi et al., "Bird Community Responses to Changes in Vegetation Caused by Increasing Large Mammal Populations in the Serengeti Woodlands," *Wildlife Research* 46, no. 3 (2019): 256, https://doi.org/10.1071/WR18001.
[239] Ogada et al., "Evidence of Widespread Declines in Kenya's Raptor Populations over a 40-Year Period"; Shaw et al., "African Savanna Raptors Show Evidence of Widespread Population Collapse and a Growing Dependence on Protected Areas."
[240] Shaw et al., "African Savanna Raptors Show Evidence of Widespread Population Collapse and a Growing Dependence on Protected Areas."
[241] Sarah M. Durant et al., "Long-Term Trends in Carnivore Abundance Using Distance Sampling in Serengeti National Park, Tanzania," *Journal of Applied Ecology* 48, no. 6 (December 2011): 1490–1500, https://doi.org/10.1111/j.1365-2664.2011.02042.x.

more soil carbon, and better water retention capacity[242]. This in turn leads to better perennial availability of surface water during the dry season and shoulder seasons of transition.

The vegetation metrics that the KRCP plans to track as indicators – perennial grass biomass, basal cover, and bare area – are expected not only to provide a measure of the recovery of the rangelands, but also to provide a measure of the climate change adaptation benefits for wildlife that will result from the project activities. The expected positive changes in perennial grass biomass and basal coverage, along with the expected negative changes in bare ground, are the clearest, most direct means of tracking this climate change adaptation benefit.

Indicators for trigger species

Biodiversity monitoring for this project extends beyond tracking specific indicators, aiming to capture a comprehensive picture of ecosystem health. Future monitoring using the methods outlined in this document is expected to detect additional rare, threatened, and endangered species beyond those identified in the baseline surveys, particularly as climate adaptation and biodiversity benefits accrue from the project activities. Indicators have been carefully selected based on their practicality for measurement and their ability to reflect meaningful ecological change over time.

Population trends for all trigger species listed in Section 5.5.2 will be tracked to assess biodiversity impact. The species groups selected as key indicators for population trends include:

- Vultures (White-backed Vulture, Rüppell's Vulture, Lappet-faced Vulture),
- Raptors (Secretarybird, Tawny Eagle, Martial Eagle, Bateleur),
- Giraffe (Masai Giraffe),
- Elephant (African Savanna Elephant).

These species were chosen because they were detected during the 2023 baseline biodiversity surveys and are either numerous enough or detectable enough to enable meaningful analysis of changes in their population over time. Regular monitoring surveys will systematically track trends in their abundance.

Vultures were selected because they collectively represent the largest trigger species group and their populations have shown notable declines in the project area[243]. Increases in mammal abundance because of project activities are expected to increase carrion availability, which could provide additional food resources for vultures. Additionally, there are existing vulture conservation efforts in the project area undertaken by at least three organizations. Expansion of these efforts through the KRCP could further contribute to stabilizing and reversing vulture population declines.

The Tawny Eagle was selected as an indicator species due to its relatively higher abundance in the project area compared to other large raptors. While many raptor populations are in decline both regionally[247] and across their entire range[248], the Tawny Eagle has shown a less severe decline. Its

[242] Johnson et al., "Adaptive Multi-Paddock Grazing Management's Influence on Soil Food Web Community Structure for."
[243] Ogada et al., "Evidence of Widespread Declines in Kenya's Raptor Populations over a 40-Year Period."

relatively stable population size makes it a suitable representative indicator for monitoring raptor trends over the course of the project.

Giraffe and elephant will also be monitored, with updated language clarifying their relationship to project activities. While elephants are facultative grazers that can benefit directly from increased perennial grass biomass, giraffes are obligate browsers that do not rely on grasses. However, both species are expected to benefit from the project's efforts to reduce land conversion and habitat fragmentation, which helps maintain the woody savannah ecosystems essential for giraffe browsing and the open rangelands required for elephant movement[249].

Ongoing biodiversity surveys will be sufficiently rigorous to track population trends in the other trigger species in the project area over time, but only vultures, elephant, giraffe, and Tawny Eagle are considered the most important biodiversity indicators that will be the focus of species-specific efforts. As discussed in the section on existing biodiversity conditions, threats to wildlife in the project zone include threats to trigger species such as lions (which are threatened by retaliatory killings), vultures (which are by-killed by carcass poisonings and are electrocuted by wires), and raptors (which are also electrocuted) that are not directly related to the project's grazing management activities. These threats nonetheless can be tracked if carcasses are observed during biodiversity surveys or from community reports/survey responses, and through partnership with local organizations focusing on these conservation issues more progress to reduce these threats are possible.

5.4.2 Biodiversity Monitoring Plan Dissemination (CCB, B4.3)

As described in Section 2.3.4, project summary information (including information on the monitoring plan) was presented in native languages at community meetings including Annual General Meetings (AGMs), meetings of cooperatives, and grazing committee meetings in May and June, 2024. After project validation, English and native language summaries of monitoring reports will be presented at community meetings. The full monitoring plan is publicly available with the PD at the Verra Registry under Verra ID# 4714.

5.5 Optional Criterion: Exceptional Biodiversity Benefits

5.5.1 High Biodiversity Conservation Priority Status (CCB, GL3.1)

High Biodiversity Conservation Priority Status is conferred by the presence of trigger species in the project area, as documented through baseline biodiversity assessments and ongoing monitoring efforts. Table 5-1 presents nine species identified as trigger species during these assessments, meeting the criteria for high conservation value. These include four IUCN CR or EN raptors (Secretarybird, Tawny Eagle, Martial Eagle, Bateleur), three IUCN CR or EN vultures (Rüppell's Vulture, Lappet-faced Vulture, White-backed Vulture), one EN mammal (African savanna elephant), and one EN mammal (Masai giraffe) with 110 individual observations recorded.

To meet the requirement of demonstrating regular occurrence of these species in the project zone, project biodiversity surveys and monitoring programs confirm repeated observations of these species over time. The biodiversity monitoring approach incorporates:

- Baseline biodiversity assessments that establish the initial presence and distribution of trigger species.
- Continued monitoring efforts to document recurring observations of these species in the project zone.
- Ecological studies and regional species data that support expected species distributions and movement patterns.

5.5.2 Trigger Species Population Trends (CCB, GL3.2, GL3.3)

Trigger species	Secretarybird, Martial Eagle, Bateleur, Rüppell's Vulture, Lappet-faced Vulture, White-backed Vulture, Tawny Eagle
Population trend at start of project	Most large raptors have declined precipitously across much of Africa in recent decades. Ogada et al. (2022)[244] found that modelled encounter rates of raptors in protected and unprotected areas in Kenya had decreased between the 1970s and 2000s by 52% and 79% for White-backed Vulture, 43% and 74% for Lappet-faced Vulture, 37% and 58% for Bataleur, 35% and 12% for Rüppell's Vulture, and 15% and 96% for Secretarybird. Unlike most large raptors, Tawny Eagle modelled encounter rates in Kenya between the 1970s and 2000s increased in protected areas by 132% and decreased in unprotected areas by only 18%, far less than many other eagles and all vultures[245]. Baseline monitoring data confirm the regular occurrence of these species in the project zone. While no project-zone-specific population estimates exist for these birds, national and regional trends are relevant for understanding likely trends at the project level due to the shared threats across Kenya, including poisoning, habitat loss, and reductions in prey availability. The large ranges of these species mean their populations are influenced by similar conservation conditions at the national scale.

[244] Ogada et al.
[245] Ogada et al.

Without-project scenario	Continued decline is expected unless threats are addressed across the continent. Large raptors are threatened in East Africa by poisoning (both accidental and deliberate), reduced food supply due to changing land use, collision with energy infrastructure, and trapping for food and traditional medicine[246,247]. Accidental poisoning of scavenging raptors occurs when people combat crop-raiders such as elephant and buffalo or livestock predators such as lions, while deliberate poisoning may be used by poachers attempting to hide a slain animal[248].
With-project scenario	Though the KRCP theory of change expects that large raptors benefit indirectly from restored rangelands and increased herbivore populations, there may be enough external stressors acting on these populations to mask any benefits from altered grazing practices. However, the project is implementing specific conservation measures to enhance raptor populations, including: Reducing Threats: • Community education programs on the impacts of poisoning and illegal wildlife killing, helping to reduce threats to scavenging species. • Engagement with conservation NGOs working in the region, such as the Peregrine Fund and Kenya Wildlife Service, to improve species monitoring and implement anti-poisoning initiatives. • Improved livestock management practices that decrease the likelihood of human-wildlife conflict and retaliatory poisoning events. Enhancing Population Status: • Rotational grazing and rangeland restoration activities contribute to improved habitat conditions, increasing prey availability for raptors.

[246] Derek Pomeroy et al., "Vulture Populations in Uganda: Using Road Survey Data to Measure Both Densities and Encounter Rates within Protected and Unprotected Areas," *Bird Conservation International* 25, no. 4 (December 2015): 399–414, https://doi.org/10.1017/S095927091400029X.
[247] Ogada et al., "Evidence of Widespread Declines in Kenya's Raptor Populations over a 40-Year Period."
[248] Roger Safford et al., "Vulture Conservation: The Case for Urgent Action," *Bird Conservation International* 29, no. 1 (March 2019): 1–9, https://doi.org/10.1017/S0959270919000042.

	• Protection of communal grazing areas prevents habitat degradation and loss of nesting sites for large raptors. • Observations of raptors are expected to remain stable, with Tawny Eagles encountered in sufficient numbers that a measurable positive trend is anticipated. Population Estimates at End of Project: the project will continue to monitor raptor presence through observational surveys, but precise population estimates within the project zone are currently not feasible due to the highly mobile nature of these species and lack of localized data collection efforts. However, estimates may become possible as more data is gathered over the course of the project.

Trigger species	Masai giraffe
Population trend at start of project	In Kenya, population trends for giraffe were steeply negative between the late 1970s and the early 2010s, with an estimated range-wide decline of more than 70%[249]. The Kenyan population has increased somewhat from a low of under 10,000 in 2013 to an estimated 15,790 individuals in 2020. Of these, 6,425 were observed in the Amboseli-Magadi ecosystem, which encompasses the project area[250]. While no project-zone-specific population estimates exist for giraffe, national and regional trends are relevant due to shared threats across Kenya, including habitat loss and fragmentation. Giraffe move over large areas and frequently cross between protected and unprotected landscapes, making conservation actions at the landscape scale critical to their persistence.

[249] Muruana et al., "Country Profile: A Rapid Assessment of the Giraffe Conservation Status in Kenya."
[250] Waweru et al., "National Wildlife Census 2021 Report (Abridged)."

Without-project scenario	Without intervention, giraffe populations in the project area would likely decline due to habitat conversion from savanna rangeland to intensive agro-pastoralism, leading to reduced browse availability and increased human-wildlife conflict. Habitat fragmentation from fencing and land subdivision would further restrict movement corridors.
With-project scenario	Project activities will result in restoration of perennial grasses in the project area, in turn helping maintain open savanna landscapes that support giraffe populations by reducing land conversion pressures. While giraffe are obligate browsers and do not directly rely on grasses, project interventions that enhance rangeland management indirectly benefit them by: • Increasing the viability of livestock-based livelihoods, reducing incentives for land conversion to agriculture. • Maintaining open corridors for movement by preventing fragmentation from fencing and uncontrolled settlements. • Working with local grazing committees to integrate wildlife movement needs into grazing plans. Population Estimates at End of Project: No project-zone-specific estimates exist for giraffe at present, but future surveys will aim to establish more precise numbers. Until then, trends at the regional level provide the best available data for assessing likely changes in population.

Trigger species	African savanna elephant
Population trend at start of project	Kenya's elephant population declined by over 90% from the 1970s to 1989 but has grown steadily since the 1990s[251]. The most recent nationwide

[251] Mukeka et al., "Long-Term Trends in Elephant Mortality and Their Causes in Kenya."

	census report by the Kenya Wildlife Service in 2021 estimated Kenya's elephant population at 36,280, with 1,641 occurring within the Amboseli-Magadi ecosystem[252]. As with giraffe, illegal hunting and habitat loss remain the major drivers of elephant population decline. No project-zone-specific population estimates exist, but national trends are relevant due to the high mobility of elephants and the transboundary nature of their movements. Elephants routinely travel between protected and unprotected areas, meaning their population dynamics are influenced by broader conservation efforts across Kenya and Tanzania.
Without-project scenario	Elephant populations in the project area are expected to be stable to declining, depending on the extent of land conversion from savanna rangeland to intensive agro-pastoralism. As long as habitat remains available, elephants will continue migrating through the project zone. However, increased fragmentation of savanna habitat and human-wildlife conflict could restrict movement corridors and lead to localized declines.
With-project scenario	Project activities will result in restoration of perennial grasses, which will increase forage availability for elephants that use the project area. While elephants are facultative grazers and can consume a mix of browse and grass, rangeland improvements will: • Maintain open space and prevent habitat fragmentation. • Reduce agricultural encroachment, lowering the risk of human-elephant conflict. • Ensure critical dry-season resources remain available in communal grazing areas. Population Estimates at End of Project: Given the highly mobile nature of elephants and their movement between Kenya and Tanzania, estimating

[252] Waweru et al., "National Wildlife Census 2021 Report (Abridged)."

	a project-specific population number is not currently possible. However, population monitoring through field surveys and ranger observations will continue, with the expectation that maintaining large, connected landscapes will support stable or increasing elephant numbers.

APPENDIX 1: STAKEHOLDER DESCRIPTION TABLE

Stakeholder	Rights, interest, and overall relevance to the project
Maasai Communities - Sections	A Maasai is identified primarily with his oloshon or section. This is, in effect, a subtribe of the Maasai with a unified political and administrative structure which to date creates a sense of identity and belonging. Each section had a fixed territory that, before group ranches, belonged to section members collectively. The territory of each section was large enough to provide adequate grazing in normal and dry times, but not during extreme droughts. Sections plan grazing movements within their known territories.
Maasai Communities - Clans	The clans are grouped into two moieties (orok kiteng and odo mongi), each descended from one of the two wives of the first Maasai ancestor. Work within the clan to raise children and tend to cattle. Provide assistance for key objectives such as education and marriage.
Maasai Communities - Age-sets	Age mates are initiated together at a young age and pass through each phase of life together, creating a strong and life-long bond. Communication and respect within the age-sets of the Maasai community are important when planning grazing activities that are central to their cultural livelihoods, while roles and responsibilities related to grazing are also determined by age-categories. Age-mates tend to make decisions together and work through an age-set hierarchy for conflict resolution and support.
Maasai Women	Women are increasingly getting involved in grazing livestock and are responsible for grazing small stock such as sheep and goats.
Other Tribes (interested stakeholder)	The other tribes are primarily represented by the Kamba and Kikuyu. They conduct small-scale agriculture and or establish businesses in demarcated areas within some communities such as in Olkiramatian and Olgulului. They own or lease their individual parcels of land. They often sell fresh groceries to the Maasai community.
Group Ranch/Conservancy Leadership	To manage land and grazing with the community landscapes. Establish grazing plans and monitor their implementation. Work with communities within a zone to coordinate activities.
Grazing Committees	To manage grazing within the community landscapes particularly "zones". Establish grazing plans and monitor their implementation. Work with communities within a zone to coordinate activities.

Village Administrator (interested stakeholder)	Responsible for the overall development goals in the county. Development priorities include climate change resilience and conservation, and improved agricultural productivity with a focus on livestock value chains. Work with households in the villages to manage development issues and grazing planning.
Division Chiefs (interested stakeholder)	Responsible for the overall development goals in the county. Development priorities include climate change resilience and conservation, and improved agricultural productivity with a focus on livestock value chains. Work with communities in the county to promote development issues.
Sub-Location Chiefs (interested stakeholder)	Responsible for the overall development goals in the county. Development priorities include climate change resilience and conservation, and improved agricultural productivity with a focus on livestock value chains. Work with communities in the county to promote development issues. They are actively involved in the development of grazing plans and their implementation, attend all zonal meetings and officiate any local congregations related to livelihood development.
Kajiado County Government (Governor/CEC) (interested stakeholder)	Responsible for the overall development goals in the county. Development priorities include climate change resilience and conservation, and improved agricultural productivity with a focus on livestock value chains. Work with all communities and stakeholders in the county on the development agenda. Kajiado county has a particular focus on the livestock value chain and enhancement of pastoral livelihoods. The county is also responsible for streamlining the individual group ranch/ community development plans into a County Integrated Development Plan which is a blueprint for the county's socio-economic development.
NEMA (interested stakeholder)	Coordinated, supervises and manages all matters relating to the environment in Kenya. National DNA responsible for compliance with ESIA, issuing letter of no objection, and managing project registry. Works closely with the national government on carbon project implementation and oversight.
State Department of Environment and Climate Change (interested stakeholder)	The department is involved in coordination, development and implementation of adaptation and mitigation policies, strategies and plans on climate smart agriculture (CSA) to enhance adaptation and mitigation actions in the country. The Ministry focuses on pursuing five key result areas namely Environment, Climate Change and Forestry Governance; Conservation, Protection and Management of Environment and Forestry Resources; Climate Change Adaptation and Mitigation; Agro-forestry and Commercial Forestry Management; Resource Mobilization and Partnerships. Works to promote NDC commitments. Works closely with NEMA, KWS and KWCA

Kenya Wildlife Services (interested stakeholder)	Conserves and manages Kenya's wildlife for the Kenyan people and the world. Currently manages wildlife within the Amboseli National Reserve. Work with communities to manage HWC, manage grazing inside Amboseli park and promote co-existence with wildlife.
Ilanguronyi Conservancy	Conservation area for Elephant migration. Conservating elephant populations and mitigating Human Widllife Conflict. Work with group ranches to provide dry season forage.
Kitenden A Conservancy	Conservation area for Elephant migration. Conservating elephant populations and mitigating Human Widllife Conflict. Work with group ranches to provide dry season forage.
Kitenden B Conservancy	Conservation area for Elephant migration. Conservating elephant populations and mitigating Human Wildlife Conflict. Work with group ranches to provide dry season forage.
Kitirua Conservancy	Conservation area for Elephant migration. Conservating elephant populations and mitigating Human Wildlife Conflict. Work with group ranches to provide dry season forage.
Ole Narika Conservancy	Conservation area for Elephant migration. Conservating elephant populations and mitigating Human Wildlife Conflict. Work with group ranches to provide dry season forage.
Amboseli Ecosystem Trust (AET) (interested stakeholder)	Not-for-profit umbrella organization that brings together the local community, governmental, conservation and developmental stakeholders in the Amboseli Ecosystem to drive collective action and innovative collaborations for the wellbeing of the people, wildlife and habitats of the ecosystem. Regional conservancies association body working on influencing policy, lobbying community rights, and monitoring the implementation of the Amboseli Ecosystem Management Plan. Works with KWS, Ministry of Environment, KWCA and other stakeholders and partners to influence the community conservation agenda.
IFAW (interested stakeholder)	Global non-profit helping animals and people thrive together. IFAW rescue, rehabilitate, and release animals, and they restore and protect their natural habitats. Their work in the region is to secure corridors and dispersal areas for elephants in the community areas of the Olgulului Olalarashi Group Ranch (OOGR). the above listed "conservancies" are financed by IFAW. Work closely with OOGR to mitigate against HWC and promote co-existence with wildlife
Tata Chemicals Magadi Ltd - Magadi Soda Foundation (interested stakeholder)	The foundation seeks to promote tangible objectives, including health, water and sanitation, education, economic empowerment and transportation. NGO, AIDS Population and Health Integrated Assistance has partnered the Foundation in an HIV/Aids and Wellness Programme, which includes training for peer educators and a behaviour change communication strategy. The Foundation is already supporting water

	supply initiatives and in partnership with AMREF Kenya is upgrading and rehabilitating a 70km pipeline that supplies water to Magadi. The Magadi Pipeline is a critical water source for four Magadi communities - Ol Keri, Oldonyo Nyokie, Shompole and Olkiramatian.
Kwenia Vulture Sanctuary	To protect the Kwenia Important Bird Area, which is a crucially important vulture nesting site in the Rift Valley, a partnership between local landowners of the resident Maasai community and the Kenya Bird of Prey Trust has developed a vulture sanctuary that be a 12,600-ha protected area with formal status under Kenya law. The Kenya Bird of Prey Trust has been monitoring vulture breeding populations for more than a decade at this site and is helping to facilitate the formal establishment of the vulture sanctuary.
Lion Guardians (interested stakeholder)	Lion Guardians is a leader in lion conservation centered around the Amboseli ecosystem in southern Kenya. Their programs involve recruiting local Maasai to learn how to defuse human-wildlife conflicts, monitor local lion populations, and educate their communities on safely coexisting with lions. Their lion conservation efforts not only address threats to the endangered African lion but extends to threatened vulture populations by stopping retaliatory poisoning events.
Peregrine Fund (interested stakeholder)	The Peregrine Fund is a leading organization in raptor conservation and research with global reach. They are heavily involved in vulture and eagle conservation in Africa, especially addressing threats to threatened and endangered vultures and eagles, and southern Kenya is a focal point of their efforts. They collaborate with numerous organizations on the ground such as the Kenya Wildlife Service and the Kenya Bird of Prey Trust with special focus on preventing and responding to vulture poisoning events.
BigLife (interested stakeholder)	Big Life seeks to protect and sustain East Africa's wildlife and wild lands, including one of the greatest populations of tusker elephants left in Africa. Invest in protecting lands through bursaries and land leases. They are currently keeping track of the "fenced landscapes" within the community areas and are enforcing the enactment of EMCA (2015) to keep these lands open for wildlife movements.
Poorest 25% - People with Few or No Livestock	Individuals in this group lack financial security through livestock assets but are integral to the pastoral economy. They rely on benefit-sharing mechanisms, bursaries, and access to improved rangelands for subsistence and economic opportunities. Revenue distribution structures ensure they are not excluded from project benefits.
Youth	

Elderly	
Female-Headed Households and Women in General	Women and female-headed households have limited direct economic opportunities in traditional livestock markets but significantly contribute through milk and small-stock sales. Their participation in grazing decision-making ensures rangeland plans support livestock accessibility near settlements. Financial benefits are also structures to reduce household burdens on education and healthcare.
Group Ranch/Conservancy Leadership	Responsible for ensuring equitable benefit-sharing and inclusion of marginalized groups in grazing and revenue distribution decisions.
Grazing Committees	Play a crucial role in ensuring the integration of women and vulnerable groups in land-use planning. Committees must secure feedback from all community members, including those with limited livestock holdings.
Village Administrators, Chiefs, and Local Authorities	Ensure marginalized groups, particularly poorest households and women, have representation in project governance structures.

APPENDIX 2: PROJECT ACTIVITIES AND THEORY OF CHANGE TABLE

Activity description	Expected climate, community, and/or biodiversity			Relevance to project's objectives
	Outputs (short term)	Outcomes (medium term)	Impacts (long term)	
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Increased storage of C in soil as soil organic carbon (SOC)	Removals of CO2 from atmosphere, which provide revenues to support grazing coordinators and for community development projects (exceptional community benefits).
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Increase in soil water holding capacity, providing moisture for plant growth beyond the usual dates of the onset of the dry season	Greater water retention in soils which supports hydrological subsurface flow to support longer-lasting and more common surface water sources, which will reduce time necessary for community members to acquire water and provide more surface water options during

				drought. These changes provide exceptional adaptation to climate change benefits.
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Increase in soil water holding capacity, providing moisture for plant growth beyond the usual dates of the onset of the dry season	Greater water retention in soils, which supports plant production and regrowth following grazing over a greater proportion of the year. This will allow animals to be in better condition and to reproduce and produce milk over a greater proportion of the year. These changes provide exceptional climate adaptation and community benefits
Shift livestock management from continuous grazing to rapid rotational or migratory grazing.	Rest for forage plants, allowing recovery and seed production after grazing during period of rainfall	Increased plant production and shift from annual plant and forb dominant vegetation to dominance by perennial grasses and a decrease in bare ground	Provide forage to support greater wildlife populations	Greater wildlife populations support existing ecotourism operations in the project area and in adjacent conservation lands, providing exceptional community benefits and supports conservation of at least 9 trigger species, providing exceptional biodiversity benefits

Shift livestock management from continuous grazing to rotational or migratory grazing	Allow establishment of grass banks	Provides grazing refuges during drought	Reduces need for community members to take long migrations during droughts	Reduces physical risks to herders from moving animals to conflict areas, a community benefit, and provides the ability to mitigate the impacts of drought, a climate change adaptation benefit

APPENDIX 3: PROJECT RISKS TABLE

	Identified risk(s)	Potential impact of risk on stakeholders, ecosystem health, and biodiversity	Mitigation or preventative measure(s) taken
Natural and human induced risks to stakeholders' wellbeing	Drought reducing forage availability.	Severe drought can decrease perennial grass growth, reduce water availability, and force large-scale livestock movement outside the project area.	The project actively restores perennial grasses and implements rotational grazing to enhance drought resilience. Partnerships with Savannas Forever focus on reseeding degraded areas near settlements to provide forage for small livestock and buffer against future drought.
Risks to stakeholder participation	Limited engagement in rotational grazing programs.	Lack of participation could reduce the project's impact and limit benefits to communities.	Effective communication on carbon revenue benefits, improved forage quality, and participatory governance ensures continued engagement.
Working conditions	Lack of standardized employment conditions.	Poor working conditions may negatively impact local project personnel, including grazing coordinators and monitoring staff.	The project ensures compliance with local labor laws, provides fair wages, and guarantees safe and ethical working conditions.
Safety of women and girls	Exposure to gender-based violence during grazing activities.	Increased vulnerability to violence or harassment, particularly in remote grazing areas.	The project incorporates gender-sensitive training, establishes women's leadership groups, and ensures safe workspaces within project activities.
Safety of minority and marginalized groups, including children	Exclusion of marginalized groups from decision-making.	Risk of unequal benefit distribution and disenfranchisement of certain communities.	The project promotes inclusivity through stakeholder consultations, village engagement, and equitable benefit-sharing mechanisms.
Pollutants (air, noise, discharges to water, generation of waste, and	Use of non-biodegradable waste in grazing areas.	Could lead to pollution in the project area and impact soil and water quality.	The project prohibits hazardous waste disposal and encourages sustainable, non-polluting land-use practices.

release of hazardous materials and chemical pesticides and fertilizers)			
Discrimination	Unequal access to benefits among community members.	Certain groups may be denied equal opportunities to participate in project activities.	The project mandates equal participation for all stakeholders and implements governance structures to ensure transparent decision-making.
Sexual harassment	Risk of workplace harassment.	Project personnel may face discrimination or harassment in leadership roles and work environments.	The project enforces a zero-tolerance policy for harassment, conducts gender sensitivity training, and actively promotes women's leadership.
Equal pay for equal work	Gender-based wage disparities.	Risk of wage inequality between men and women for similar roles.	The project ensures standardized pay structures and equal compensation policies.
Gender equity in labor and work	Limited employment opportunities for women.	Women may face barriers to meaningful employment within the project.	The project actively recruits women, integrates them into grazing committees, and ensures leadership roles.
Forced labor[253]	Coerced participation in project activities.	Risk of individuals being pressured into participation.	The project ensures that all labor is voluntary and adheres to local labor laws.
Child labor	Children participating in land management activities.	Potential diversion of children from education into manual labor.	The project adheres to child labor laws, raises awareness, and promotes education incentives.
Human trafficking	Movement of vulnerable individuals into exploitative labor conditions.	Though unlikely, any form of employment involves a general risk of exploitative labor.	The project ensures compliance with national labor laws, the Soils for the Future Tanzania Handbook, and community-based monitoring.
Recognition of, respect of, and promotion of the	Potential disputes over land tenure.	Risk of displacement or lack of recognition of local land rights.	The project is community-driven, respects customary land tenure, and follows legal safeguards to prevent conflicts.

[253] The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

rights to IPs, LCs and customary rights holders			
Preserving and protecting cultural heritage	Risk of disrupting culturally significant sites.	Project activities could inadvertently impact sacred or historical areas.	The project includes cultural heritage assessments and community involvement in land-use planning.
Protecting and preserving property rights, customary rights, or protecting legal or customary tenure/access rights to territories, property, and resources, including collective and/or conflicting rights	Conflicts over rights or access to grazing lands.	Unclear property rights could lead to disputes over land use as grazing management changes are implemented.	The project FPIC process ensures transparent land-use planning with legally established owners of defined management areas – villages and village land use plans. Approvals are secured at all necessary levels of government. Inclusive decision-making at the community level insures that any land use conflicts are identified and resolved very early before implementation.
Impacts on biodiversity and ecosystems	Overgrazing leading to habitat degradation.	Could reduce plant diversity and negatively impact wildlife habitats.	Rotational grazing and ecosystem monitoring mitigate degradation risks.
Soil degradation and soil erosion	Increased soil erosion due to grazing pressure.	Overgrazing can cause bare ground, increase vulnerability to erosion, and lead to topsoil loss and reduced land productivity.	The project actively restores grassland vegetation and reduces the likelihood of overgrazing.
Water consumption and stress	Overuse of water sources by livestock.	Increased pressure on already limited water resources.	The project promotes sustainable water management and grazing rotation to prevent overuse of critical water sources.
Habitats (and areas needed for habitat connectivity) for rare, threatened, and endangered species	Overgrazing could negatively impact critical habitat for key species.	Overgrazing could cause habitat degradation for threatened species that rely on health grassland vegetation.	The project actively restores grassland vegetation and reduces the likelihood of overgrazing.

Areas needed for habitat connectivity	Encroachment on migration corridors.	Livestock grazing could interfere with wildlife movement.	The project ensures that wildlife corridors are maintained and integrated into grazing plans, which actively preserve open community grazing lands with no fencing.
Invasive species	Spread of invasive plant species.	Could disrupt native vegetation and biodiversity.	The project includes invasive species monitoring and management strategies to prevent their spread or continued existence.
Ecosystem conversion	Conversion of rangelands into other land uses.	Land conversion could threaten biodiversity and carbon sequestration potential.	The project actively prevents land conversion through sustainable grazing management and land-use planning.