THE KASIGAU CORRIDOR REDD+ PROJECT PHASE I – RUKINGA SANCTUARY

8TH MONITORING REPORT (M_8)



Document Prepared by Wildlife Works Carbon

Project Title	The Kasigau Corridor REDD+ Project Phase I – Rukinga Sanctuary
Project ID	562
Version	2.0
Report ID	1
Date of Issue	16 - May - 2022
Project Location	Kenya, Taita Taveta County, Coast Province
Project Proponent(s)	Wildlife Works Carbon LLC.: President – Mike Korchinsky Tel: +1-415-332-8081 Fax: +1-415-332-8057 Email: jeremy@wildlifeworks.com
Prepared By	Jeremy T. Freund and Simon C. Bird
Validation/Verification Body	S & A Carbon Contact Name: Kyle Silon Email: kyle.silon@saacarbon.com Phone: +1-971-235-7835
GHG Accounting/Crediting Period	01 January 2005 – 31 December 2034; 30-year total period
Monitoring Period of this Report	01 January 2021 – 31 December 2021
History of CCB Status	CCB Validation: 22 December 2009 CCB Verification M_1: 3 February 2011 CCB Verification M_2: 29 November 2012 CCB Verification M_3: 23 May 2013 CCB Verification M_4: 01 November 2016 CCB Verification M_5: 24 August 2018 CCB Verification M_6: 12 June 2020 CCB Verification M_7: 31 December 2021
Gold Level Criteria	The Kasigau Corridor Phase I REDD+ Project – Rukinga Sanctuary has achieved Gold Level for both its provision of Climate Change Adaptation Benefits and its Exceptional Biodiversity Benefits. **Climate Change Adaptation Benefits** There is overwhelming evidence in the literature that there will be significant negative effects from climate change and increased climate variability on the communities in the Project Zone. Traditionally, these

	communities have depended heavily on subsistence agriculture in an area that is one of the least fertile in Kenya. The rains have failed far more frequently in recent years, and even when they have come, been unpredictable. This has led to missed opportunities for sowing at the appropriate time within the growing season, which would have ensured a harvest even in seasons with low rainfall. These issues are expected to increase given the likelihood of more severe climate impacts in the future. Resulting food insecurity causes farmers to continue shifting, clearing more land in the hope they will find a better plot on which the variable and highly localized rains will fall. In the baseline scenario, we therefore anticipate even higher deforestation rates in the future. Another detrimental impact of failed crops is the triggering of increases in poaching for bushmeat. The native wildlife populations are drought specialists. However, they do experience higher stress levels in years with lower rainfall and higher median temperatures. This in turn leads to wildlife populations with less resiliency to increased stress from poaching. As of this monitoring period, the Project has implemented the following activities: • Reduce community dependence on livestock and land through alternative IGAs, promote cultivation of drought resistant crops, improve storage facilities and management of crops, water harvesting and water storage, raise awareness of the danger of fires. • Increase support of local institutional structures including the norms and rules of governance to help develop adaptive strategies, increase literacy levels, diversification of livelihood activities and income generation Projects, involve women to a greater degree in decision making processes, increase general participation in decision making at the local level. • Help maintain intact and interconnected ecosystems through protection of ecosystems, ensure landscape connectivity to allow migration, regeneration activities using indigenous, drought-resistant trees. **Exceptional Biodiversity Benefits** • KCRPI has a resident population of Grevy's zebra (*Equus grevyi*), which is on the IUCN Red List – Endangered. Based on a recent study on this population[1], just under a half of the

[1] 1 Githiru, M. 2017. The forgotten Grevy's zebra Equus grevyi population along the Kasigau Corridor ranches, SE Kenya: recent records and conservation issues. Africa Journal of Ecology 55(4): 554-563. https://doi.org/10.1111/aje.12385

	population of about 35-60 individuals of this species are found within Rukinga Wildlife Sanctuary or its project zone. We believe this population remained relatively constant during this monitoring period due to the encounter trends which have not been very different since 2015. Since the IUCN still estimates the global population of the Grevy's zebra to be 1,956 mature individuals[2], this range constitutes between 1-2% of the global population. • KCRPI is part of the home range of at least two packs of African Wild Dogs (*Lycaon pictus*) (Endangered) with active breeding dens previously recorded within the Project Area. • KCRPI also supports several vulture species including White-backed vulture *Gyps africanus* (Critically Endangered) and Lappet-faced vulture Torgos tracheliotos (Endangered). • KCRPI has stable breeding populations of several other High Conservation Value (HCV) species classified as Vulnerable and Endangered including cheetah *Acinonyx jubatus* (Vulnerable), lion *Panthera leo* (Vulnerable), Leopard *Panthera pardus* (Vulnerable) , African elephant *Loxodonta africana* (Endangered) Secretarybird *Sagittarius serpentarius* (Endangered), Bateleur *Terathopius ecaudatus* (Endangered) and Martial eagle *Polemaetus bellicosus* (Endangered). • The larger Project Zone contains the Taita Hills which are part of the Eastern Arc Mountain Global Hotspot as defined by Conservation International, and harbour two Critically Endangered bird species: Taita Apalis (*Apalis fuscigularis*) and Taita Thrush (*Turdus helleri*). • During this monitoring period the primary activity implemented providing exceptional biodiversity benefits was the active protection of the Project Area from deforestation and forest degradation. This has preserved and enhanced the native habitat for the biodiversity present. In addition, to habitat protection, this also maintained the corridor function for biodiversity, since the Project Area also provides key connectivity by linking important protected areas. This provides a secure migratory and dispersal area that reduces conflicts with surrounding communities. • Other important activities implemented that supported biodiversity conservation included enhance security and law enforcement, expansion, de-silting and scooping of water holes that provide vital sources of water to the biodiversity of the Project Area in this drought-stricken region.

[2] https://www.iucnredlist.org/species/7950/89624491, accessed on 28 July 2021

Acknowledgements



These reports are dedicated to the memory of Rob Dodson, the longtime head of Wildlife Works African Operations. Rob died suddenly and tragically from natural causes in 2017.

Rob was the living embodiment of Wildlife Works' vision, a man who loved every living thing, a caring man with a big heart who understood the challenges the people of the Kasigau community face, and the importance that we do everything in our power to help that community to meet those challenges as we work together to protect the wildlife that is their natural heritage.

Rob was always there to listen to the community's needs, to give his support to their ideas, to roll up his sleeves and work hard alongside them to make their dreams come true, and to celebrate with them life's sweet victories.

Rob was also a fortunate man, who met Lore, the love of his life, while living in the bush with the elephants and buffalo. Rob cherished every moment he could spend with her and with their two beautiful children. His family shares his passion for his work, and we thank them for sharing Rob with us for all these years.

Perhaps one of Rob's most enduring legacies is the wonderful team of people he leaves behind to continue his life's work. Rob was a strong leader, and an incredible mentor for the Wildlife Works team in Kenya. These Kenyan men and women are infused with Rob's strength and spirit; they shared many challenges and many triumphs with Rob, and through it all he always saw the funny side of life.



Joseph Ngeti



Jessica Njeri

We also wish to dedicate this report to two Wildlife Works Rangers who were killed in the line duty in 2020. Joseph Ngeti and Jessica Njeri were each fatally attacked by an elephant in separate incidents. They were both exemplary and devoted rangers and they will be remembered for their sacrifice. Their hard work and dedication towards this noble profession cannot go unnoticed and we will continue to honour them.

-Mike Korchinsky

Acronyms

ACoGS	Avoided Conversion of Grasslands and Shrublands
AFOLU	Agriculture, Forestry and Other Land Use
APD	Avoided Planned Deforestation
APC	Avoided Planned Conversion
AUC	Avoided Unplanned Conversion
AUDD	Avoided Unplanned Deforestation and/or Degradation
CCB	Climate, Community and Biodiversity
CDM	Cumulative Deforestation Model
CEPF	Critical Ecosystem Protection Fund
DNA	Designated National Authority
ER	Emissions Reductions
FAO	Food and Agricultural Organization
FCPF	Forest Carbon Partnership Facility
FPIC	Free, Prior and Informed Consent
GHG	Greenhouse Gas
GIS	Geographic Information System
GOK	Government of Kenya
GR	Group Ranch
HCV	High Conservation Value
IBA	Important Bird Area
KCRPI	Kasigau Corridor REDD+ Project Phase I – Rukinga Sanctuary
KCRPII	Kasigau Corridor REDD+ Project Phase II – The Community Ranches
KBA	Key Biodiversity Area
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
KWTA	Kenya Water Tower Agency
MRR	Monitoring Report Requirements of the VM0009 VCS methodology
MRV	Measuring, Reporting and Verification
NGO	Non-Governmental Organization
NPA	Natural Protected Area

NTFP	Non-Timber Forest Products
PA	Project Area
PD	Verified Carbon Standard and Climate, Community and Biodiversity Project Description document
REDD	Reducing Emissions from Deforestation and forest Degradation
REDD+	Reducing Emissions from Deforestation and forest Degradation, plus Conservation, Sustainable management of forests, and enhancement of forest carbon stocks
R-PP	Readiness Preparation Proposal
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
WWC	Wildlife Works Carbon

Table of Contents

1 Summary of Project Benefits 9
1.1 Unique Project Benefits 9
1.2 Standardized Benefit Metrics 11
2 General 19
2.1 Project Description 19
2.2 Project Implementation Status 26
2.3 Stakeholder Engagement 34
2.4 Management Capacity and Best Practices 37
2.5 Legal Status and Property Rights 49
3 Climate 50
3.1 Monitoring GHG Emission Reductions and Removals 50
3.2 Quantification of GHG Emission Reductions and Removals 120
3.3 Optional Criterion: Climate Change Adaptation Benefits 137
4 Community 139
4.1 Net Positive Community Impacts 139
4.2 Offsite Stakeholder Impacts 143
4.3 Community Impact Monitoring 144
4.4 Optional Criterion: Exceptional Community Benefits 165
5 Biodiversity 166
5.1 Net Positive Biodiversity Impacts 166
5.2 Offsite Biodiversity Impacts 169
5.3 Biodiversity Impact Monitoring 169

Summary of Project Benefits

1.1 Unique Project Benefits

Outcome or Impact	Achievements during the Monitoring Period	Section Reference	Achievements during the Project Lifetime
1) Health education programme	Health education through our Girl/Boy child programme that targets girls (and boys) from vulnerable families: Held trainings for school groups for 226 girls and boys on sexual health, sanitation and drug abuse: 2 meetings held, attended by a range of 20-84 participants.	2.1.1	In-school and out-of-school training camps or meetings on sexual health and sanitation are held for both boys and girls. A total of 9 school meetings or training camps have been held since 2015, with each having an attendance of between 20-150 students and a cumulative total of 667 students.
2) Hadithi	Provided marketing and sales support to 2 craft groups in 2021, comprising of a total of 46 members. Approximately KSH 4,043,065 (USD 35,465) in funding was provided to the members of these groups.	2.1.1	This activity continues to grow and diversify, currently providing marketing and sales support to 10 craft groups undertaking traditional and practical basket weaving and beadwork. This comprises over 273 women. Cumulatively, a gross of more than $USD 118,431 in direct funding has been provided to these local groups in the period of 2015 to 2021.
3) Eco-tourism	4 staff are employed for management of Kivuli Camp within Rukinga Sanctuary. A total of 135 guests booked at Kivuli Camp in 2021, spending a total of 417 nights and 690 bed-nights.	2.1.1	Kivuli Camp remains fully operational and hosts a mix of foreign and local guests including tourists and educational visitors.
4) Eco-charcoal production	9 permanent staff are still manually processing 1000-	2.1.1	Pioneered and tested the sustainable charcoal

	1500 0.5kg briquettes/week. Improved kilns have now been procured, fabricated and tested on-site, while a grinder, mixer and briquette press have been procured and are being fabricated and tested on-site before rollout to full production.		production using finger-sized twigs. Nine permanent staff manually processing 1000-1500 0.5kg briquettes/week. Long-term monitoring system for a rotational harvest plan set up, and leveraged R&D funds from the National Research Fund (Kenya) helped procure improved kilns, grinder, mixer and briquette press for improved production. Fabrication and on-site testing nearly completed before moving to full commercial production.

1.2 Standardized Benefit Metrics

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
GHG emission reductions & removals	Net estimated emission removals in the Project Area, measured against the without-project scenario	0		0
	Net estimated emission reductions in the Project Area, measured against the without-project scenario	235,287 tCO_2e	3.2.4.5	3,644,822 tCO_2e
Forest[3] cover	For REDD[4] Projects: Number of hectares of reduced forest loss in the Project Area measured against the without-project scenario	Data Not Available Project baseline model does not calculate hectares		Not Applicable – Project baseline model does not calculate hectares
	For ARR[5] Projects: Number of hectares of forest cover increased in the Project Area measured against the without-project scenario	Not Applicable		Not Applicable
Improved land management	Number of hectares of existing production forest land in which IFM[6] practices have occurred as a result of the Project's activities, measured against the without-project scenario	Not Applicable		Not Applicable

[3] 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*)

[4] 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*)

[5] 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*)

[6] 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*)

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	Number of hectares of non-forest land in which improved land management has occurred as a result of the Project's activities, measured against the without-project scenario	Not Applicable		Not Applicable
Training	Total number of community members who have improved skills and/or knowledge resulting from training provided as part of project activities	In 2021, COVID-related restrictions were eased enabling 75 local community members (comprising four women, youth and school groups) to visit the Greenhouse.	2.1.1	A total of 316 local community members in 17 community groups have visited the organic greenhouse on various training and awareness engagements since 2015.
	Number of female community members who have improved skills and/or knowledge resulting from training provided as part of project activities of project activities	In 2021, the one Women Group in Phase 1 (Kulikila) was provided with follow-up support from the Wildlife Works' Greenhouse and Community Outreach Departments, despite struggling with water availability due to drought.	2.1.1	This Kulikila group is still receiving support. Major support was setting up their agri-business activities, primarily a vegetable greenhouse and outside garden with drip irrigation (about 40*40m) and a forestry (nursery) unit in their localities.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Employment	Total number of people employed in of project activities,[7] expressed as number of full-time employees[8]	There were 58 employees at the end of this monitoring period (Dec 2021), of whom 28% were female, and 99% are Kenyan, with 85% being local (i.e., from the Project Zone and or Taita Taveta County).	2.1.1, 4.3	Average over past three years of 51 employees for KCRPI with about 90% being from the local area and almost 30% female.
	Number of women employed in project activities, expressed as number of full-time employees	16 (28% of total)	2.1.1	Long-term average between 25 and 30% of workforce.
Livelihoods	Total number of people with improved livelihoods[9] or income generated as a result of project activities	In addition to the numbers stated under different benefits below (e.g., water, health, employment, bursaries), our biennial household-level surveys have reported close to	2.1.1	Nearly 50% of randomly selected households view the REDD+ project positively, due to having received some benefit from KCRPI, especially education bursaries, but also employment, tree

[7] 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.

[8] 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 UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])

[9] 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.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		50% of our 185 respondents had a positive effect in their household from the KCRPI. Most cited various livelihood-related benefits were education-related support, employment, tree seedlings and water.		planting and provision of water and other social amenities.
	Number of women with improved livelihoods or income generated as a result of project activities	In addition to women-targeted efforts (e.g., the women's group with a greenhouse for agri-business and new women's groups working with Hadithi), about a half of the population who would be beneficiaries from the livelihood improvements at household level are female.	2.1.1	In addition to women-targeted efforts (e.g., four women's groups with greenhouses for agri-business and 10 groups [273 women] working with Hadithi on basket weaving), about a half of the population who would be beneficiaries from the livelihood improvements at household level is female.
Health	Total number of people for whom health services were improved as a result of project activities, measured against the without-project scenario	In addition to improved services at the local health facilities renovated through the WWCT, the Voi Diagnostic Lab at Moi District Hospital tested	2.1.1	At the Voi Diagnostic Lab the number of patients had been steadily growing before the COVID-19 disruption, due to growing referrals across the County and

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		3,072 patients who undertook 8,164 tests in 2021. Wildlife Works also supported Ministry of Health efforts by providing basic COVID-19 prevention infrastructure to schools like handwash stations and masks.		neighboring counties. It has grown from handling about 75 patients per month since opening in March 2014 to nearly 250 patients monthly currently, each undergoing between 1-8 tests depending on the procedure.
	Number of women for whom health services were improved as a result of project activities, measured against the without-project scenario	Based on County statistics, about 50% of those seeking services at the Voi Lab are women, and about half of the healthcare school programme participants are girls. 39 girls from various schools in Phase 1 were provided with reusable sanitary pads.	2.1.1	Based on County statistics, about 50% of those seeking services at the Lab would be women, and about half of the healthcare school programme participants are girls.
Education	Total number of people for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	• Number: 632 students • Amount: KES 2,983,140 • Classroom construction or renovation: 2 schools	2.1.1	• Bursary recipients: 3144 • Total amount spent on bursaries and projects : KES 15,342,822 • 3 school-projects involving

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		Other infrastructure (desks and chairs): 1 school, 50 desk lockers and 50 chairs desks/chairs		classroom renovation, supply of school furniture and water harvesting and storage were undertaken.
	Number of women and girls for whom access to, or quality of, education was improved as a result of project activities, measured against the without-project scenario	For bursaries, more than half of the recipients were girls.	2.1.1	For bursaries, about 51% of the recipients have been girls over the lifetime of the Project.
Water	Total number of people who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Three water projects involving installation of gutters, supply of water tanks and installation of water pipelines benefitting over 4,000 community members in multiple villages and schools.	2.1.1	Since 2012, 8 water-related projects have been implemented across KCRPI including pipelines, storage tanks, rock catchments, gutters and water pans for harvesting across all the project locations in community areas and schools, estimated to reach a total of about 12,535 community members.
	Number of women who experienced increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	Based on County statistics, about 50% of the water users in the community and schools would be women and girls.	2.1.1	Based on County statistics, about 50% of the water users in the community and schools would be women and girls.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Well-being	Total number of community members whose well-being[10] was improved as a result of project activities	In addition to the livelihoods, health, education and water-related improved wellbeing above, the project maintained support for the three local community institutions (Locational Carbon Committee, Bursary Committees and Community-based Organizations) which continues to instill a stronger sense of self-determination. 18 new members of the LCCs were elected in 2021 representing over 14 villages around the Phase 1 Project Area.	2.1.1, 4.3	In addition to the livelihoods, health, education and water-related improved wellbeing above, there are also three community organizations (LCC, Bursary Committees and Community-based Organizations) that have either been created or strengthened through . Through these committees, the communities have a stronger sense of self-determination.
	Number of women whose well-being was improved as a result of project activities	At least 33% of the committee members are women.	2.1.1	At least 33% of the committee members are women.

[10] 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, Health, Education, Water, etc.), but could also include other benefits such as empowerment of community groups, strengthened legal rights to resources, conservation of access to areas of cultural significance, etc.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
Biodiversity conservation	Change in the number of hectares significantly better managed by the Project for biodiversity conservation,[11] measured against the without-project scenario	30,169	5	30,169
	Number of globally Critically Endangered or Endangered species[12] benefiting from reduced threats as a result of project activities,[13] measured against the without-project scenario	The resident Grevy's zebra regularly encountered in their known home ranges within Rukinga Ranch. There were several encounters of HCV species (CR and EN) including African Wild Dog, African elephant, Secretarybird, Bateleur, and Martial eagle across the Sanctuary too.	5.1.2	3 Critically Endangered or Endangered species: Grevy's zebra and African elephant, African wild dog, Secretarybird, Bateleur, Martial eagle White-backed White-headed and Lappet-faced vultures sightings; most confirmed breeding in project area.

[11] 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.

[12] Per IUCN's Red List of Threatened Species

[13] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

2 GENERAL

2.1 Project Description

2.1.1 Implementation Description

This is the 8th monitoring period for the Kasigau REDD+ Project Phase I – Rukinga Sanctuary (KCRPI). As the Project has now been in operation for 17 years, the Project Activity is fully implemented. The primary Project Activity is the conservation of the forest in the Project Area, which has been fully and successfully implemented and operated throughout the current monitoring period. This Project Activity directly resulted in the reduction of CO_2e emissions reported in this monitoring report.

The Project has additional Project Activities which address the focal issues identified by project stakeholders in the SBIA workshop, which include poverty, human/wildlife conflict, environmental degradation, agricultural issues and education. By addressing these focal issues, the project helps to alleviate many of the drivers of deforestation and forest degradation. The project also contributes to the mitigation of leakage and securing Project permanence. These activities were proposed and described in full detail in the PD, section 6.1. All activities have been fully implemented, except for a few that were found to be infeasible and/or community groups elected to end them. Please see Section 4.3.2.1 for a list of these. A current description of implementation status is provided below in Section 4.3.2.

A primary focus of the Project Activities is to provide improved livelihoods either through direct employment with the Project or introduction of new or improved income-generating activities. On average, Wildlife Works retains a workforce of between 50-53 across the Project Area. At the end of the reporting period, there were 58 employees in total, 2 in senior management positions. Of the 58, almost 30% (14) are female and more than 90% were from the local area (i.e., from one of the Project Zone or larger Taita Taveta County). In addition to the core project operations, revenue from carbon credit sales is also provided to the Wildlife Works Carbon Trust (WWCT) and is used to fund self-determined community projects. Under the WWCT, 10 Projects were initiated (either ongoing or completed) by the Locational Carbon Committees (LCCs) during the reporting period (2021). Major activities included school infrastructure or supplies (3), construction or renovation projects (1), water (5) and health (1). projects. School projects involved classroom renovation, supply of school furniture and water harvesting and storage. Other water projects also involved water harvesting, storage and installation of water pipelines. Construction and health projects involved construction of water storage tank and supply of buckets and liquid soap to schools in Marungu location respectively. Overall, total amount spent during this monitoring period on community Projects alone was KES 8,904,794 (approximately $USD78,112). This excludes school bursary schemes, which totaled an additional KES 2,983,140 (approximately $USD 26,168). Please see section 4.3.2 of this MR for more details on WWCT funded Projects.

Any potential leakage resulting from the Project Activity is measured directly in the Project's leakage area. No leakage was observed for this monitoring period (Section 3.2.3.2). Please refer to sections 10.2 and 10.3 of the PD for descriptions of the delineation of the leakage area and the leakage measurement procedure. Non-permanence risk factors are assessed at each verification event in accordance with VCS requirements and reported in the non-permanence risk tool.

The total GHG emission reductions for this (M_8) monitoring period are 235,287 t CO_2e. There were no material changes made to the Project since the last verification.

2.1.2 Project Category and Activity Type

The Kasigau Corridor REDD+ Project Phase I project falls under the VCS sectoral scope 14: – Agriculture. Forestry, and Other Land Uses (AFOLU), under the categories Reduced Emissions from Deforestation and Degradation (REDD). Specifically, the Project falls under the REDD+ category of Avoided Unplanned Deforestation (AUD). The Project is eligible under these categories by the definitions provided in the VCS AFOLU Requirements version 3.4 published 8 October 2013 by virtue of the fact that it prevents emissions that would have otherwise taken place through unplanned deforestation and/or native grassland conversion.

KCRPI is not a Grouped Project type under the VCS standard nor the CCB Programmatic approach.

2.1.3 Project Proponent(s)

Organization name	Wildlife Works Carbon
Contact person	Mike Korchinsky
Title	Founder and CEO
Address	242 Redwood Highway, Mill Valley CA 94941 USA
Telephone	+1-415-332-8081
Email	mike@wildlifeworks.com

2.1.4 Other Entities Involved in the Project

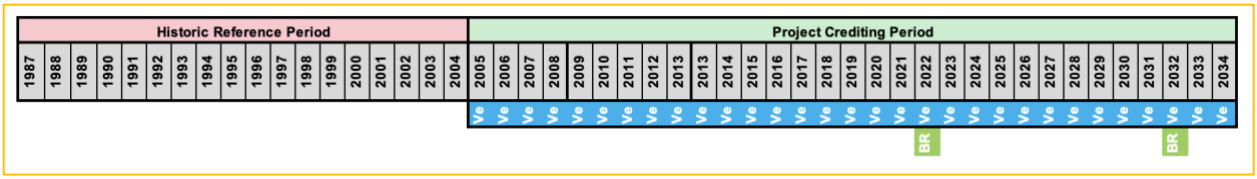
No other entities are involved in KCRPI.

2.1.5 Project Start Date (G3.4)

The Project start date is January 1st, 2005. This monitoring period (M_8) is the eighth monitoring period. It started on January 1st, 2021 and ended on December 31st, 2021.

2.1.6 Project Crediting Period (G3.4)

The Project crediting period started on January 1st, 2005 and will end on December 31st, 2034 (30 years). The Project length for KCRPI is 30 years and will end on December 31, 2034.



Project Timeline (Ve = verification year, BR = baseline re-evaluation year)

Figure 1: The Project Crediting Period, baseline re-evaluations and approximate verification schedule.

Wildlife Works is committed to robust monitoring with a goal of verifying at least every two years. Per VCS requirements, a baseline re-evaluation will be performed once every 10 years. Wildlife Works will re-evaluate the baseline for KCRPI revisions as specified by Verra. The project has received an exemption from the baseline reassessment requirement from Verra allowing us to postpone this until the next monitoring period. This exemption is based on the project's intent to nest into the Kenyan national REDD+ programme, which is not yet complete.

2.1.7 Project Location (G3.3)

KCRPI is located in Southeastern Kenya, in Taita Taveta County, Coast Province. It is approximately 150 km northwest of the city of Mombasa. As part of the 2010 ratification of the Kenyan Constitution, counties were introduced as new geographical administrative units. These counties number the same as the old districts (47), but there were significant governance changes following the elections of 2013, including devolution to a new two-level governance system, which sees only national and county governments.

The Project Area covers all the land known as Rukinga Sanctuary, with a total of 30,168.66 ha (74,516 acres). The land was originally known as LR 12263, which had historically been reduced by subdivisions 12263/1 and 12263/2 at dates prior to the start date of this project.

Rukinga is part of that land that forms a corridor (the Kasigau Wildlife Corridor) between the Tsavo East National Park and the Tsavo West National Parks to the East of the Marungu range. The Project Area and Reference Area are clearly delineated in Figure 1 in the PD in section 5.1, and the shapefiles representing the boundaries have been made available to the project validator. Lands within the Project boundary are classified as tropical dryland forest[14] for at least 20 years and has been primary forest throughout recorded history[15].

The Project is located in Southeastern Kenya; in the Coast Province about 2 hours' drive from the port town of Mombasa along the Nairobi-Mombasa highway. The Project's Eco-Region is typified by a dryland forest ecosystem, dominated by acacia and commiphora drought-resistant species. The majority of people in the area descend from the Taita tribe, with significant populations of Duruma, Kamba and other less-prevalent tribes. More detailed information concerning the social, economic and geographic attributes of the Project Zone can be found in the Project's CCB PDD.

[14] UN IPCC, Good Practice Guidance for LULUCF, Table 3A.1.8;

[15] The earliest record that has been located is dated 1895 which identifies the area as forested [Hobley 1895 – Upon a Visit to Tsavo and the Taita Highlands – The Geographical Journal 1895 Vol 5 No 6 pp 545-561]

There have been no changes to the Project Area location or maps since the publication of the VCS and CCB Project Documents (PDs).

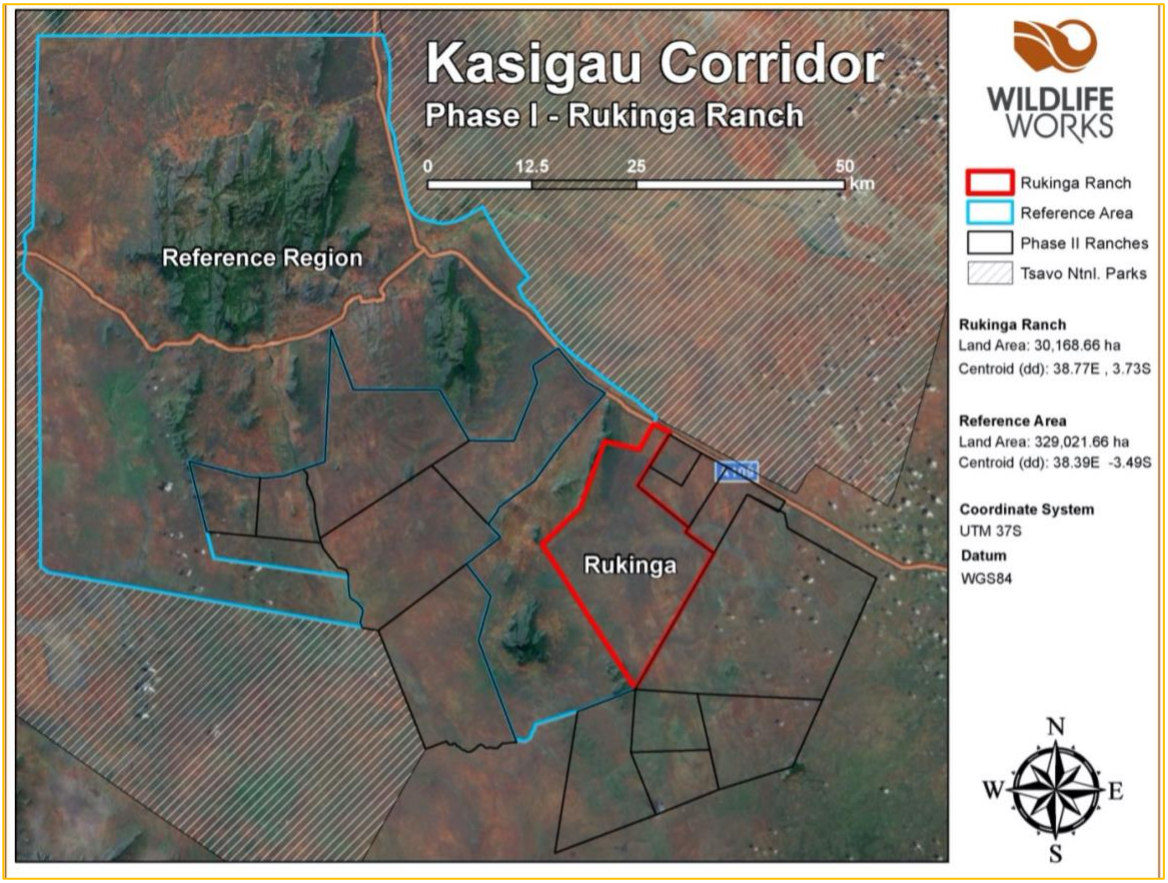


Figure 2: The Kasigau Corridor REDD Project Phase I – Rukinga Sanctuary Project Area and Reference Area Spatial Boundaries.

The KCRPI Project Area, along with the neighboring community group ranches that make up the KCRPII Project Area, are part of that land that forms a corridor (the Kasigau Wildlife Corridor) between Tsavo East and Tsavo West National Parks, located to the Southeast of the Taita Hills, an area of high conservation value and the northern most extent of the Eastern Arc Mountain range (see map above).

There are several Kenyan Administrative Locations (sub-districts) associated with the Project Area, with a total population of over 350,000 people. Approximately 15,000 people reside within 5 km of the Project boundaries within the two Locations (Marungu and Kasigau) included in the KCRPI Project Zone. Figure 3 below displays the combined Project Zone for both KCRPI and KCRPII projects, which stipulates locations of the communities directly involved with / affected by KCRPI.

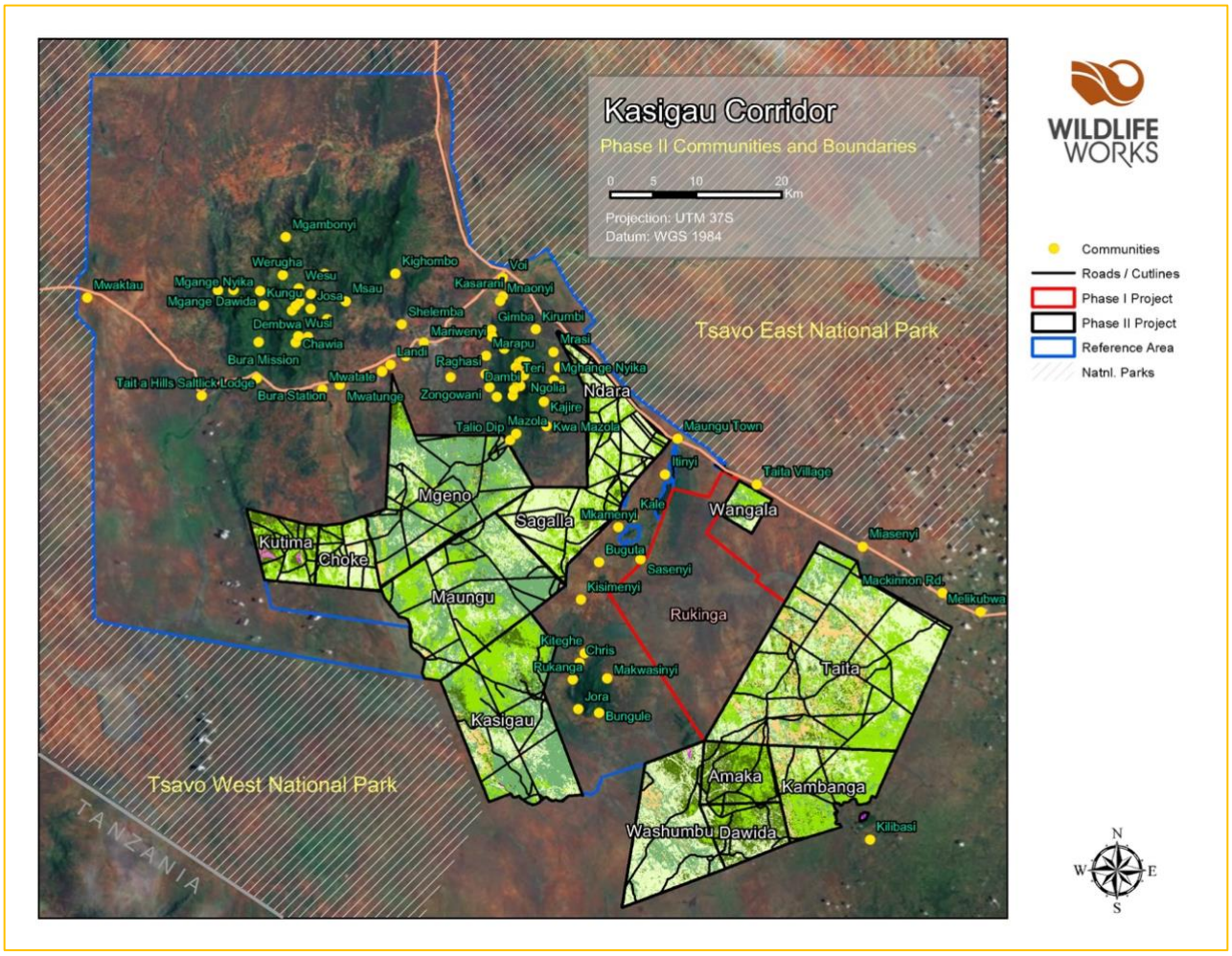


Figure 3: The Project Zone - Communities within the scope of influence of the Kasigau Corridor REDD Project Phase I – Rukinga Sanctuary Project Area.

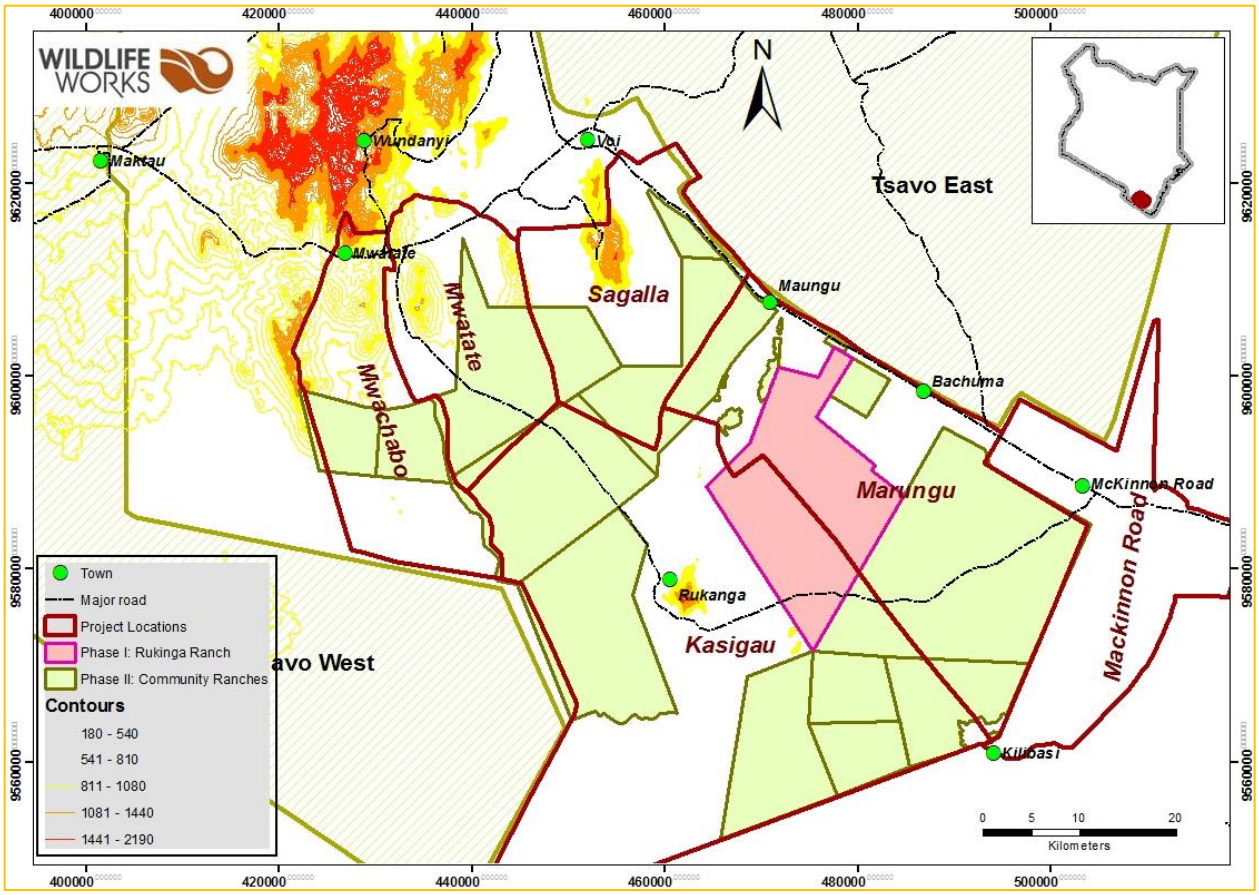


Figure 4: The six locations in the Project Zone with which the project works with.

Climate

The climate in this region of Kenya is categorized as Arid and Semi-Arid Land (ASAL), with average annual rainfall in the 300–450 mm range. There are no permanent water sources on the Project Area. Historically the rains occurred seasonally twice a year, in December and April. These are known as the grass rains and the long rains, respectively. However, over the past ten years, local climatic conditions have become more irregular, and there have been two periods of extended drought.

The Project is located at 3° South latitude and receives strong sunshine most days of the year. The coolest month is August, the hottest February.

Soils

The dominant soil type within the Project Area, and a common soil for this area of Kenya, is Red Laterite, characterized by high amounts of iron and aluminum. There are also small bands of black cotton soil occurring randomly, accounting for a small area, and represent an insignificant contribution to the Project's soil carbon pool. There are areas within the Project's boundary where gneiss islands (rocky outcrops) penetrate the soil to form small hills. These outcrops represent a small portion of the Project Area and were excised from the soil carbon pool before project validation.

Geology

The Project Area is geologically dominated by the remnants of the Eastern Arc Mountains, which include the Taita Hills, Mt. Kasigau at the Centre of the Project Area, and lesser hills such as Sagalla, and the Marungu Range that runs North-South along the Western boundary of the Rukinga Sanctuary. These hills are home to remnant patches of montane cloud forest, and to several endemic bird and flora species.

2.1.8 Title and Reference of Methodology

The Project utilizes VM0009 Methodology for Avoided Mosaic Deforestation of Tropical Forests v1.1, approved by the VCS for Sectoral scope 14 on November 10th, 2011.

2.1.9 Other Programs (CL1.5)

KCRPI is not currently registered with any other GHG program. However, concurrently with the VCS/CCB verification of this eighth monitoring period, the project is also seeking validation and verification under the SD VISta Standards. The project is also exploring the potential of becoming certified under the W+ Standards. In addition, the Project intends to nest into a Kenyan national jurisdictional REDD+ Program at the time that one becomes operational. As Wildlife Works intends to assist in the development Kenya's nesting strategy, the Kasigau Corridor Projects will be some of the first to nest. We will therefore ensure no conflicts with existing or other GHG programs exist.

2.1.10 Sustainable Development

The KCRPI provides many benefits that will help achieve Kenya's stated Sustainable Development Goals (SDGs). In 2015, Kenya joined the global community in adopting its SDGs, a set of 17 universal goals covering the thematic areas of environmental, economic and social development. They are structured to help drive national funding and policy decisions. In 2016, Kenya implemented the Vision 2030 plan, a long-term development plan with the goal of transforming Kenya into a newly industrializing, middle-income country that provides a high quality of life to all its citizens by 2030, within a clean and secure environment. These two sustainable development plans are coordinated in their goals and thematic areas. The climate, community and biodiversity benefits provided by KCRPI, and detailed in sections 3, 4 and 5, all contribute to achieving the global and national sustainable development goals detailed in these two plans. These contributing benefits are monitored through KCRPI's climate, community and biodiversity monitoring plans. SDGs that KCRPI will directly contribute to include:

- Goal 1: No Poverty
- Goal 4: Quality Education
- Goal 6: Clean Water and Sanitation
- Goal 8: Decent Work and Economic Growth
- Goal 10: Reduced Inequalities
- Goal 11: Sustainable Cities and Communities
- Goal 13: Climate Action
- Goal 15: Life on Land

2.2 Project Implementation Status

2.2.1 Implementation Schedule (G3.4)

Date	Milestone(s) in the Project's development and implementation
01 January 2005	Start of Project activity, protection of forest from deforestation and degradation, Project Start Date,
2007—Present	Tree Nursey
Since project start (2005) - Present	Jojoba propagation
Since project start (2005) – Present	Wildlife Works Greenhouses and selling point
Since project start (2005) - Present	Reforestation of Mt. Kasigau and surrounding area
Since project start (2005) - Present	Wildlife Works Carbon Trust: School Construction and Renovations, Infrastructure provision, Bursary Scheme, Agri-business, and Water and health-related Projects.
Since project start (2005) - Present	Community Wildlife Scouts
Since project start (2005) - Present	Forest and Biodiversity Monitoring
Since project start (2005) - Present	Project Product Sales and Marketing
Since project start (2005) – Present	Security and Ranger Patrols
Since project start (2005) - Present	REDD+ Carbon Inventory Monitoring
2007 – Present	Tree Nursey
Expansion completed in October 2011 Print factory opened in November 2011	Eco Factory Expansion and Print Factory
27 April 2011	CCB Validation
13 May 2011	VCS Validation
13 May 2011	VCS Verification M_1
25 May 2011	CCB Verification M_1

Built in 2012 – Maintained to the Present	Group Ranch Office Renovations / Construction
30 November 2012	VCS Verification M_2
05 December 2012	CCB Verification M_2
2012 - Present	Support to Community Based Organizations: Sagalla Conservation and Development Forum (SCDF), Mwatate District Stakeholders' Forum (MDSF) and Mwachabo Development Forum (MDF), Marungu Hill Conservancy Forum (MHC), Kasigau Development Trust (KDT) and Mackinnon Road CBO.
Started in testing phase 2011, moved to new facility on Taita Ranch early 2013 – Present	Wildlife Works Eco-Charcoal Production Facility
New building operating from 2013 – Present	Wildlife Works Soap Factory
21 May 2013	VCS Verification M_3
23 May 2013	CCB Verification M_3
2013 - Present	Local Production Clothing Factory
2013 – Present (some operations disrupted by COVID-19)	Wildlife Works Health Projects
2014 – Present	Support to Establishing / Maintaining the Tsavo Conservancy
02 September 2015	VCS Verification M_4
02 September 2015	CCB Verification M_4
24 August 2018	VCS Verification M_5
24 August 2018	CCB Verification M_5
Officially opened in 2019 – Present	Ecotourism Projects: Kivuko Eco Camp in Taita
12 June 2020	VCS Verification M_6
12 June 2020	CCB Verification M_6
12 December 2021	VCS Verification M_7
12 December 2021	CCB Verification M_7

2.2.2 Methodology Deviations

KCRPI has not deviated from the methodology during this monitoring period.

2.2.3 Minor Changes to Project Description (*Rules* 3.5.6)

Deviations to the Community Monitoring Plan

Over the life of the project to-date we have modified some of the indicators used to assess the impact of the project on the communities based on data availability or the effectiveness of the indicator. In all cases the indicator used is being modified, or there are other associated indicators already present, ensuring that the impact of the project activity and/or impact category is still being monitored.

School Construction and Bursary Scheme

We have not reported on # of children in each school since December 2012 (M2) as we found it to be an inappropriate indicator of the success of our school construction and bursary scheme since it was difficult to reliably report that data. Rather, we focus on the following: number of students supported by the WW bursary scheme, amount of money spent on WW bursary scheme, percent of students not in school due to lack of fees; performance of pupils supported (full scholarship); number of classrooms constructed, or school renovations; number and type of education infrastructure installed; and number of pupils using the infrastructure built. This deviation does not impact the project's community monitoring of this activity area as other indicators monitor this more effectively.

Wildlife Works Rukinga EcoFactory

We have not reported on the production/profitability of the EcoFactory since September (M4) as we found it to be an inappropriate indicator of the success of this project activity as this information can be considered confidential. Instead, we focus on the number of staff employed at the end of that monitoring/reporting period. This deviation does not impact the project's community monitoring of this activity area as other indicators monitor this more effectively.

Organic Greenhouse Project

We have not reported on profit/profitability of the Organic Greenhouse Project since May 2013 (M3) as we find that to be an inappropriate indicator of the success of the project activity. Rather, we report on the species and quantity of seedlings at the greenhouses and the number of greenhouses established during the monitoring period. This deviation does not impact the project's community monitoring of this activity area as other indicators monitor this more effectively.

Jojoba/Dryland Farming Project

We have not reported on the profit/profitability of the Jojoba/Dryland Farming Project since May 2013 (M3), because the vast majority of seedlings are bought from the community and then given for free to back to community members and local institutions after developing in the greenhouse. Therefore, this indicator is not fully reflective of the effort and net impact of this activity if read out of context. Furthermore, our other indicators (i.e. number of employees) are more appropriate at measuring the success of this project activity. This deviation does not impact the project's community monitoring of this activity area as other indicators monitor this more effectively.

2.2.4 Project Description Deviations (*Rules* 3.5.7 – 3.5.10)

KCRPI did not deviate from the PD during the current, m_8, monitoring period. The following deviations from the PD made during previous monitoring periods were listed in relevant VCS monitoring reports. They are listed below to perpetuate documentation of all PD or MR deviations during the Project lifetime. Deviations listed below were approved during each of their corresponding verification events:

M_1 Deviations

There were no deviations in the first monitoring period

M_2 Deviations

There is one change from the parameters described in the Project Description. The parameter $\delta_{LE}, \hat{\delta}_{LE}$ was listed in the PD with a value of 0.4498, it was subsequently discovered that the equation was incorrect and with the corrected equation the parameter was recalculated at -0.564. There have been no other major deviations from the monitoring plan described in the PD, section 13 Monitoring, or in the monitoring standard operating procedure documents: 'Standard Operating Procedure - Biomass' and 'Standard Operating Procedure - Soils'.

The plot sampling team has been expanded to 13 members, and the biomass monitoring team is now fully implemented and operational, with a manager, Mwangi Githiru, a Biomass Monitoring center and 3 full-time members, as well as seasonal interviewers

M_3 Deviations

There is one change from the parameters described in the Project Description. In the first year of the Project 5 leakage plots were moved, however in this monitoring period it was discovered that due to an over-site the leakage model had not been updated to reflect the new plot values. With this update the parameter $\delta_{LE}, \hat{\delta}_{LE}$ has changed from -0.564 to - 0.762.

M_4 Deviations

There were no deviations in this monitoring period.

M_5 Deviations

The KCRPI has one deviation from the Project's CCB Project Description. In the CCB PD it states that the Project Start Date is 01 January 2006, and that the Project Lifetime is 20 years. However, the Project's VCS PD and every Monitoring Report and Project Implementation Report has stated the Project Start Date to be 01 January 2005, and the Project Lifetime to be 30 years. The KCRPI Project Start date is 01 January 2005, and the Lifetime is 30 years.

The Project also has one deviation from the VCS Project Description. A Project schedule is listed in the PD in Section 5.2. After reading and attempting to interpret the AFOLU requirements, the assumption was made that baseline reassessment should be performed every 10 years following the date of project validation, not 10 years after the project crediting period start date as the schedule in the PD indicates. Specifically, as the m5 monitoring period ends on December 21, 2017 and a baseline reassessment has not yet been performed, there was a deviation from the schedule in the PD, which indicated that a baseline reassessment was required by January 1, 2016.

During this monitoring period, some Project procedures were revised, including the disturbance monitoring plan and soil sampling and bulk density sampling standard operating procedures. Supporting

the Project's adaptive management practices, we consistently update procedures and protocols to incorporate new techniques and methods that will improve data quality, reduce error and ensure repeatability. Both updated protocols were provided to the auditor for review. The soil bulk density sampling procedures were updated to include improvements on the field measurement of bulk density using a pit method. The soil sampling procedure was revised to add better clarity and to integrate the bulk density sampling procedure. The disturbance monitoring procedure was revised to add a simplified method for quantifying emissions from a deforestation event. Whereas previously it was required that new sampling plots be added in the area of deforestation to determine the emission, this revision provides the opportunity to delineate the disturbance area, placing it entirely in a non-forest strata, and assume that all biomass has been destroyed and emitted.

M_6 Deviations

During this monitoring period we updated the Project's crediting area. We are required to use the legal areas as detailed in the ranch deeds for the carbon credit calculations. However, as these areas were determined approximately 70 years ago using analog field survey methods, those exact areas cannot be recreated using digitization techniques in GIS. The project boundaries were created in GIS by using the ranch area descriptions and specifications as contained in each deed map, however, this resulted in total areas that were different than as documented in the deeds. Therefore, the validated approach is to use an adjustment model the that aligns the ranch areas as determined with GIS to match the legal areas listed in the title deeds. In this model if the GIS area is larger than the legal (title deed) area we subtract the difference from the strata with the highest carbon stock, whereas for ranches where the GIS area is smaller than the legal area we add the difference to the strata with the lowest carbon stock.

This change is the most conservative option available as the adjustments made are all done in the most conservative manner possible. There has been no change to the validated Project Area or Project boundary.

M_7 Deviations

During the m_7 monitoring period we revised the Disturbance Monitoring Plan (please see "Standard Operating Procedure-Disturbance Monitoring Plan-v3.0_2021-09_22) to clarify language to conform to our intent, and our practice since the start of the Project, which was – and continues to be – that we firstly identify areas of potential significance if they are greater than 250 ha, and we subsequently measure significance (or lack thereof) using the comparison method described in the Disturbance Monitoring Plan. This deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario. This deviation does not impact the application of the Disturbance Monitoring Plan procedures, and is in compliance with the methodology VM0009 requirements.

We have also revised the forest inventory SOP (please see "Standard Operating Procedure Kasigau_Phase I - Forest Inventory v3.2_2021-11-15") to clarify the shrub measurement procedures and ensure that they are aligned with the PD and the original procedures used for the shrub destructive harvest. This deviation only affects the monitoring of the project and does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario. This deviation is in compliance with the methodology VM0009 requirements.

2.2.5 Risks to the Project (G3.5)

Identified major risks that could impact the Project are as follows:

- Changes in legislation – government expropriating land through e.g. a compulsory purchase for development scheme. As the Government of Kenya has been supportive of KCRPI and there is no recent history of expropriation of private conservation lands, this risk is considered very low. We will continue to seek international press for our Project, as keeping it in the spotlight promotes awareness, and reminds the Government of the value it is adding to the country of Kenya.
- Income – risk that revenue from the sale of carbon credits falls short of Projected sales or credit prices to sustain the Project's solvency. Financial sustainability was modeled at extremely conservative carbon offset credit sale values and volumes. This Project is a very popular Project with high potential value in the marketplace. The likelihood of financial insolvency is therefore deemed to be very low.
- Crop failure - substantial and repeated crop failure in surrounding communities could lead to increased poaching and use of the forests for financial benefit. This risk is high. The majority of alternative economic development efforts are aimed at mitigating this risk.
- Invasion of cattle grazers due to famine in adjacent communities, or lack of grazing elsewhere - Although an influx of cattle would affect herbaceous vegetation (grasses) in the Project area, it would not result in a significant carbon stock change. This risk is considered to be moderate, especially as Somalis have used the land in this area to feed and water their cattle over the years, sometimes with permission from landowners and sometimes without. However, given the increasing aridity in the area, we believe Somali cattle herders will be forced to look elsewhere for rangelands. We will apply carbon funding to increase ranger patrolling to better protect the Project Area from illegal incursion.
- Drought – drought is an increasing reality in this region of Kenya. We anticipate that climate change will worsen this problem throughout the Project crediting period. Drought inherently introduces two additional risks:
  - Wildlife – drought places severe stress on wildlife in the Project Area. However, many of the species living in this ecosystem are extraordinarily drought-adapted, and have little problem surviving for extended dry spells. For those that aren't, we plan to continue to provide emergency water sources at all the ranches in the Project Area. More detail on this issue is provided in the CCB PDD in Section GL1.2.
  - Cash crops – drought will render the survival of cash crops, such as Jojoba and citrus more difficult. These high value cash crops will be planted sparingly so as to minimize water demand. Additionally, they require much less water than a comparable maize field, and can survive higher temperatures, provided they receive some water. Farmers will be able to provide this in order to preserve the financial value of the crop under Project funding.
- Fire – grass fires are common in the region due to intense heat and dry conditions. Naturally occurring fires are extremely rare, with the majority caused by humans, either accidental or intentionally set. Our strategy is to continue educating the local population, especially the youth, about the dangers of burning fallows, which is often done to improve grazing for their animals. Fires tend to burn the grasses and shrubs, but move very quickly, and typically don't kill trees, as native species are generally grass-fire tolerant.

2.2.6 Enhancement of High Conservation Values (G3.6)

KCRPI contains a dryland forest biome that doubles as an important migratory corridor and range extension area, especially for elephants and other wide-ranging wildlife like big cats from the protected parts of the Tsavo Conservation Area. It was recognized as part of one of the key Wildlife Migratory Corridors and Dispersal Areas by KWS in a recent analysis[16] and contains several critically endangered species, including Grevy's Zebra, African Wild Dog and several vulture species, as well as those considered under other global threat categories (Endangered or Vulnerable) (e.g., Lion, Cheetah, African Elephant, Martial eagle, Bateleur and the Secretarybird). Mt. Kasigau is within the Project zone and represents an important site housing a threatened cloud forest ecosystem. It provides basic ecological services for wildlife, especially during extended dry spells, whilst also providing critical livelihood and cultural resources for local communities.

Wildlife Works' entire KCRPI is set-up to maintain these High Conservation Values (HCVs) within the Project area and at Mt. Kasigau along four main fronts: security provision, habitat improvement, mainstreaming monitoring and supporting research and conservation in critical landscapes.

1. **Security provision and enhancement**: After peaking in 2013-2014, commercial elephant poaching within KCRPI and around the Tsavo Conservation Area has been declining since 2015 and continued its downward trend for this reporting period (2021). However, there was greater elephant mortality due to a combination of factors including a prolonged drought leading to natural deaths and retaliation from human-elephant conflict leading to four (4) poisoning incidents. Wildlife Works has instituted several permanent initiatives to address the poaching and other emerging problems affecting protection and conservation of these HCV species:

- Larger and better equipped ranger force: the KCRP ranger force has been increased to over 100 (about 10% women). In addition, we have maintained a large watchmen pool (currently 22) in order to free up rangers for wildlife security matters. Rangers maintain approximately 10 daily foot and car patrols from 8 outposts distributed across the Project area. These patrols are coordinated by our head of security, Eric Sagwe, every day to ensure complete coverage of the Project area, whilst focusing on known areas of greatest risk, such as entry points and high charcoal production areas. We also now run regular aerial patrols using two resident gyrocopters that support the ground patrol teams and enable faster response to human-wildlife conflict incidents
- Ranger Posts: All ranger posts remain well serviced and maintained to ensure they remain operational as bases for our ranger force, especially in terms of reliable solar power supply to ensure phones and two-way radios are always charged, and other important amenities like water.
- Kenya Wildlife Service (KWS) collaboration: Wildlife Works rangers remain an unarmed force. To help protect the rangers and coordinate larger actions, the working relationship with the KWS Special Operations Teams initiated in 2012 has been maintained and mainstreamed. Indeed, KWS now has several permanent mobile patrol teams physically based on the ranches along the Kasigau Corridor (most of which are within the REDD+ Project Area) moving bases as need be, mainly dealing with commercial (armed) elephant poaching issues.

[16] Gordon O. Ojwang', Patrick W. Wargute, Mohammed Y. Said, Jeffrey S. Worden, Zeke Davidson, Philip Muruthi, Erustus Kanga, Festus Ihwagi and Benson Okita-Ouma (2017). Wildlife Migratory Corridors and Dispersal Areas: Kenya Rangelands and Coastal Terrestrial Ecosystems

- Collaboration with other organizations: Wildlife Works continues to engage like-minded organizations or individuals in undertaking critical research (e.g., Save The Elephants and the Sheldrick Wildlife Trust), bolstering conservation and fighting the poaching menace, including use of tracker dogs and additional air patrols. Wildlife Works maintains and operates two gyrocopters that fly over the Project area on an almost daily basis, collecting vital information for security and biodiversity monitoring. We now have two pilots on-site fulltime: Dan Zuma and Keith Heyler. Lastly, Wildlife Works has engaged Sensing Clues (https://sensingclues.org/), to develop and adopt their Cluey App which helps capture and relay patrol data near real-time. This makes it safer for the ranger teams working on the ground and more effective in responding to incidents, especially those detected from the air.

2. **Habitat enhancement in Project Area**: Water is the primary limiting resource in this dryland ecosystem. Wildlife Works continues to improve water availability for wildlife in the Project area by scooping (desilting) existing or old water pans/waterholes to enhance water retention after the rains. Wildlife Works continues to maintain the wildlife-only borehole within the Project area located at Salama Dam on Rukinga Ranch, and also sunk a second borehole in Rukinga near Gate 5-5 that serves as an additional water source for wildlife in the northern part of the ranch. Both these boreholes greatly help avert human-elephant conflict, since many conflicts occur when elephants are in search of water outside the ranches.
   - Habitat enhancement around Mt Kasigau: during the 2021 reporting period, a total of 394 seedlings were planted in and around the mountain in neighboring schools and farms in an effort to reforest the landscape and agricultural matrix and reduce pressure on montane forests. In addition to private farms, other sites planted included: Moi Boys High School, Jora Primary School, Rukanga Primary School, Kiteghe Primary School, Kasigau Girls Secondary School and Bungule Primary School. Survival is monitored annually by our greenhouse team (see report under Section 4.3.2.1.).

3. **Mainstreaming monitoring**: the detailed biodiversity and social monitoring activities (outlined in Sections 4 & 5) illustrate Wildlife Works' efforts to maintain high quality data collection to aid in evaluating Project impacts and informing adaptive management. The Wildlife Works Research Camp has been maintained since 2012 and was expanded in 2014-2016 to include a fully functional campsite with several safari tents available as extra accommodation for visiting researchers. Additional renovations and expansion were begun in 2021 and are ongoing. Wildlife Works' Management maintains a long-term view of entrenching the monitoring and research components that will support implementation of the 30-year REDD+ program, as well as general long-term conservation and management of the expansive Tsavo Ecosystem. For instance, based on our knowledge of the area and wildlife and community data we were involved in the Environmental and Social Impact Assessment (ESIA) discussions around the standard-gauge railway development and are currently engaged in discussions around a planned Nairobi-Mombasa Expressway, plus multiple other EIA evaluations for the various proposed developments in and around the Project Area. Our aim is to try and ensure known key wildlife habitats, migration areas and corridors are avoided where possible, or impacts mitigated in areas where development is deemed unavoidable.

4. **Supporting conservation in critical landscapes**: Within the KCRPI Reference Area are the Taita Hills, whose indigenous forests hold globally important biodiversity, and are part of the Eastern Arc

Mountains Hotspot. They are recognized as an Important bird area in Kenya, due to the presence of the two Critically Endangered bird species: the Taita Thrush and Taita Apalis. Dr. Mwangi Githiru, Wildlife Works' Director for Biodiversity and Social Monitoring continues to serve as the designated BirdLife International's "Species Guardian" for both species[17] and continues to be involved in their research, monitoring and conservation.

2.2.7 Benefit Permanence (G3.7)

KCRPI is a component of a comprehensive conservation effort being executed by Wildlife Works since 1998. It is our intention to utilize carbon funding provided by the REDD+ Project to make necessary investments in job creation and income generation activities to maintain financial stability into the foreseeable future. We have demonstrated the effective management of carbon proceeds throughout the first 5 verification periods, achieving consecutive successful verifications, making it the most advanced REDD+ Project validated under VCS and CCB. The Project has executed carbon rights agreements in the Project area and received carbon proceeds through the sale of credits in the voluntary market as an operational REDD+ Project. As a result, landowners now realize the value of their carbon. It is our intention to get these CRAs registered as full easements against the title deed of the land, although there is no perfected mechanism under Kenyan law yet. Our approach to transfer knowledge and our assistance in creating conservation institutions within the community speak to our desire to ensure climate, community and biodiversity benefits continue in perpetuity.

It is Wildlife Works' intention to create a lasting culture of employment and financial health in the Project's sphere of influence. To that end, every job created thus far, and every job slated for creation in the future upon receipt of carbon funding, is designed to last not only throughout the Project's crediting period, but well beyond. Through job training, such as in our EcoFactory, members of the surrounding communities are currently building their capacity and gaining new skills that will last into the foreseeable future. Carbon revenues have and will continue to change the face of the surrounding communities, and through KCRPI, Wildlife Works has effectively raised awareness about the link between forest / wildlife protection and the availability of sustainable employment. We have made detailed job creation information available to the public and included many of the metrics in the various versions of this document. For every Project activity, as one of the performance indicators, we will be tracking the number of jobs created as a direct result of that activity. Employment information is reported in each MR throughout the Project lifetime. The types of job created by KCRPI activities, whenever possible, are full-time, permanent positions, designed to last well beyond the project crediting period.

2.3 Stakeholder Engagement

2.3.1 Community Consultation (G3.8)

Stakeholder Engagement

Please refer to sections G3.8-G3.10 in the CCB PDD for details on how stakeholders and communities were involved in Project design and consulted during development. This section also describes Wildlife Work's commitment to on-going stakeholder engagement and consultation throughout the Project's

[17] See <E**rror! Hyperlink reference not valid.**http://www.birdlife.org/extinction/pdfs/Taita_spp_Guardian_Action_Update.pdf>

lifetime.

The primary method of communication and consultation with Project stakeholders and communities is through our Community Engagement and Outreach Department. They hold regular meetings with the communities and other stakeholders including schools to both disseminate Project information, and to receive and address comments, suggestions and grievances. Together with a selected committee, they are in-charge of opening Suggestion Boxes that are distributed across the Project Zone including at Chief's Offices for willing community members to drop written feedback including grievances (see *Section 2.3.4*). In addition, the Project office is open during regular business hours and maintains an open-door policy for community members and stakeholders to research Project information or to submit comments. The hours for the Carbon office are 8:00 am to 5:00 pm Monday through Friday. This is the same plan as described in the CCB PDD and has not been amended.

No significant Project changes have resulted from these on-going consultations, but various changes and modifications have occurred, mainly concerning the processes of community engagement and project implementation e.g., election of member to various committees involved in the distribution of community allocations. Communities and stakeholders have provided numerous comments on how to ensure fairness, increase downward accountability and reduce the possibility of corruption in the benefit sharing program. This has led to WWC ensuring greater transparency, for instance in process followed for the election of committee members, or regarding the names of students being provided with bursaries and the names of companies receiving contracts and their amounts.

2.3.2 Public Comment Period Publicity (G3.9)

The Kasigau REDD+ Project Phase I – Rukinga Sanctuary Monitoring Report has been posted for public comment on the CCB website (https://registry.verra.org/app/projectDetail/CCB/562) and open to comments for 30 days, during the period May 25th to June 25th, 2022. The document was also made available to the public in hard copy during the public comment period at our carbon offices in Rukinga, and at several other communities involved in KCRPI, affording local stakeholders an opportunity to review the documents and/or raise any issues.

2.3.3 Distribution of Project Information (G3.9)

The following steps were taken to ensure all stakeholders have access to the MR and are aware of and provided a means to comment on the document during the public comment period:

- An executive summary of the monitoring report was made available in English and Swahili at the Project office and distributed to the CBOs, LCCs and Project communities.
- WWC community relations staff actively communicated to community members the start of the Public comment period at recent community outreach meetings and encouraged them to file comments. Community relations officers will also make note of any verbal comments and ensure their registration.
- A computer was made publicly available at the Project office for submitting comments directly to the CCB website. All Public comments received in writing are provided to the VVB.

2.3.4 Conflicts and Grievances (G3.10)

The grievance redress mechanism enables individual stakeholders, groups or communities across KCRPI to contact us if they have an inquiry, a concern or a formal complaint regarding any element related to the environmental and social performance of the Project. It is mainstreamed into our broader stakeholder engagement process. The Community Engagement and Outreach Manager is responsible for receiving, registering and processing all grievances. We have established procedures to help us screen, investigate and determine resolution and redress options, as well as systems to communicate decisions taken and progress on pending actions. This helps ensure the grievance mechanism remains accessible and trusted.

Stakeholders across KCRPI have five ways of registering their complaints or concerns, which they do either orally or through writing:

i. **Open-door company policy**: Wildlife Works maintains an open-door policy for all community members whereby they are free, if they would wish to, to walk in and personally register a complaint with the appropriate member of staff, including senior management. Wildlife Works retains its main operating base within the Project area to ensure accessibility of key members of staff and management to community members.
ii. **Through the Chief's Office**: the REDD+ Project area covers six administrative locations each headed by a Chief. Wildlife Works strives to engage these key leaders in all our operations involving the communities e.g., to organize community meetings during our SBIA workshops. They are also key arbiters in cases where Wildlife Works are unable to resolve an issue or complainant. Grievance forms are also available at Chief's offices, and Wildlife Works meets with the Chiefs periodically to collect completed forms. When forms are dropped into REDD+ Project's suggestion boxes outside Chief's Offices, we adhere to the chain of custody procedure described below.
iii. **Suggestion boxes**: Wildlife Works has installed suggestion boxes across the Project area at Chief's Offices. Chief's Offices are established such that they are accessible to most members in a Location. They are opened once a month by a team comprising a community representative, a Chief or Chief's representative, and a Wildlife Works staff member. All comments and complaints are registered, and the team agrees on how to respond to them depending on the issue and following the procedures and guidelines.
iv. **During community meetings**: as mentioned above, the Chief is involved in setting up various community meetings (termed "Barazas" in Swahili) and community members are free to air any complaints or feedback during these meetings. Wildlife Works maintains records and minutes for all meetings and follows up with the individual complainants in the case of specific grievances, or with the Chief's Office for general complaints.
v. **Online via the CCB/VCS websites**: this is especially during the Public Comments Period when Project audits – validation and/or verification – are conducted. Members of communities with access to the internet can register any complaints/feedback directly. Those without such access can use any of the procedures above to register complains or comments, especially through the CBO or Chief's Office using paper grievance forms.

A total of 10 comments were received from the Project communities in the monitoring period. All submissions were made through suggestion boxes. Of these, the majority were requests or suggestions (59%) and project compliments (38%); the rest were a clarification request and a complaint. The complaint was related to human-wildlife conflicts and the claim that some community members had been

harassed by Wildlife Works' rangers. To address this issues, Wildlife Works' community outreach and security departments organised a baraza (meeting) that included a friendly football match between the youths and the rangers where there were mutual discussions about the conflicts, where they originated from and how to avert them in future. Use of unnecessary force was also discussed and would be avoided in future in-line with the Wildlife Works' Security Policy and Procedures.

2.4 Management Capacity and Best Practices

2.4.1 Required Technical Skills and Expertise (G4.2)

Wildlife Works is managed by Mike Korchinsky, a serial entrepreneur, with significant large company management expertise. Mike is supported by Colin Wiel who is a successful entrepreneur in his own right and the founder of the San Francisco chapter of the Keiretsu Forum, a world class angel investor forum.

Key personnel in this Project include:



Wildlife Works' CEO and Founder - Mike Korchinsky, who has been a large-scale owner of conservation lands in Africa and Canada for almost 15 years. Previous to founding Wildlife Works, he followed a very successful business career. Through this he gained experience in managing multi-million dollar projects all over the world, some of which had as many as 5,000 team members, and in which he was he was responsible for all profit and loss accounts. In addition, he also has experience in being a member of the executive team of a U.S. public company.

Mike founded Wildlife Works in 1997. Since then it has come to be respected by many leading conservation groups in the world as a model for community-based conservation. Mike and his team on the ground in Kenya have successfully steered Rukinga Ranch through many challenges over the years and succeeded in creating the vibrant biodiversity sanctuary that it is today. Mike has contributed extensively to the development of AFOLU carbon accounting methods and credit markets, and his achievements would run off of this page if listed in their entirety.

Director of Regional Operations – Jamie Hendriksen



Jamie is the head of all operations for the KCRPI and KCRPII Projects, including the design, operations, budget, construction and management of the expansion plans to all the new ranches within the Project area. Jamie is additionally responsible for all aspects of land management of the 30,168.66 ha Rukinga Ranch, plus additional lands of over 200,000 ha that Wildlife Works manages for conservation. He was head of operations under our previous manager, Rob Dodson, and supported Rob in the daily management of the Project. He has extensive knowledge of local and regional biodiversity. Prior to Wildlife Works, Jamie has over 11 years' experience in running high-end tourist lodges throughout Africa. He is skilled mechanically, trained in Project management, and completes jobs quickly and professionally. He is fluent in Swahili and has had great experience operating in Wildlife Sanctuaries, often in high-conflict areas. He is a skilled communicator, negotiator and team player.

VP Carbon Development – Jeremy T. Freund



With over 20 years' experience in the fields of remote sensing, GIS and physical geography, Jeremy brings broad scientific and technical knowledge to the Wildlife Works Carbon management team. With a B.S. in Aerospace Engineering from the University of Colorado at Boulder, Jeremy worked for several years on satellite communication software. After getting a Masters in geography from the University of California, Santa Barbara, where he developed a crop monitoring system for Kenya as part of the Famine Early Warning System Network (FEWS NET), Jeremy then spent several years working in applied natural resource science, moving steadily toward conservation science, including several years at UC Berkeley's College of Natural Resources developing GIS / remote sensing solutions for natural resource science and forest monitoring systems. Jeremy has been with Wildlife Works for 10 years, where his primary responsibilities include carbon accounting and accreditation management for REDD+ Projects and national REDD+ Programs as well as development of new and innovative geospatial techniques for AFOLU Carbon accounting and MRV. Jeremy also oversees WWC's technical advising efforts for national and jurisdictional nested REDD+ Programs and has worked with several key forested nations to develop their national reference levels and nesting strategies.

Other key management roles to ensure successful continuation of all Project Activities include the following:

Sewing Factory Manager – Daniel Munyao



Daniel is a Kenyan citizen, also from the Kamba tribe. He is an experienced sewing factory supervisor, having held positions at several large factories in Nairobi and Mombasa prior to joining Wildlife Works in October 2002. He began his career in 1982 as a machinist and worked his way up through the management ranks. His wide experience of all aspects of apparel production, together with his personal attributes of being an excellent team player, a positive reinforcement style manager, and needing little or no supervision on a day to day basis. This makes him an invaluable resource for us in managing our sewing factory in the bush.

Community Relations and Human Resources Manager- Lenjo Laurian



Lenjo is of Taita origin from the local community and was one of our first employees. He was hired in January 2001 as a storekeeper and assistant to the previous site manager Alice Ndiga He was trained into the position he now holds. His skills include people management, cultural knowledge of local community norms, basic administration computer skills such as Word and Excel, excellent verbal and written communication skills with fluency in English, Swahili and Taita and excellent conflict resolution.

Director of Biodiversity and Social Monitoring – Dr. Mwangi Githiru



As Director of Biodiversity and Social Monitoring, Mwangi's main role is to formulate biodiversity and social monitoring plans, and lead research teams undertaking surveys and studies geared towards evaluating the impact of Wildlife Works' REDD+ programs in Africa. He has a Ph.D from the University of Oxford, England, and has held a Post-doctoral position at the University of Antwerp, Belgium and a fellowship at Brown University, USA. Previous to his employment at Wildlife Works, he worked on the governmental level as the Deputy Director of Research in the Ministry of Higher Education, Science and Technology.

Director of Forest Science - Simon Bird



Simon has been working in the forest ecology and environmental conservation industry for over 10 years. Simon has a B.S. in Environmental Science and a M.S. in Soil Science from the University of Vermont. Simon works in the Carbon Technical Development department at Wildlife Works Carbon's San Francisco California office. There he assists with the development of REDD projects, including the validation and verification process and the annual monitoring, reporting and verification for existing REDD+ projects. Simon's duties include overseeing biomass sampling methods and protocols, forest modeling, and technical writing and reporting to both the VCS and CCB standards. Simon has additionally participated in the revision process of VCS REDD methodology VM009.



Head Wildlife Ranger - Eric Sagwe

Eric grew up less than 1 mile from our Project headquarters and was originally hired as a young man with no formal training to be a wildlife ranger in the sanctuary. At that time the Head Ranger was Ekiru Mirimuk from a different region of Kenya, who had been brought in at the start of our Project because he had specific knowledge and experience with managing a ranger force in the Kenyan bush, to patrol and to perform anti-poaching and other activities. When Ekiru retired, Eric was promoted to Head Ranger. His skills include motivation and leadership by example, tracking, patrol design and supervision, wildlife recognition and bush awareness and conflict management.

Conservation Project Manager – Cara Braund



Cara has been with the Kasigau Corridor REDD+ Project since January 2012, and has been involved in various aspects of the Project, including managing the office operations, communication with international and local stakeholders, supervising operations and ensuring departmental coordination. Based at the Kenyan Headquarters, one of her primary roles is communicating with the local landowners regarding the progress of the Project, including giving them revenue updates. Cara also assists Jamie Hendriksen, Director of Regional Operations, in various aspects of work, and serves as a primary or secondary point of contact for external stakeholders and Project partners such as NGOs, private sector operators and government agencies. Cara handles logistics for national and international visitors to the Project.

Senior Research Scientist- Dr. Geoffrey Wambugu



Geoffrey has been working in the field of environmental conservation for over 15 years. He joined Wildlife Works in 2021 as a Senior Research Scientist where he is now assisting Dr. Mwangi Githiru, Director of Biodiversity and Social Monitoring in technical and scientific functions of the directorate. He has a PhD from University of Nairobi (Environmental Planning) and has held a Smithsonian postdoc fellowship from Mpala Research Centre in Kenya. His work includes executing Wildlife Works' Biodiversity and Social monitoring strategies for the KCRPI and KCRPII projects, supporting REDD+ projects' validation and verification audits and linking with relevant REDD+ policy processes nationally and internationally.

2.4.2 Worker Training (G4.3)

Wildlife Works has always provided training for its employees in Kenya, starting from the early days when we built a factory and taught local women how to sew from first principles. We have trained local wildlife rangers, factory workers and supervisors, organic greenhouse workers, personnel managers, and forest inventory specialists (plot sampling teams). We have developed robust training programs for Wildlife Works rangers, factory workers and greenhouse workers. The most recent specialized hires have been for the Biodiversity Monitoring Team, which involves geo-location of animal sightings, detailed inventory management and reporting and skilled field techniques. Each department works to cross-train employees, so that to the fullest extent possible, all members of a department can perform relevant tasks required by the department. Therefore, while there may be specialized tasks, tools used or processes utilized in a department, we strive for breadth of knowledge for all employees, with the aim of affording all departmental employees with the capacity to perform all tasks required and cover any position needed. Additionally, we design our training systems to promote employee mobility within the company.

2.4.3 Community Employment Opportunities (G4.4)

As mentioned above in section 2.1.1, Wildlife Works has supported the development of community-based organizations (CBOs), whose aim it is to win and manage carbon-funded activities. The CBOs are trained in grant writing and management, project management, accounting and other key skills pertinent to developing the communities in the area. The goal is for these CBOs to eventually become 100% self-sustaining. Currently, at their request, the CBOs are under the tutelage and financial support of Wildlife Works. Without carbon funding, the CBOs would not have been implemented, and Wildlife Works is proud to be able to afford the communities in the sphere of influence of the carbon Project with the capacity to manage their funds accordingly.

The project maintained 58 employees at the end of this monitoring period, of whom 28% were female, 99% are Kenyan and over 85% are local (i.e., from the Project Zone or Taita Taveta County). 5 additional permanent staff members were hired during this monitoring period.

To ensure and maintain equal opportunity hiring practices, the following process has been developed and is implemented by the Project Office.

Wildlife Works Jobs Advertisement

When a vacancy arises, we advertise / announce it so it reaches all the locations within the Project area through local administrators (Chiefs), CBOs and our community relations department.

Positions are advertised for a minimum of one month (30 days), after which suitable candidates from all locations are shortlisted according to the information listed on their application. As many suitable candidates as possible are invited for interviews. We conduct transparent interviews with the objective of filling the position with optimal candidates, but priority is given to women and disadvantaged groups, ensuring they are well represented and given a fair chance, as described in Wildlife Works' HR Policies.

We ensure that the entirety of the KCRPI Project Area is well represented, promoting equal opportunity for training for those that may lack necessary skills, but wish to be involved.

Wildlife Works Recruitment and Selection Policies

Recruitment Policy & Procedure

Policy Statement

Wildlife Works' policy is to be an equal opportunity employer. We shall not, as part of recruitment, discriminate based on gender, age, race and ethnicity or entertain any form of discrimination. The company shall ensure that all employee requisitions, interviewing, and hiring shall be performed in an effective manner with the objective to fill positions with the best available candidates.

Purpose

The purpose of this policy is to ensure that a transparent and unbiased recruitment and selection process is followed - one that results in the appointment of the best candidate, based solely on merit and best-fit with the organizational values, philosophy, and goals in mind.

Equity & Diversity Policy

Policy Statement

Wildlife Works' policy is to provide equal employment, educational and social opportunities for all employees, without regard to race, colour, religion, sex (including pregnancy), national origin, age, status, disability, political affiliation, sexual orientation, gender identity or genetic information at any given time. Wildlife Works is committed to the principle of excellence, with respect for all.

Equal Employment Opportunity & Affirmative Action

Wildlife Works prohibits discrimination and any form of harassment, provides equal employment opportunity without regard to race, HIV / AIDS status, pregnancy, mental status, colour, religion, gender, trade affiliation, ethnicity or national origin, political or other opinion disability, sexual orientation or preferences of age.

The company is committed to recruiting, hiring, and promoting qualified minorities, such as women and individuals with disabilities within the surrounding community and within the workplace.

2.4.4 Relevant Laws and Regulations Related to Worker's Rights (G4.5)

Wildlife Works operates within all local and national employment laws and has been doing so for over 16 years in the country of Kenya. Like any business, Wildlife Works is subject to periodic audits by the

Government Employment Officer. We have passed all inspections, whether from local officials or International agencies such as Verite.

Laws relevant to this Project are as follows:

EMPLOYMENT LAWS

Export Processing Zone's Act (Cap. 547)

As an Export Processing Zone (EPZ) company, we are exempted from the standard Labor Laws of Kenya. Instead, we must conform to those laws that that have been deemed applicable to General Provisions of the Employment Act (Cap 226-229) or amended for EPZs as covered by the Export Processing Zone's Act (Cap. 547).

National Health Insurance Fund

N.H.I.F was established on 12th July 1966 by an Act of Parliament (Cap 255) of the Laws of Kenya, and later became a state corporation on the 15th February 1999 through an Act of Parliament no.9 of 1998. The objective of its establishment is to enable majority of Kenyans to access healthcare services at supplemented costs. Contribution to the fund are compulsory for all persons whose income is Ksh.1000/= and above. To ensure our full compliance with this regulation a Wildlife Works representative visits the NHIF offices in Voi monthly. Our monthly payroll is submitted and the NHIF staff calculates our monthly contribution, which is then paid in full. Additionally, we are subject to random checks by the NHIF inspector, who makes unannounced visits to our facility to inspect our books. We have always been found to be in full compliance of this act.

The National Social Security Fund Act (Cap 258)

The National Social Security Fund Act of 1965 created this fund for the benefit of the members. It is a compulsory savings scheme into which the employer pays a statutory contribution for every employee who is a member. We physically go to the NSSF offices in Voi monthly to submit our monthly payroll on a NSSF form, and we pay the monthly dues. We are subject to strict audit checks by the NSSF inspector who visits our facility every two months and on passing the audit provides us with an official letter indicating we are in compliance. We have always been found to be in full compliance of this act.

Pay As you Earn (P.A.Y.E)

Section 37 of the Income Tax Act.

The "Pay as You Earn" method of deducting income tax from salaries and wages applies to weekly wages, monthly salaries, annual salaries, bonuses, commissions and directors' fees (whether the director is resident or non-resident). We are required to go to the Kenya Commercial Bank (KCB) on a monthly basis to pay the withheld tax from our employees' wages and salaries. The bank takes one folio from our KRA receipt book, and stamps the other two folios, one of which we then take to the KRA office in Voi and provide it to them.

The Factories and Other Places of Work Act (Cap 514)

The Factories Act deals with the health, safety and welfare of an employee who works in a factory or other place of work. This Government department has never audited our facilities, as it is very small and covers the entire country. However, we have good reason to believe we are in full compliance with this act as a result of a third-party audit of our factory and operations performed by the independent NGO Verite, from the USA.

FairTrade

As of 2012, the 3 Wildlife Works EcoFactories are now certified Fairtrade USA.

The Work Injury Benefits Act (Cap. 236)

This Act ensures that companies have systems in place to provide any employees who are injured on duty with adequate compensation from the employer. We are required to maintain private insurance to cover our responsibility under this act.

Regulation of Wages and Conditions of Employment Act (Cap. 229)

This act sets the conditions of work and the minimum wage guidelines. The EPZ Act supersedes this act with regard to minimum wage and in fact the EPZ minimum wage guidelines are slightly higher than the National Employment Act guidelines.

Labor Relations Act, 2007 (Acts No. 14)

This is the new version of the old Trade Unions Act and the Trade Disputes Act, revised to harmonize the old Trade Acts with Kenya's recent ratification of many of the elements of the ILO Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87). We are required to provide our workers with the freedom of association. We are required to honor a dispute process as laid out in the act. We currently have no collective bargaining agreement in place nor are we required to do so. We have never had a dispute with any employee that resulted in any collective action, lock out etc. and we have no disputes at all at this time, and we believe that we are in full compliance with this Act. To ensure that employees are aware of their rights under the Act, the following language is included in all employment contracts issued by Wildlife Works in Kenya.

"Wildlife Works, EPZ Ltd. acknowledges the importance of the recently enacted Labor Relations Act 2007, and therefore we wish to inform you that you are entitled to Freedom of Association, and specifically to join the Kenya Textile Workers Union (KTWU) should you so choose. Should you choose to join the KTWU, all membership dues and agency fees for the Union will be payable directly by you."

2.4.5 Occupational Safety Assessment (G4.6)

As outlined in the company's Occupational Health and Safety Policy and Procedures Manual, Wildlife Works is committed to worker safety. In the field of wildlife management, it is impossible to remove all risks associated for rangers who spend every day in the bush with wild animals. Furthermore, due to the illegal ivory trade, armed poachers are present in the Project Area. In January of 2012, one ranger was killed and a second severely injured in an ambush attack by poachers. In response to this incident, rangers have been outfitted with improved field medical kits designed for application in life-threatening situations in remote areas. Special training in the use of these kits has also been provided to reduce the risk of serious injury or casualty. We provide full training and close guidance for our rangers, instructing them on how to avoid conflict with armed poachers and wildlife. This includes continued partnership with Ranger Campus, a non-profit organization which trains rangers in health and safety best practices and first-aid. In 2020, two rangers were killed in separate attacks by elephants. Joseph Ngeti and and Jessica Njeri were both dedicated rangers and killed in the line of duty while protecting the Project Area. The first incident was caused when a female elephant was trying to protect a baby elephant caught in a poacher's snare, and consequently attacked the ranger patrol. The second incident occurred when a bull elephant that had "gone rogue." We coordinated with the Kenya Wildlife Services to remove it from the ranch it was

thought to be located in. All traffic in the ranch was stopped and as an additional safety precaution, only vehicles that were accompanied by two armed Kenyan Wildlife Service rangers were allowed to move anywhere in the ranch. However, despite these precautions, the elephant attack was both too sudden and brutal to ultimately prevent. WWC reviewed both incidents very closely, and it was determined that these were simply very unfortunate freak incidents and were not the result of an operational mistake or error made by the rangers. Our rangers' safety is vital; therefore, Wildlife Works is actively seeking to learn from these incidents and revise procedures and training accordingly. Wildlife Works' rangers receive ongoing trainings, and we are in the process of training more instructors within the ranger base. WWC is also investigating technologies that could be employed to identify nearby wildlife and alert rangers to their presence; however, no such technology has been found to be viable and/or useful in identifying risks. Despite well-planned ranger patrols and the wealth of experience rangers have in the bush, the position is inherently dangerous. Therefore, we insure all our full-time employees under the National Health Insurance Fund (NHIF) and the National Social Security Fund (NSSF), which also covers spouse and children. In addition, as a company policy, we provide each employee with up to Ksh 10,000 worth of medical allowance at the local doctor in the nearby town of Voi.

As part of our partnership with PUMA, we underwent a PumaSafe Audit. This was to ensure that the Wildlife Works EcoFactory met PUMA's standards for workers' rights, and health and safety. As part of this audit a first-aid room was built and equipped, as was a staff kitchen and canteen. The Kenyan Red Cross held two training sessions in first aid and personal health, training 40 EcoFactory workers, rangers and greenhouse staff.

Table 1: An assessment of the hazards associated with key jobs performed in the KCRPI.

Hazard	Mitigation
Sewing Factory Employees	All risks are identified in training manual provided to Validator along with how to avoid risk.
Needle sticking fingers	Finger guards are provided, sharps bin is provided for safe disposal of needles that are replaced
Inhalation of fibers	Face masks are provided
Fire	Fire exits clearly marked, no smoking in factory, firefighting stations in factory, three doors out of facility
Greenhouse Employees	All risks are identified in training manual provided to Validator along with how to avoid risk.
Exposure to Chemicals	Only non-toxic chemical free organic materials used in Greenhouse therefore no toxic or caustic chemical exposure. Rubber

	gloves and protective eye gear provided if needed.
Inhalation Hazard	Only non-toxic chemical free organic materials used in Greenhouse therefore no toxic or caustic chemical exposure. Masks provided during spraying of organic pesticides.
Temperature Extremes	Frequent breaks and availability of water during hot conditions. Shade cloth covering of work area.
Slip, Trip and Fall	Ensure work is clear of all slip or trip hazards before work begins.
Lifting	Use proper lifting techniques, always get help for lifting heavy objects.
Cuts	Wear gloves, keep tools sharp and always be aware of the proximity of fingers to blades when making cuts.
Electric Shock	There is no electricity at all at the Organic Greenhouse.
Pinching and Crushing Points	Wear gloves, keep tools sharp and always be aware of the proximity of fingers to blades when making cuts.
Inclement/Adverse Weather	Organic Greenhouse located adjacent to Ranger station, so employees can retreat indoors in adverse weather.
Snakes, animals	Keep greenhouse floor clear of organic debris for clear visibility, always be aware of the possibility for snakes, spiders, scorpions to be present, and do not approach or touch if seen.
Wildlife Works Rangers	All risks are identified in Ranger training manual provided to Validator along with how to avoid risk.
Elephants, Lions, Buffaloes, Snakes etc.	Training is given in how to approach, identify and stay a safe distance from potentially dangerous animals. First Aid

	training is provided in cuts, limb fractures, snakebites, dehydration and other possible health risks. Team design of 6 minimizes risk.
Poachers	Training is given in how to track, and peacefully apprehend poachers if possible and how to avoid confrontation with armed and aggressive poachers. Team design of 6 minimizes risk.
Sun Exposure, thorns etc.	Rangers are all provided with uniforms with long sleeves and long trousers and brimmed hats and boots. Lots of drinking water available at Ranger posts.
Wildlife Works Plot Sampling Team	All risks are identified in Plot Sampler training manual provided to Validator along with how to avoid risk.
Elephants, Lions, Buffaloes, Snakes etc.	Training is given in how to approach, identify and stay a safe distance from potentially dangerous animals. First Aid training is provided in cuts, limb fractures, snakebites, dehydration and other possible health risks. Team is designed to have sufficient numbers to improve lookout and minimize risk.
Poachers / Charcoalers	Team is instructed to avoid contact with any poachers or people producing charcoal. If the presence of any poacher or charcoaler is detected, the team is to immediately leave the area and notify the Head of Security when they are in a safe position.
Sun Exposure, thorns etc.	Each plot team member is all provided with uniforms with long sleeves and long trousers and boots. They are to bring lots of drinking water, which is available in the field at Ranger posts or other company and Ranch outposts.
Injuries from debris or tools during Soil Sampling	The plot team is also provided with personal protective equipment to help mitigate injuries. This includes safety glasses and long sleeves and trousers to protect against

	flying debris while digging. Additionally, they are provided with boots to protect their feet during digging.
WW/Tsavo Soap Factory	All risks are identified in Soap Factory Safety training manual provided to Validator along with how to avoid risk.
Lye	Comprehensive instructions are given on how to mix lye safely, and goggles and gloves are provided for employees.
Oils, Gas heating	Vegetable oils are only heated to 50-55° C, so are only hand warm. Gas stove is simple self-igniting LPG camp stove.

2.4.6 Financial Health of Implementing Organization(s) (G4.7)

Wildlife Works is responsible for project implementation and support with funding coming from successful sale of credits from KCRPI and KCRPII. Project financial information, including the Project's profit and loss statement and carbon credit sales demonstrate the financial strength of this Project. This information is commercially sensitive and will be shared with the VVB at the site visit upon request. All costs associated with carbon inventories and development of project design documents have been met by Wildlife Works.

Financial Health of Implementing Organizations

Wildlife Works Carbon LLC is a Delaware registered Limited Liability Corporation in good standing, majority owned by Wildlife Works, Inc. and Mike Korchinsky.

Wildlife Works, Inc. is a US registered corporation and, as such, is governed by the corporation laws of California which ensure that the company remains financially solvent and able to meet its liabilities.

The company is owned by independent shareholders of good standing and has a Board of Directors comprised of 4 members. It is sufficiently capitalized through its Joint Venture with Wildlife Works Carbon LLC to ensure completion of the Project. Wildlife Works Carbon LLC has also received several high-profile investments from international corporations who support Wildlife Works' mission and believe wholly in its cause. Such deals have included multi-million-dollar investments from Allianz SE and PPR as well as advance purchases from BNP Paribas, Nedbank SA and PPR Home. The KCRPI project has demonstrated strong carbon credit sales over its lifetime, most recently including a large recurring sales contract to supply carbon credits to the International Finance Corporation (IFC) for use in a green bond.

Please see the CCB PDD, Section G3.11 for further details on Project finance. All Project financial information is held at the Carbon Office in Rukinga, Kenya. Wildlife Works also employs a full-time bookkeeper and accountant who is assigned to both KCRPI and KCRPII.

2.5 Legal Status and Property Rights

2.5.1 National and Local Laws (G5.1)

Wildlife Works operates within all local and national employment laws and has been doing so for over 15 years in the country of Kenya. Like any business, Wildlife Works is subject to periodic audits by the Government Employment Officer. We have passed all inspections including nationally required Occupational Health and Safety audits for all our workplaces including offices and factories.

There have been no local laws or regulations in Kenya that have gone into effect, changed or have been eliminated since the last verification event.

2.5.2 Free, Prior and Informed Consent (G5.3)

Wildlife Works conducted a Full Free, Prior and Informed Consent (FPIC) campaign with stakeholders (ranch owners and community members) during the Project's development phase (please see the CCB PDD Section 5.3). Additionally, as part of continuous engagement and consultation, the Project Proponent continually holds meetings with Project stakeholders and the surrounding communities to update them on the Project implementation process, status and any other emerging issues, and receive any new comments, requests, suggestions or grievances from the stakeholders.

2.5.3 Property Rights Protection (G5.4)

Currently and historically, there have not been any communities within the boundaries of the protected area. Therefore, the Project does not currently, and never has, required the relocation of any people. The Project will never re-locate any people that could encroach on the Project Area lands, although we work to actively prevent encroachment. Prior to the project start date, members of the community and / or immigrants had illegally cleared almost 4,000 hectares of the Project Area for farmland, but those individuals involved had returned to their home province or relocated to the newly formed Sasenyi Valley Land Cooperative of their own volition prior to the project start date.

2.5.4 Identification of Illegal Activity (G5.5)

The illegal activities that may be conducted in the Project Area include poaching of animals, both for animal products, such as elephants for their tusks, or for bush meat. Additionally, hardwood trees may be cut down for charcoal production or for building poles. Land could also be cleared for small-scale farms by members of the surrounding communities.

No project benefits are derived from illegal activity. Wildlife Works has established a long and successful track record of monitoring the Project Area for any illegal activities and halting them. As described in other sections of this report, our rangers have caught many poachers and charcoal burners before they were able to do significant damage to the ecosystem and have established a close working relationship with Kenyan government authorities. Wildlife Works always uses non-violent practices when dealing with perpetrators of illegal activities in the Project Area. In fact, the majority of charcoal producers that were arrested for illegal activity are now employed with Wildlife Works in jobs that benefit the environment. Neither the Project, nor members of the community related to the Project, benefit in any way from these illegal activities.

3 CLIMATE

3.1 Monitoring GHG Emission Reductions and Removals

3.1.1 Data and Parameters Available at Validation

Data Unit / Parameter:	α
Data unit:	unitless
Description:	Effect of time on the cumulative proportion of conversion over time for the Project Accounting Area
Source of data:	Reference area and historic reference period
Value applied:	-1.0804558
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	β
Data unit:	unitless
Description:	Effect of time on the cumulative proportion of conversion over time for the Project Accounting Area
Source of data:	Reference area and historic reference period
Value applied:	0.0003792
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data / Parameter	$\hat{\eta}$
Data unit	Real
Description	Estimated linear predictor of cumulative deforestation model.
Source of data	Calculated using Equation 7. Equation 7 is fit using historic observations of forest state in the reference area.
Value applied	0.031649

Justification of choice of data or description of measurement methods and procedures applied	The linear predictor is used to predict the future degree of forestation in the Project Area at any point in time after the project start date.
Purpose of the data	Determination of baseline scenario
Comments	

Data Unit / Parameter:	$\boldsymbol{\theta}$
Data unit:	unitless
Description:	Effect of certain covariates on the cumulative proportion of conversion over time
Source of data:	Reference area and historic reference period
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Time and place in which the logistic model is fit
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data / Parameter	$\delta_{LE}, \hat{\delta}_{LE}$
Data unit	Time
Description	Lag parameter of leakage model.
Source of data	The parameter is estimated from the observed cumulative forest degradation and deforestation, $\hat{d}_t$, observed at the beginning of the Project, t0. This proportion is observed using a sample of plots in the leakage area, and the parameter is calculated using equation 9.
Value applied	-0.762
Justification of choice of data or description of measurement methods and procedures applied	To produce a parameterized leakage model that can be used to predict cumulative deforestation and degradation at any point in time.
Purpose of the data	Determination of baseline scenario
Comments	

Data Unit / Parameter:	$\hat{\lambda}$
Data unit:	proportion (unitless)
Description:	Exponential soil carbon decay parameter
Source of data:	Calculated using empirically measured, project specific data.
Value applied:	0.55
Justification of choice of data or description of measurement methods and procedures applied:	To predict the decay of soil organic matter in the Project Area under the project scenario.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$\hat{\ell}_{max}$
Data unit:	Proportion
Description:	The estimated maximum proportion of soil carbon lost over time.
Source of data:	Measured and calculated by quantifying soil carbon in cultivated areas within the reference area where the time of deforestation is known. The mean soil content from these measurements is then divided by the mean soil carbon measured within the Project Area.
Value applied:	0.4557
Justification of choice of data or description of measurement methods and procedures applied:	Used to determine the proportion of the total soil carbon in the Project Area that would be lost under the without-project deforestation scenario.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	ℓ_{max}
Data unit:	Proportion
Description:	The maximum proportion of soil carbon lost over time.
Source of data:	Measured and calculated by quantifying soil carbon in cultivated areas within the reference area where the time of deforestation is known. The mean soil content from these measurements is then divided by the mean soil carbon measured within the Project Area.

Value applied:	0.4557
Justification of choice of data or description of measurement methods and procedures applied:	Used to determine the proportion of the total soil carbon in the Project Area that would be lost under the without-project deforestation scenario.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$\mathcal{A}$
Data unit:	Set
Description:	The set of all sampled farms in the reference area used to estimate the maximum proportion of soil carbon loss
Source of data:	A sample of farms in the reference area.
Value applied:	See soil sampling records
Justification of choice of data or description of measurement methods and procedures applied:	Observed once prior to the end of the first monitoring period, held constant over entire project lifetime.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	n_{SCL}
Data unit:	Count
Description:	The actual sample size used to estimate the maximum proportion of soil carbon loss.
Source of data:	Is equal to the variable $\mathcal{A}$, the set of all sampled farms in the reference area to estimate $\hat{\ell}_{max}$, the maximum proportion of soil carbon loss.
Value applied:	25
Justification of choice of data or description of measurement methods and procedures applied:	Used in equation 19 to determine the uncertainty in the soil carbon loss model.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{DF}$

Data unit:	standard deviation (unitless)
Description:	The estimated standard deviation of the state observations used to fit the logistic function for the Project Accounting Area BEM
Source of data:	Value calculated from the point observations in the cumulative deforestation model using Equation 17.
Value applied:	0.3127
Justification of choice of data or description of measurement methods and procedures applied:	Used to determine the uncertainty in the cumulative deforestation model and number of leakage plots required.
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	$\mathcal{C}$
Data unit:	set
Description:	The set of all selected carbon pools
Source of data:	Monitoring records
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.' Wildlife Works was responsible for the measurement. All measurements were made between 2005 and 2021.
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	$\mathcal{I}$
Data unit:	set
Description:	The set of all observations of conversion. When superscripted with a monitoring period, the conversion observations are taken for leakage analysis.
Source of data:	Remote sensing image interpretation or field observations in the leakage area.
Value applied:	N/A
Justification of choice of data or description of	N/A

measurement methods and procedures applied:	
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	$a_{project}$
Data unit:	ha
Description:	Area of Project Area
Source of data:	GIS analysis prior to sampling
Value applied:	30,168.66
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	p_{forest}
Data unit:	Proportion
Description:	The proportion of the Project Area that is forested.
Source of data:	Measured using GIS and remote sensing analysis.
Value applied:	0.92
Justification of choice of data or description of measurement methods and procedures applied:	Used to determine the total amount of the Project Area that is forested. Used in equation 33.
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	a_{LE}
Data unit:	ha
Description:	Area of leakage area for the Project Area
Source of data:	GIS analysis prior to sampling
Value applied:	30,168.66
Justification of choice of data or description of	Used to define the area within which plots are established to measure any potential leakage from the Project Area.

measurement methods and procedures applied:	
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	$\widehat{m}_{LE}$
Data unit:	Count
Description:	The sample size in the leakage area.
Source of data:	Equation 10 calculates the sample size of plots needed in the leakage area.
Value applied:	38
Justification of choice of data or description of measurement methods and procedures applied:	To determine the number of sample plots needed to measure forest degradation and deforestation in the leakage area with the desired confidence levels.
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	$\boldsymbol{n_{DF}}$
Data unit:	count
Description:	Total number of state observations made to fit the cumulative deforestation model
Source of data:	Remote sensing image interpretation
Value applied:	2000
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.'
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	$\boldsymbol{o_i}$
Data unit:	unitless
Description:	State observation for the ith sample point in the Project Accounting Area reference area
Source of data:	Remote sensing image interpretation

Value applied:	See cdm records
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.'
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	r_{sp}
Data unit:	unitless
Description:	Expansion factor for above-ground biomass to below-ground biomass (root/shoot ratio)
Source of data:	IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 4: Agriculture, Forestry and Other Land Use, Chapter 4: Forest Land, Table 4.4
Value applied:	0.4
Justification of choice of data or description of measurement methods and procedures applied:	IPCC default value for Tropical shrubland
Purpose of Data:	Calculation of baseline emissions
Any comment:	

Data Unit / Parameter:	t
Data unit:	days
Description:	Vector of observed times to forest state
Source of data:	Monitoring records
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	N/A
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	w

Data unit:	unitless
Description:	The initial vector of weights used when fitting the deforestation model using IRLS. See equation [7] and section 6.4.7 for details.
Source of data:	Remote sensing image interpretation
Value applied:	See cdm records
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	x_i
Data unit:	geographic coordinates
Description:	Latitude of the ith sample point
Source of data:	Remote sensing image interpretation
Value applied:	See cdm records
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.'
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	$x_{i,j\,k}$
Data unit:	varies
Description:	The ith measurement in plot j in stratum k.
Source of data:	Field measurement
Value applied:	See plot sampling records
Justification of choice of data or description of measurement methods and procedures applied:	
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$x_{i,j,k,d}$
Data unit:	*m*
Description:	The diameter of *i*th piece of lying dead wood on transect j in stratum k, decay class d.
Source of data:	Field measurements
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	Should use the most accurate of the data sources if both are available
Purpose of Data:	Determination of baseline emissions
Any comment:	Parameter not used

Data Unit / Parameter:	y_i
Data unit:	geographic coordinates
Description:	Longitude of the ith sample point
Source of data:	Remote sensing image interpretation
Value applied:	N/A
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_Phase1- Forest Inventory v3.1_2021-11-15.pdf.'
Purpose of Data:	Determination of baseline scenario
Any comment:	Parameter not used

Data Unit / Parameter:	ρ_{sp}
Data unit:	$\mathrm{g} \cdot \mathrm{cm}^{-3}$
Description:	Wood density of species sp.
Source of data:	Literature
Value applied:	0.24
Justification of choice of data or description of measurement methods and procedures applied:	Value is used as the wood density of standing dead wood with decay class of II. It converts the calculated wood volume to biomass.
Purpose of Data:	Determination of baseline scenario

Any comment:	Value was taken from: Harmon, Woodall, Fasth, Sexton and Yatkov. 2011. Differences between standing and downed dead tree wood density reduction factors: A comparison across decay classes and tree species. Research Paper NRS-15. Newton Square, PA. U.S. Department of Agriculture, Forest Service, Northern Research Station.

Data Unit / Parameter:	p_{BGLT}
Data unit:	Proportion
Description:	Proportion of below-ground large tree biomass removed as a result of land conversion to agriculture.
Source of data:	Default value from methodology based on the fact that Project Area would be converted to agriculture in without project scenario.
Value applied:	1
Justification of choice of data or description of measurement methods and procedures applied:	Used in equation 24 to determine the baseline emissions in below-ground large tree biomass.
Purpose of Data:	Determination of baseline scenario
Any comment:	

Data Unit / Parameter:	cf_{sp}
Data unit:	$\mathrm{t\,C \cdot t.d.m.^{-1}}$
Description:	Carbon fraction of dry matter for dead wood.
Source of data:	In cases where an adequate value is not available from peer-reviewed literature, the methodology calls for the IPCC default value of 0.5 to be used. In this project the IPCC default was used
Value applied:	0.5
Justification of choice of data or description of measurement methods and procedures applied:	Used to convert the calculated total dry biomass of wood to carbon for each tree measured.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	r_{WP}

Data unit:	Proportion
Description:	Proportion of above-ground large tree biomass converted to long-lived wood products.
Source of data:	Expert local knowledge or peer reviewed literature.
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied:	To account for carbon stored in biomass from the Project Area that is converted to long-lived wood products during any monitoring period.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$d_{j,k}$
Data unit:	Meters (m)
Description:	Depth of soil sample in plot j in stratum k.
Source of data:	Measured, defined in the Soil carbon SOP "Standard Operating Procedure Kasigau - Soil v1.0_5_24_2011.pdf"
Value applied:	1
Justification of choice of data or description of measurement methods and procedures applied:	Used in the soil carbon model for estimating total soil carbon quantities.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$f_{sp}(\cdot)$
Data unit:	Function
Description:	Allometric equation for species sp.
Source of data:	Derived from destructive sampling of trees in the same region of the Project.
Value applied:	Please see section 5.1, List of Allometric Equations for a table displaying the species-specific allometric equations used in the carbon analysis.
Justification of choice of data or description of measurement methods and procedures applied:	

Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$\mathcal{D}$
Data unit:	Set
Description:	The set of all decay classes
Source of data:	Field measurements
Value applied:	See biomass inventory records
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.'
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	$\mathcal{M}$
Data unit:	Set
Description:	The set of all monitoring periods prior to $[m]$
Source of data:	Field measurements
Value applied:	See biomass inventory records
Justification of choice of data or description of measurement methods and procedures applied:	This parameter was measured in accordance with the VCS standard and AFOLU guidance, using the procedures outlined in the VCS methodology VM0009 v1.1 and the 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.'
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	–
Data unit:	Percent
Description:	Moisture content of tree green biomass.
Source of data:	Measured on site by cutting discs from destructively harvested trees. The value was calculated by the difference of the disc's green mass and its dry mass.
Value applied:	50

Justification of choice of data or description of measurement methods and procedures applied:	To convert the green weight of tree biomass as calculated by the allometry to dry tree biomass.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	–
Data unit:	Percent
Description:	Moisture content of Shrub green biomass.
Source of data:	Value was derived from the literature for African woody plants, based on moisture content at the Genus level for the primary shrub species. The source document is Simpson, William T., 1996. “Method to Estimate Dry-Kiln Schedules and Species Groupings: Tropical and Temperate Hardwoods.” Research Paper FPL-RP-548. Madison, WI: United States Department of Agriculture, Forest Service, Forest Products Laboratory.
Value applied:	45
Justification of choice of data or description of measurement methods and procedures applied:	To convert the green weight of shrub biomass as calculated to dry shrub biomass.
Purpose of Data:	Determination of baseline emissions
Any comment:	

Data Unit / Parameter:	–
Data unit:	Percent
Description:	Moisture content of Herbaceous green biomass.
Source of data:	Field measurements were conducted to collect bundles of herbaceous material. The value was calculated by the difference of the bundle’s green mass and its dry mass.
Value applied:	83
Justification of choice of data or description of measurement methods and procedures applied:	To convert the green weight of herbaceous biomass as calculated to dry herbaceous biomass.
Purpose of Data:	Determination of baseline emissions
Any comment:	

3.1.2 Data and Parameters Monitored

Data Unit / Parameter:	$\mathcal{E}$
Data unit:	Set
Description:	The set of all burning events
Source of data:	Records of biomass burning and charcoal production in the Project Area
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of project emissions
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	a_k
Data unit:	Hectares (ha)
Description:	Area of stratum k
Source of data:	Measured
Description of measurement methods and procedures to be applied:	GIS analysis is used for the mapping and measurement of the strata within the Project Area.
Frequency of monitoring/recording:	First monitoring period
Value applied:	

Stratum name	area (ha)
ag active	706.52
dryland forest strata 1+2	6,858.93
dryland forest strata 3	5,622.92
dryland forest strata 4	2,766.58
dryland forest strata 5	8,125.52
dryland forest strata 6	4,324.29

	grassland 1,600.12 **montane forest** 55.22 **out area** 108.56 **Total area** 30,168.66 Additionally, please see the Project Area and strata map in Section 3.2.
Monitoring equipment:	Supervised classification of the Project Area was accomplished using commercial software to perform Land-use/Land-cover classification, as well as to perform QA/QC procedures. Wildlife Works used a common software package to perform this stratification.
QA/QC procedures to be applied:	QC: Wildlife Works' VP Carbon Development checks the accuracy of the stratification with sample plot information sourced from the inventory data and also with other available geographical datasets. QA: The accuracy of the classification is also checked partially by the CEO of Wildlife Works Carbon and by the other staff in the Carbon Development department, all of whom possess GIS and remote sensing expertise.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Supervised classification of the Project Area was accomplished using commercial software to perform Land-use/Land-cover classification, as well as to perform QA/QC procedures. Wildlife Works used a common software package to perform this stratification.
Any comment:	

Data Unit / Parameter:	$a_{j,k}$
Data unit:	Hectares (ha)
Description:	Area of plot j in stratum k
Source of data:	Measured
Description of measurement methods and procedures to be applied:	Measuring tapes used to establish plot area.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.

Value applied:	Tree biomass plots have an area of 0.196 ha or 0.02 ha depending on location and shrub biomass have an area of 0.07 ha or 0.005 ha depending on location.
Monitoring equipment:	Tape measure
QA/QC procedures to be applied:	QC: Wildlife Works' VP Carbon Development checks the accuracy of the stratification with sample plot information sourced from the inventory data and also with other available geographical datasets. QA: The accuracy of the classification is also checked partially by the CEO of Wildlife Works Carbon and by the other staff in the Carbon Development department, all of whom possess GIS and remote sensing expertise.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Supervised classification of the Project Area was accomplished using commercial software to perform Land-use/Land-cover classification, as well as to perform QA/QC procedures. Wildlife Works used a common software package to perform this stratification.
Any comment:	

Data Unit / Parameter:	a_{plot}
Data unit:	Hectares (ha)
Description:	Area of plot j in stratum k
Source of data:	Measured
Description of measurement methods and procedures to be applied:	Measuring tapes used to establish plot area.
Frequency of monitoring/recording:	First monitoring period
Value applied:	Tree biomass plots have an area of 0.196 ha or 0.02 ha depending on location and Shrub biomass have an area of 0.07 ha or 0.005 ha depending on location. Herbaceous plots have an area of 0.0004 ha.
Monitoring equipment:	Tape measure
QA/QC procedures to be applied:	QC: Wildlife Works' VP Carbon Development checks the accuracy of the stratification with sample plot information sourced from the inventory data and also with other available geographical datasets.

	QA: The accuracy of the classification is also checked partially by the CEO of Wildlife Works Carbon and by the other staff in the Carbon Development department, all of whom possess GIS and remote sensing expertise.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Supervised classification of the Project Area was accomplished using commercial software to perform Land-use/Land-cover classification, as well as to perform QA/QC procedures. Wildlife Works used a common software package to perform this stratification.
Any comment:	

Data Unit / Parameter:	$cf_{soil,j,k}$
Data unit:	Dimensionless: (kg · kg^{-1}; kilogram Carbon per kilogram soil)
Description:	Carbon fraction of soil sample j in plot in stratum k
Source of data:	Measurement
Description of measurement methods and procedures to be applied:	Measured according to the SOP: 'Standard Operating Procedure Kasigau - Soil v1.0_5_24_2011.pdf'.
Frequency of monitoring/recording:	Updated at the monitoring event at least once every five years.
Value applied:	See soil sampling records
Monitoring equipment:	As described in the SOP: 'Standard Operating Procedure Kasigau - Soil v1.0_5_24_2011.pdf'. Handheld GPS receiver Shovel(s) Garden hoe Large tarp Sharpie markers Soil collection bags.
QA/QC procedures to be applied:	QC: The Director of Regional Operations, Kasigau Corridor are in charge of carrying-out consistency checks of all data and confirming that the field team has followed the SOPs, and they perform regular field audits and data collection checks. QA: The processing of the samples and the soil analysis is done by a third party laboratory, "Cropnuts". The Laboratory has its own measures of control and its management is independent to that of the Project

	Proponent. A complete description of the company and its procedures can be found at http://www.cropnuts.com
Purpose of data:	Calculated from laboratory analysis.
Calculation method:	Updated at the monitoring event at least once every five years.
Any comment:	

Data Unit / Parameter:	$\mathrm{dbh}_{\mathrm{i,j,k}}$
Data unit:	Centimeters (cm)
Description:	Diameter at breast height (DBH) of the ith tree in plot j in stratum k.
Source of data:	Measurement
Description of measurement methods and procedures to be applied:	Tree diameter is measured with a metric diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3' for $dbh_{i,j,k}$ for all plots.
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: Handheld GPS (with plot coordinates pre-entered in UTM) Steel rebar and plot-center caps for marking plot centers Diameter tape (D-tape) for measuring DBH Metric tape at least 50m long, preferably fiberglass or weatherproof material Tree tags (preferably aluminum to prevent rusting, stamped with successive numbers) Flagging tape, multicolored for marking direction, etc. Compass, preferably with mirror Clinometer / Inclinometer for measuring tree height Notepads/plot sheets, preferably waterproof Pens, preferably waterproof Backpack, equipment holder

	Water, food, sunscreen, bug spray First-aid kit Cell phone, sat-phone or 2-way radios
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	$h_{i,j,k}$
Data unit:	Meters (m)
Description:	Height of the ith tree in plot j in stratum k.
Source of data:	Measurement
Description of measurement methods and procedures to be applied:	Tree height is measured with a metric measurement stick according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf.'
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for $h_{i,j,k}$ for all plots.
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: Tree height measurement stick and/or clinometer
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	ν
Data unit:	Count
Description:	Shrub size class per species.
Source of data:	Measurement.

Description of measurement methods and procedures to be applied:	Shrub count is measured using ocular methods according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xls' for the full database of shrub counts for each plot.
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: Shrub height measurement stick and field metric measurement tape.
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field Measurement
Any comment:	

Data Unit / Parameter:	$m_{dry,j,k}$
Data unit:	Kilograms (kg)
Description:	Dry mass of non-tree sample harvested from clip plots in plot j, stratum k.
Source of data:	Measurement.
Description of measurement methods and procedures to be applied:	Dry mass of non-tree sample is measured using destructive harvesting methods according to the procedures detailed in the SOP*: '*Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf'.
Frequency of monitoring/recording:	As required by the VCS Standard version 3 this parameter is remeasured at least once every five years.
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of shrub counts for each plot.
Monitoring equipment:	As stated in the Biomass monitoring *SOP:* Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.1_2021-11-15.pdf', the following equipment is utilized:

	Field metric measurement tape, clippers and a bag for the sample.
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field Measurement
Any comment:	

Data Unit / Parameter:	$r_{BASE,i,j,k}$
Data unit:	Centimeters (cm)
Description:	Base radius of the ith standing dead, decay class II tree in plot j in stratum k.
Source of data:	Measured
Description of measurement methods and procedures to be applied:	Tree base diameter is measured at breast height with a metric diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	The file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' is the primary database and calculator for tree measurement and contains all values measured for $r_{BASE,i,j,k}$ $by\ plot$.
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: Handheld GPS (with plot coordinates pre-entered in UTM) Steel rebar and plot-center caps for marking plot centers Diameter tape (D-tape) for measuring DBH Metric tape at least 50m long, preferably fiberglass or weatherproof material Tree tags (preferably aluminum to prevent rusting, stamped with successive numbers) Flagging tape, multicolored for marking direction, etc. Compass, preferably with mirror Clinometer / Inclinometer for measuring tree height

	Notepads/plot sheets, preferably waterproof Pens, preferably waterproof Backpack, equipment holder Water, food, sunscreen, bug spray First-aid kit Cell phone, sat-phone or 2-way radios
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	Carbon pool not included

Data Unit / Parameter:	$r_{TOP,i,j,k}$
Data unit:	Centimeters (cm)
Description:	Top radius of the ith standing dead, decay class II tree in plot j in stratum k.
Source of data:	Estimated.
Description of measurement methods and procedures to be applied:	The top diameter of standing dead, decay class trees is conservatively estimated to be 0 cm. This is the most conservative value for top diameter since the standing dead bole volume is calculated with the equation of a truncated cone, using Equation 52.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	0 The 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' is the primary database and calculator for tree measurement and shows that the values estimated for $r_{TOP,i,j,k}$ are all 0.
Monitoring equipment:	N/A.
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	Parameter not used

Data Unit / Parameter:	$v_{i,j,k}$
Data unit:	m^3
Description:	Volume of the ith standing dead, decay class II tree in plot j in stratum k.
Source of data:	Value calculated using the procedures described in Section 13.7 of the VCS methodology VM0009 v1.1.
Description of measurement methods and procedures to be applied:	N/A.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	Please see the *file* 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm', which *is* primary database and calculator for the tree measurement and contains all values measured for $r_{BASE,i,j,k}$ by plot.
Monitoring equipment:	N/A.
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [52]
Any comment:	

Data Unit / Parameter:	$y_{INTACT,j,k}$
Data unit:	Tonnes CO_2e • ha-1
Description:	Carbon stock in standing dead trees in decay class I, plot j, stratum k.
Source of data:	Measurement.
Description of measurement methods and procedures to be applied:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_Phase1- Forest Inventory v3.2_2021-11-15.pdf'.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standing dead trees in decay class I for each plot.

Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Summation across plots
Any comment:	

Data Unit / Parameter:	$y_{DECAYED,j,k}$
Data unit:	Tonnes CO_2e / ha
Description:	Carbon stock in standing dead trees in decay class II, plot j, stratum k.
Source of data:	Measurement.
Description of measurement methods and procedures to be applied:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Frequency of monitoring/recording:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years.
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standing dead trees in decay class II for each plot.
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Procedures applied according to the SOP: 'Quality Control Procedure v1.6.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	$y_{j,k}$

Data unit:	Varies
Description:	Attribute of plot j, stratum k
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	y_k
Data unit:	Varies
Description:	Attribute of stratum k
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	ρ_{mesoil}
Data unit:	kg/m^3
Description:	Mass-equivalent bulk density of fine portion pf soil sample

Source of data:	Measurement.
Description of measurement methods and procedures to be applied:	Bulk density is measured using the procedures detailed in the SOP: 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'.
Frequency of monitoring/recording:	100% of soil sample plots are measured once every five years.
Value applied:	Please see the file 'Kasigau Corridor I Soil Calc M8 v1.3.xlsx' for the full database of soil sampling data and calculations.
Monitoring equipment:	The monitoring equipment is listed in the soil carbon monitoring SOP: 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'.
QA/QC procedures to be applied:	The QA/QC procedures are listed in the soil carbon monitoring SOP: 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	$C_{AGLT}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in above-ground large trees at monitoring period $[m]$.
Source of data:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Description of measurement methods and procedures to be applied:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years. Value calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	1,688,346.79
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized:

	GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [46]
Any comment:	

Data Unit / Parameter:	$C_{AGNT}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in above-ground non-tree biomass at monitoring period $[m]$.
Source of data:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Description of measurement methods and procedures to be applied:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years. Value calculated using the procedures described in Section 13.5.3 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	169,259.14.
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [44]
Any comment:	

Data Unit / Parameter:	$C_{AGST}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in above-ground small tree biomass at monitoring period $[m]$.

Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	$C_{BGLT}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in below-ground large tree biomass at monitoring period $[m]$.
Source of data:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Description of measurement methods and procedures to be applied:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years. Value calculated using the procedures described in Section 13.6.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	675,338.72
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Value calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.

Any comment:	

Data Unit / Parameter:	$C_{BGNT}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in below-ground non-tree biomass at monitoring period $[m]$.
Source of data:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Description of measurement methods and procedures to be applied:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years. Value calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	67,703.66
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Value calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1. Equation [64]
Any comment:	

Data Unit / Parameter:	$C_{BGST}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in below-ground small tree biomass at monitoring period $[m]$.
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A

Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	$C_{SDW}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in standing dead wood at monitoring period $[m]$.
Source of data:	Carbon stock is measured using a diameter tape according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf'.
Description of measurement methods and procedures to be applied:	20% of biomass plots are measured at each monitoring event, so that 100% of plots are measured once every five years. Value calculated using the procedures described in Section 13.7 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	45,654.68
Monitoring equipment:	As stated in the Biomass monitoring SOP 'Standard Operating Procedure Kasigau_PhaseI- Forest Inventory v3.2_2021-11-15.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Value calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Any comment:	

Data Unit / Parameter:	$C_{LDW}^{[m]}$

Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in lying dead wood at monitoring period $[m]$.
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$C_{SOIL}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated carbon stock in soil carbon at monitoring period $[m]$.
Source of data:	Carbon stock is measured in the field according to the procedures detailed in the Soil monitoring SOP 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf''.
Description of measurement methods and procedures to be applied:	100% of soil sample plots are remeasured once every five years. Value calculated using the procedures described in Section 13.9 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at least every five years.
Value applied:	13,199,254.70
Monitoring equipment:	As stated in the Soil monitoring SOP 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf', the following equipment is utilized: GPS unit, diameter tape and field metric measurement tape.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions

Calculation method:	Value calculated using the procedures described in Section 13.9 of the VCS methodology VM0009 v1.1.
Any comment:	

Data Unit / Parameter:	$C_{Total}^{[m]}$
Data unit:	Tonnes CO2e
Description:	Estimated carbon stock in the Project Area at monitoring period $[m]$.
Source of data:	Calculated as the sum of all required and optional carbon pools
Description of measurement methods and procedures to be applied:	Value calculated using the procedures described in Section 13.4 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	15,799,903.01
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [20]
Any comment:	

Data Unit / Parameter:	$C_{BE}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated baseline emissions
Source of data:	The sum of estimated emissions over selected carbon pools.
Description of measurement methods and procedures to be applied:	Value calculated using the procedures described in Section 8 of the VCS methodology VM0009 v1.1
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	270,445.15
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions

Calculation method:	Equation [20]
Any comment:	

Data Unit / Parameter:	$\bar{C}$
Data unit:	Tonnes CO2e / ha
Description:	Estimated mean carbon stock in the Project Area
Source of data:	Estimated using a pilot sample or literature search prior to sampling
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	May be updated at every monitoring period.
Value applied:	90.39
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [37], [41]
Any comment:	If the sample size is updated in improve precision between monitoring periods, the carbon stock estimates calculated from previous inventories may be used to update the required sample size.

Data Unit / Parameter:	$C_{LE}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated emissions from leakage
Source of data:	Leakage is measured according to the procedures detailed in the SOP: 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf. Equation [32]
Description of measurement methods and procedures to be applied:	Value calculated using the procedures described in Section 10 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	0

Monitoring equipment:	Monitoring equipment list is provided in leakage monitoring SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf'.
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of leakage
Calculation method:	Equation [32]
Any comment:	

Data Unit / Parameter:	$C_{PE}^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Estimated project emissions
Source of data:	Equation [31]
Description of measurement methods and procedures to be applied:	Value calculated using the procedures described in Section 9.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	0
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of Project Emissions
Calculation method:	Equation [31]
Any comment:	

Data Unit / Parameter:	$C_{U}^{[m]}$
Data unit:	Tonnes CO2e
Description:	Confidence deduction
Source of data:	Equation [35].
Description of measurement methods and procedures to be applied:	Value calculated using the procedures described in Section 11.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	0
Monitoring equipment:	N/A

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of Baseline Emissions
Calculation method:	Equation [35]
Any comment:	

Data Unit / Parameter:	$C^{[m]}$
Data unit:	Tonnes CO_2e
Description:	Quantified emissions reductions and/or removals
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	Value calculated using the procedures described in Section 9 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	270,445.15
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [34]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,AGLT}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in above-ground large trees at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in section 13.5.1
Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsx' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [47]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,AGNT}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in above-ground non-trees at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [63]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,AGST}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in above-ground small trees at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A

Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [47]
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$\hat{\sigma}_{SE,BGLT}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in below-ground large trees at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [47]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,BGNT}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in below-ground non-trees at monitoring period [m].
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period

Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [65]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,BGST}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in below-ground small trees at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [47]
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$\hat{\sigma}_k$
Data unit:	Tonnes CO_2e
Description:	Estimated standard deviation of carbon stocks in stratum k.
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.5.1 of the VCS methodology VM0009 v1.1.

Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [46]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,LDW}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in lying dead wood at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.8 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [63]
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$\hat{\sigma}_{SE,SDW}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in standing dead wood at monitoring period [m].
Source of data:	Biomass inventory

Description of measurement methods and procedures to be applied:	Calculated using the procedures described in section 13.7 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [47]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,SOIL}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard error of carbon stocks in soil carbon at monitoring period [m].
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in section 13.9 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'Kasigau Corridor Soil Calc M8 v 1.2.xslx' for the full database of standard error calculations and values for the soil carbon pool.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [49]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{SE,Total}$
Data unit:	Tonnes CO_2e

Description:	Estimated standard error of total carbon stocks in the Project Area at monitoring period [m]
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in Section 13.12 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	840,070.12
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [63]
Any comment:	

Data Unit / Parameter:	$\hat{\sigma}_{\bar{C}}$
Data unit:	Tonnes CO_2e
Description:	Estimated standard deviation of carbon stocks in project area.
Source of data:	Biomass inventory
Description of measurement methods and procedures to be applied:	Calculated using the procedures described in section 13.5.1 of the VCS methodology VM0009 v1.1.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the full database of standard error calculations and values for the carbon pools selected.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	calculation
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	cf_{dw}

Data unit:	Tonnes carbon per tonne dry matter
Description:	Carbon fraction of dry matter for dead wood
Source of data:	Project accounting area sampling
Description of measurement methods and procedures to be applied:	Measurement procedures are described in the biomass measurement SOP 'Standard Operating Procedure Kasigau - Forest Inventory v2.9_2015.01.20.pdf'.
Frequency of monitoring/recording:	Held constant throughout project lifetime
Value applied:	Please see the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' to see the values used for the different decay stages of dead wood.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	Calculation of baseline emissions
Calculation method:	Where available, data from peer-reviewed literature should be used. Where adequate literature is not available, the IPCC default value of 0.5 may be applied.
Any comment:	

Data Unit / Parameter:	$cf_{soil,j,k}$
Data unit:	kg carbon per kg soil
Description:	Carbon fraction of soil sample in plot j in stratum k
Source of data:	Laboratory analysis of field samples.
Description of measurement methods and procedures to be applied:	Measurement procedures are described in the soil carbon measurement SOP 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'.
Frequency of monitoring/recording:	Monitoring is performed at least every five years.
Value applied:	Please see the file 'Kasigau Corridor I Soil Calc M8 v1.3.xlsx' to see the carbon fraction for each plot.
Monitoring equipment:	See the SOP 'SOP – Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'.
QA/QC procedures to be applied:	See the SOP 'SOP – Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'.
Purpose of data:	Calculation of baseline emissions
Calculation method:	Estimated from laboratory analysis of soil samples.
Any comment:	

Data Unit / Parameter:	c_k
Data unit:	US Dollars
Description:	Relative cost of making an observation in stratum k.
Source of data:	Pilot study and literature
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	$\bar{E}$
Data unit:	Percent
Description:	Result of cross-validation of newly developed allometric equations.
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	Parameter not used.
Any comment:	N/A

Data Unit / Parameter:	$\hat{e}_i$
Data unit:	kg

Description:	Estimated cross-validated residual for observation i.
Source of data:	N/A
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	Parameter not used.
Any comment:	N/A

Data Unit / Parameter:	$f_{-i}(\bullet)$
Data unit:	Function
Description:	Allometric function re-fit without observation i
Source of data:	Intermediate variable used in cross-validation of newly developed allometric equations.
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	Parameter not used.
Any comment:	N/A

Data Unit / Parameter:	$G(t, \lambda)$
Data unit:	Proportion
Description:	Proportion of soil lost at time t with decay parameter λ
Source of data:	Calculation

Description of measurement methods and procedures to be applied:	Exponential decay model. See equations [11] and [13]. This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 v1.1 Section 6.5.1.
Frequency of monitoring/recording:	Re-evaluated whenever the baseline model is re-assessed.
Value applied:	Please see the file 'Kasigau Corridor Soil Calc M8 v1.3.xslx'.
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [14]
Any comment:	

Data Unit / Parameter:	F_{DF}
Data unit:	Proportion
Description:	Proportion of cumulative deforestation
Source of data:	Estimated from a model. See equation [16]
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 v1.1 Section 6.4.8.
Frequency of monitoring/recording:	Predicted from model at each monitoring event
Value applied:	0.5380
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [16]
Any comment:	

Data Unit / Parameter:	F_{LE}
Data unit:	Proportion
Description:	Proportion cumulative deforestation and degradation predicted by the leakage model.

Source of data:	Estimated from a model. See equation [8].
Description of measurement methods and procedures to be applied:	This parameter was measured in accordance of the VCS standard and AFOLU guidance, using the procedures outlined in the VCS Methodology VM0009 v1.1Section 10.3.3.
Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	0.461
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of Leakage
Calculation method:	Equation [8]
Any comment:	

Data Unit / Parameter:	$\hat{r}_{LE}^{[m]}$
Data unit:	Proportion
Description:	The estimated leakage factor as a proportion of baseline emissions
Source of data:	Estimated based on the difference between observed deforestation in the reference area and predicted deforestation in the reference area as described in section 10.4.
Description of measurement methods and procedures to be applied:	This parameter was calculated according to the VCS Methodology VM0009 v1.1 Section 10.4
Frequency of monitoring/recording:	Prior to first monitoring event
Value applied:	0
Monitoring equipment:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf'
QA/QC procedures to be applied:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf'
Purpose of data:	Calculation of Leakage
Calculation method:	Calculation
Any comment:	

Data Unit / Parameter:	l_j

Data unit:	meters
Description:	Length of transect j used for measuring lying dead wood.
Source of data:	Field measurements.
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Carbon pool not included in Project

Data Unit / Parameter:	$m_{burned,i}$
Data unit:	Tonnes
Description:	The mass of wood burned during the ith event
Source of data:	Records of biomass burning and charcoal production in the Project Area
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	Calculation of project emissions
Calculation method:	Measurement
Any comment:	Parameter not used.

Data Unit / Parameter:	$\widehat{m}_{DF}$
Data unit:	Count
Description:	The estimated sample size in the space of the reference area given the pilot sample data

Source of data:	Equation [6]
Description of measurement methods and procedures to be applied:	This parameter was calculated according to the VCS Methodology VM0009 Section 6.4.3
Frequency of monitoring/recording:	Reevaluated whenever the baseline is reassessed.
Value applied:	1,877
Monitoring equipment:	Equipment list in Annex 17
QA/QC procedures to be applied:	Review of GER calculations
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [F.53]
Any comment:	

Data Unit / Parameter:	$m_{soil,j,k}$
Data unit:	kg
Description:	Dry mass of soil sample taken from plot j in stratum k.
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	Please see the SOP 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'
Frequency of monitoring/recording:	At a minimum of every five years.
Value applied:	See the file 'Kasigau Corridor I Soil Calc v2.xlsx' for the records of all soil samples.
Monitoring equipment:	Equipment list in the SOP 'SOP - Kasigau Soil Field Sampling v3.6 2017-10-05.pdf'
QA/QC procedures to be applied:	Review of GER calculations
Purpose of data:	Calculation of baseline emissions
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	$m_{rf,j,k}$
Data unit:	kg
Description:	Dry mass of rock fraction of soil sample in plot j in stratum k

Source of data:	Field measurements. Soil samples must be sieved to 2 mm and fragments larger than 2mm weighed.
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	$m_{dry,subsample}$
Data unit:	Kg
Description:	Dry mass of subsample of non-tree biomass collected to estimate dry:wet ratio
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	$m_{wet,j,k}$
Data unit:	kg
Description:	Wet mass of non-tree sample harvested from clip plots in plot j, stratum k
Source of data:	Field measurements

Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	$m_{wet,subsample}$
Data unit:	kg
Description:	Wet mass of subsample of non-tree biomass collected to estimate dry:wet ratio
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	$\hat{n}_k$
Data unit:	Count
Description:	Estimated total number of plots required in stratum k.
Source of data:	Calculated using equation [38] or equation [42].

Description of measurement methods and procedures to be applied:	This parameter was calculated according to the VCS Methodology VM0009 Section 13.3.1
Frequency of monitoring/recording:	May be updated if a new sample with greater precision is desired at a monitoring period.
Value applied:	See the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the number of plots per strata
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [38] or equation [42].
Any comment:	

Data Unit / Parameter:	N_P
Data unit:	Count
Description:	Total number of possible plots in Project Area
Source of data:	Calculated.
Description of measurement methods and procedures to be applied:	GIS analysis at the time of stratification.
Frequency of monitoring/recording:	Updated whenever stratification of the Project Area is updated.
Value applied:	207,990.6
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Calculated with the Equation $N_P = \frac{a_{project}}{a_{plot}}$
Any comment:	

Data Unit / Parameter:	$\mathrm{N_{P,k}}$
Data unit:	Count
Description:	Total number of possible plots in stratum k.
Source of data:	Calculated.

<table>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>GIS analysis at the time of stratification.</td></tr>
<tr><td>Frequency of monitoring/recording:</td><td>Updated whenever stratification of the Project Area is updated.</td></tr>
<tr><td>Value applied:</td><td><table>
<tr><th>Stratum Name</th><th>Total Number of Possible Plots</th></tr>
<tr><td>ag active</td><td>35,139.25</td></tr>
<tr><td>dryland forest strata 1+2</td><td>50,678.43</td></tr>
<tr><td>dryland forest strata 3</td><td>30,339.31</td></tr>
<tr><td>dryland forest strata 4</td><td>14,090.08</td></tr>
<tr><td>dryland forest strata 5</td><td>41,382.91</td></tr>
<tr><td>dryland forest strata 6</td><td>27,510.95</td></tr>
<tr><td>grassland</td><td>8,149.36</td></tr>
<tr><td>montane forest</td><td>700.30</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment:</td><td>Supervised classification of the Project Area was accomplished using commercial software to perform Land-use/Land-cover classification, as well as to perform QA/QC procedures. Wildlife Works used a common software package to perform this stratification. ArcGIS software is used for area measurement of the Project Area and strata.</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>QC: Wildlife Works' VP Carbon Development checks the accuracy of the stratification with sample plot information sourced from the inventory data and also with other available geographical datasets.
QA: The accuracy of the classification is also checked partially by the CEO of Wildlife Works Carbon and by the other staff in the Carbon Development department, all of who possess GIS and remote sensing expertise.</td></tr>
<tr><td>Purpose of data:</td><td>Calculated with the Equation $N_{P,k} = \frac{a_k}{a_{plot}}$</td></tr>
<tr><td>Calculation method:</td><td>Supervised classification of the Project Area was accomplished using commercial software to perform Land-use/Land-cover classification, as well as to perform QA/QC procedures. Wildlife Works used a common software package to perform this stratification. ArcGIS</td></tr>
</table>

	software is used for area measurement of the Project Area and strata.
Any comment:	

Data Unit / Parameter:	$\hat{n}_{total}$
Data unit:	Count
Description:	Estimated total number of plots required.
Source of data:	Calculated using equation [37] or equation [41].
Description of measurement methods and procedures to be applied:	This parameter was calculated according to the VCS Methodology VM0009 Section 13.3.1
Frequency of monitoring/recording:	May be updated if a new sample with greater precision is desired at a monitoring period.
Value applied:	See the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' for the number of plots per strata
Monitoring equipment:	BN/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [37] or equation [41].
Any comment:	

Data Unit / Parameter:	$o_i^{[m]}$
Data unit:	Binary
Description:	State observation for the ith sample point during monitoring period [m].
Source of data:	Field observation
Description of measurement methods and procedures to be applied:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf.'
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	See the file 'Phase I Leakage Model_M8_v1.1.xlsx' for the values.
Monitoring equipment:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf.'
QA/QC procedures to be applied:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf.'

Purpose of data:	Calculation of leakage
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	$\bar{o}^{[m]}$
Data unit:	Binary
Description:	Average of state observation for the ith sample point during monitoring period [m].
Source of data:	Field observation
Description of measurement methods and procedures to be applied:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf.'
Frequency of monitoring/recording:	Updated at every monitoring period.
Value applied:	See the file 'Phase I Leakage Model_M8_v1.1.xlsx' for the values.
Monitoring equipment:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf.'
QA/QC procedures to be applied:	See the SOP 'Standard Operating Procedure Kasigau - Forest Leakage v1.0_01_01_2011.pdf.'
Purpose of data:	Calculation of leakage
Calculation method:	Field measurement
Any comment:	

Data Unit / Parameter:	$P(t_i)$
Data unit:	Probability
Description:	Probability of making an observation at time t_i
Source of data:	Methodology VM0009 v1.1 page B36
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 6.4.1
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is reassessed.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions

Calculation method:	Equation [4]
Any comment:	Parameter not used

Data Unit / Parameter:	$P(t_i, x_i, y_i)$
Data unit:	Probability
Description:	Probability of observing a sample point in the reference area located at (x_i, y_i) at time t_i
Source of data:	Methodology VM0009 v1.1 page B36
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 6.4.1
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is reassessed.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [4]
Any comment:	Parameter not used

Data Unit / Parameter:	$P(x_i, y_i \mid t_i)$
Data unit:	Probability
Description:	probability of observing location (x_i, y_i) given on observation is made at time t_i
Source of data:	Methodology VM0009 v1.1 page B36
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 6.4.1
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is reassessed.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [4]
Any comment:	Parameter not used

Data Unit / Parameter:	t_i
Data unit:	Time
Description:	The time of the ith sample point
Source of data:	Remote sensing image interpretation
Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 v1.1 Section 6
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is re-assessed.
Value applied:	See CDM records
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equations [1],[3],[5]
Any comment:	

Data Unit / Parameter:	$U^{[m]}$
Data unit:	Percent
Description:	Average uncertainty in carbon stocks and the baseline model
Source of data:	Equation [36]
Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 Section 11.1.
Frequency of monitoring/recording:	Updated at every monitoring period
Value applied:	10.4
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [36]
Any comment:	

Data Unit / Parameter:	U_{SCL}
Data unit:	Percent

Description:	Estimated uncertainty in the soil carbon loss model.
Source of data:	Calculated from Equation [19].
Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 Section 6.5.7.
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is reassessed.
Value applied:	13.9
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [19]
Any comment:	

Data Unit / Parameter:	U_{DF}
Data unit:	Percent
Description:	Estimated uncertainty in the cumulative deforestation model
Source of data:	Equation [15]
Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 Section 6.4.9.
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is reassessed.
Value applied:	5.9
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [15]
Any comment:	

Data Unit / Parameter:	$\boldsymbol{U_{TOTAL}^{[m]}}$
Data unit:	Percent
Description:	Estimated uncertainty of total carbon stocks
Source of data:	Equation [67]

Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 Section 13.12.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	10.4
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [67]
Any comment:	

Data Unit / Parameter:	$v_{soil,j,k}$
Data unit:	m^3
Description:	Total volume of soil sample in plot j in stratum k
Source of data:	Field measurements
Description of measurement methods and procedures to be applied:	See SOP 'SOP - Soils Bulk Density v1.6 2017-07-27.pdf'
Frequency of monitoring/recording:	Monitored at a minimum of once every five years.
Value applied:	See file 'Kasigau Corridor I Soil Calc M8 v.1.3.xlsx' for records
Monitoring equipment:	See SOP 'SOP - Soils Bulk Density v1.6 2017-07-27.pdf'
QA/QC procedures to be applied:	See SOP 'SOP - Soils Bulk Density v1.6 2017-07-27.pdf'
Purpose of data:	Calculation of baseline emissions
Calculation method:	measurement
Any comment:	

Data Unit / Parameter:	$v_{rf,j,k}$
Data unit:	m^3
Description:	Volume rock fragments (> 2mm) in soil sample taken in plot j in stratum k
Source of data:	Field measurements

Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	N/A
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	N/A
Purpose of data:	N/A
Calculation method:	N/A
Any comment:	Parameter not used

Data Unit / Parameter:	w_i
Data unit:	Unitless
Description:	The weight applied to the ith sample point
Source of data:	VCS Methodology VM0009 Section 6.4.1 and 6.4.3
Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 Section 6.4.1 and 6.4.3
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is re-assessed.
Value applied:	See CDM records
Monitoring equipment:	N/A
QA/QC procedures to be applied:	VCS Methodology VM0009 Section 6.4.1 and 6.4.3
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	

Data Unit / Parameter:	$w_i^{[m]}$
Data unit:	Unitless
Description:	The weight of the ith sample point during monitoring period $[m]$
Source of data:	Equation [5]
Description of measurement methods and procedures to be applied:	VCS Methodology VM0009 Section 6.4.1 and 6.4.3

Frequency of monitoring/recording:	Reevaluated whenever the baseline model is re-assessed.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	VCS Methodology VM0009 Section 6.4.1 and 6.4.3
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	w_k
Data unit:	Unitless
Description:	Proportion of plots allocated to stratum k.
Source of data:	Calculated using equation [39] or [40].
Description of measurement methods and procedures to be applied:	This parameter was calculated in accordance with VCS Methodology VM0009 Section 13.3.1
Frequency of monitoring/recording:	May be updated at each monitoring period.
Value applied:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	VCS Methodology VM0009 Section 13.3.1
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	x
Data unit:	Real, vector
Description:	Vector of observed covariates to deforestation
Source of data:	Independent variable used in deforestation model. See equation [7] and section 6.4.7 for details.
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is re-assessed.
Value applied:	N/A

Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	Parameter not used.

Data Unit / Parameter:	$\boldsymbol{o}$
Data unit:	Real, vector
Description:	Vector of observed forest states
Source of data:	The response variable used to fit the cumulative deforestation model using IRLS. See equation [7] and section 6.4.7 for details.
Description of measurement methods and procedures to be applied:	See section 6.4.7
Frequency of monitoring/recording:	Reevaluated whenever the baseline model is re-assessed.
Value applied:	See CDM records
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	

Data Unit / Parameter:	$\boldsymbol{x}^{[m]}$
Data unit:	varies
Description:	Covariate values
Source of data:	Participatory Rural Appraisal, analysis of public records, and/or expert interpretation of inventory data or remotely sensed imagery
Description of measurement methods and procedures to be applied:	Should use the most accurate of the data sources if both are available.
Frequency of monitoring/recording:	Every monitoring period
Value applied:	N/A
Monitoring equipment:	N/A

QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	N/A
Any comment:	

3.1.3 Monitoring Plan

The following is an overview of the monitoring plan, a detailed rendition of which can be found in the PD under Section 13.14 Monitoring of Carbon Stocks in the Project Area (the field procedures are detailed in the documents 'Standard Operating Procedure - Biomass' and 'Standard Operating Procedure – Soils').

In order to most accurately estimate biomass in the KCRPI Project Area, in a timely and cost-effective manner that will capture biomass variation, we apportioned the project area into 7 land cover strata. Strata are based on ecosystem type, with larger trees in high density in the dense montane forest stratum, medium to large trees and lots of shrubs in the middle dryland forest strata and scattered trees, very few shrubs and heavy grass cover in the grassland / sparse stratum. All roads, airstrips and other developed areas within the Project boundaries, are combined into an 8th stratum and excluded from the Project Accounting Area (PAA). Overall, the 9 strata sum to the total Project Area, comprising the Project Area's overall landcover as shown in Figure 5 below.

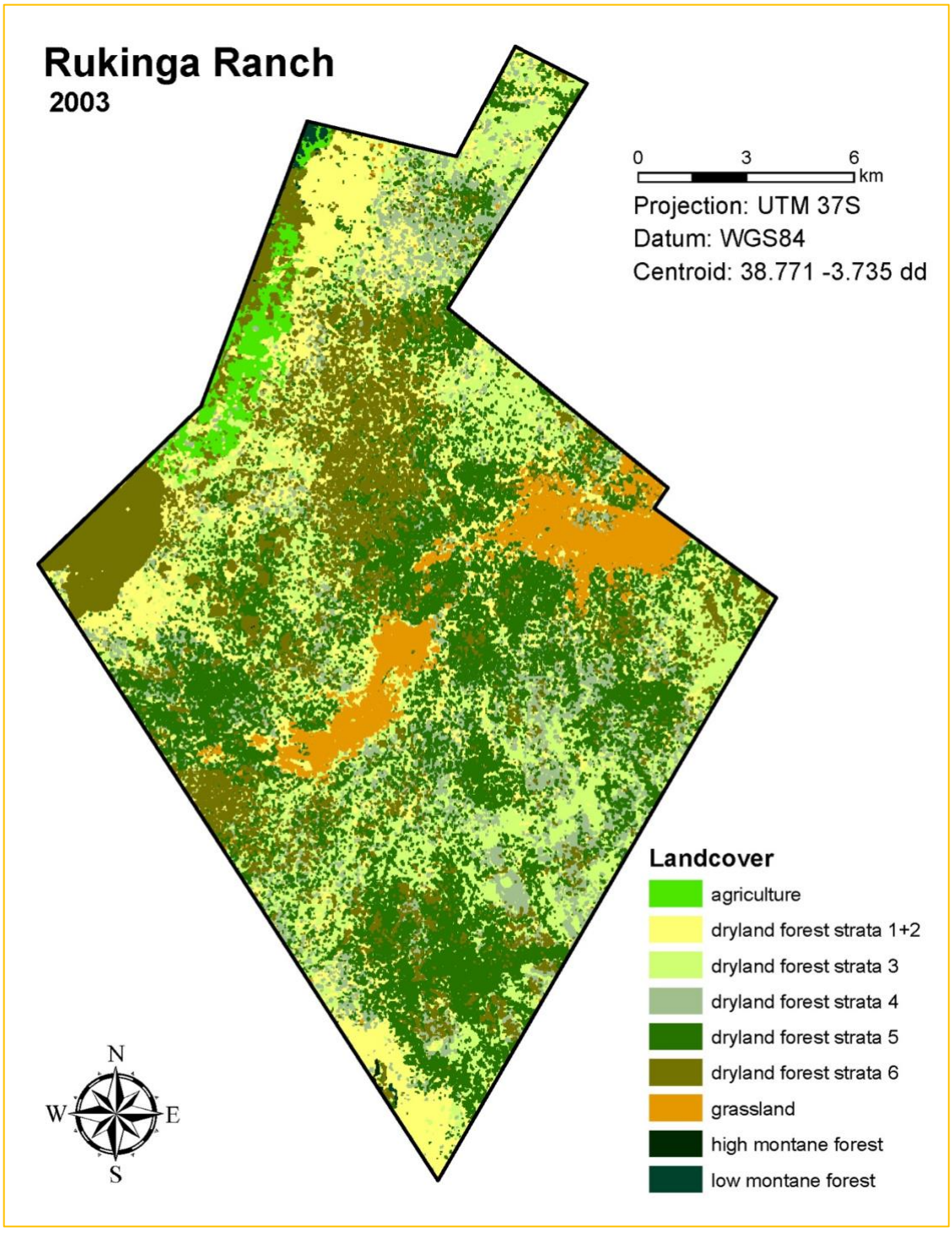


Figure 5: The Kasigau Corridor REDD+ Project Phase I – Rukinga Sanctuary landcover strata.

Biomass plot sampling was conducted throughout the monitoring period under the supervision of senior project and WWC global staff. All plot sampling was conducted using the same successful, exacting protocol that was used for the first monitoring period for this Project. Proper adherence to updated SOPs was ensured throughout the sampling process.

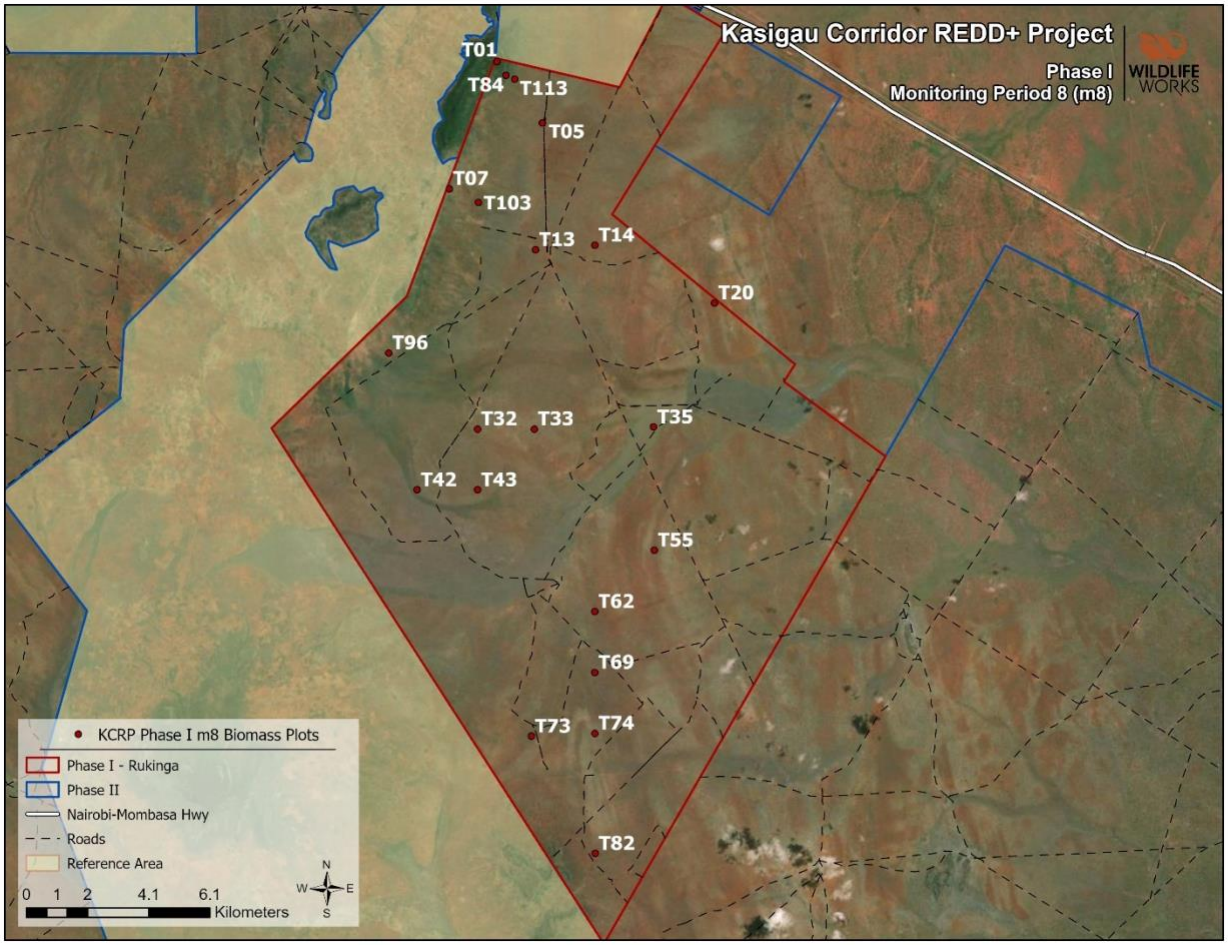


Figure 6: Biomass plots for M_8– 20% of the 115 permanent plots are measured for each year in the monitoring period.

Forest inventory design features a stratified random plot sampling. A total of 115 Plots were randomly placed in the Project Area for all land cover strata, and the biomass field protocol (SOP) was used to collect a comprehensive forest inventory prior to validation. For ongoing MRV, we monitor 100% of the plots every five years, thereby monitoring 20% of the plots (selected at random) each monitoring period and ensuring that no plot has been measured more than 5 years prior to a verification event. For this monitoring period (M_8), 21 plots were measured across the Project Area (Figure 6).

Leakage plots are permanent and placed randomly within the leakage area. However, to avoid any bias in their treatment by the community, they are not conspicuously marked like biomass plots. The Northeast corner of each leakage plot is recorded in a GIS system, and the plot is evaluated by the leakage plot sampling team, using two walking transects per plot. The teams were specially trained by Jamie

Hendriksen, Wildlife Works' Director of Regional operations, to recognize and measure degradation due to charcoal burning and kilning, a phenomenon that is typical to this region.

Leakage quantification is based on the trained judgment of the team members to assign a leakage factor, representing forest degradation, for each plot. Two team members walk each plot, and their results are compared, to arrive at a leakage factor for each plot. Because this process requires some personal judgement, factors could conceivably decrease from one year to the next. This could be due to a difference in plot team member judgment, time of day of measurement, or the forest degradation state of plots measured previously in the day. As a conservative quality assurance measure, if the reported leakage factor of a plot is more than 2 bins lower than the previous years reported factor, the previous year's factor will be used. If more than 10% of leakage plots have a reported leakage factor more than 2 bins lower than the previous year's factor, these leakage plots will be remeasured.

A detailed rendition of the degradation estimation procedure is listed in Standard Operating Procedure - Leakage.

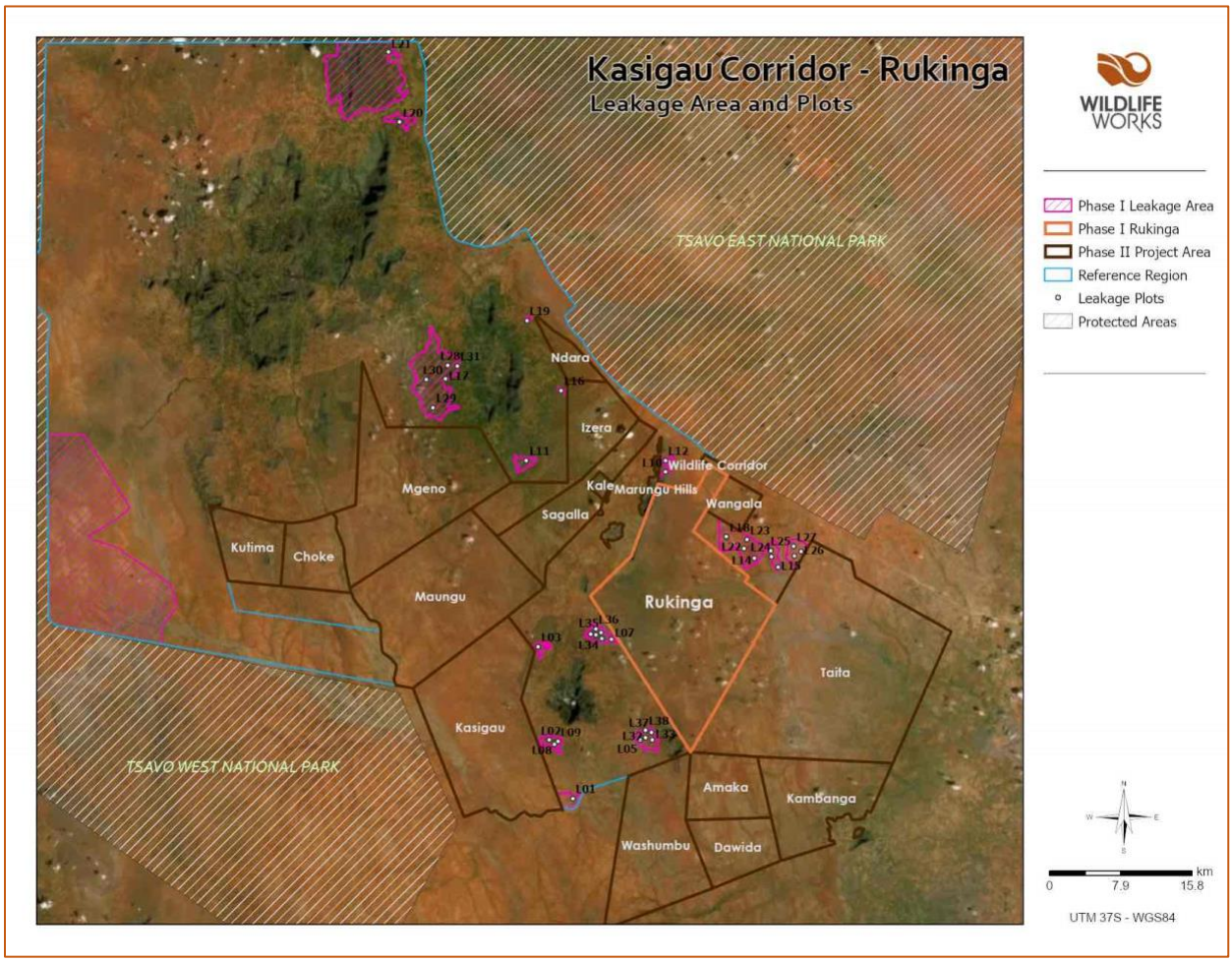


Figure 7: Leakage plot locations for KCRPI.

Organizational Structure

Wildlife Works has 2 dedicated plot sampling teams, each team containing 8 sampling specialists. The teams are under the supervision of Jamie Hendriksen, Director of Regional Operations. Each team is directed by a team leader, who is trained in GPS operation and forest sampling techniques. The team leader must additionally demonstrate proficiency in species identification and biometric estimation techniques (calculating DBH, height, measuring angle from north, etc.). These team leads have typically grown into their position with experience and proven acumen in the field, and the positions are coveted within the Wildlife Works hierarchy. The overall team leader is Joshua Kitiro, while each team also has an operation leader: Cyprian Mwaswasi and Mattias Kakoi. Collectively, these three are responsible for all data collection and its transfer to the main Rukinga office. Their names are attached to each soil, leakage and biomass plot data sheet. All discrepancies can be easily traced back to date and time of collection, as well as team members who collected the data. To minimize any conflict between team members, or job burn-out, plot team members continuously change positions, and the team members switch teams often.

As mentioned above, leakage plot teams are specially trained by Project management to recognize forest degradation characteristics typical of the Kasigau Corridor.

Data Collection, Storage and Aggregation

Data collected in the field is systematically translated into the carbon model. The carbon model contains dropdown lists and pre-filled formulas to ensure accuracy of entry and minimize human translation error. Data for this monitoring period were entered by Defence Mghoi, who was trained by Rob Dodson, former VP of African Field Ops and Jamie Hendriksen, Director of Regional Operations. Data entry is crosschecked internally, as well as by staff in the US office. Data goes through a final check by the U.S. based carbon development staff, where any outlying or otherwise inconsistent or unusual data is identified and rectified.

Carbon accounting is ultimately the responsibility of the VP of Carbon Development, and all models and procedures adhere to the VCS methodology. Digital copies of all data and models are maintained at Wildlife Works' Carbon Development office in Vermont.

Field Training

The field protocols (SOPs) for biomass and soils were produced using the experiences and expertise of field techniques by the initial plot sampling team. Whenever necessary, the biomass and soil sampling SOPs are revised to encompass new techniques, methods or metrics. Two teams have been trained using this procedure and undergo several checks to ensure consistency in method. Before each monitoring event, plot teams undergo field training from Mwangi Githiru and Jamie Hendrickson to refresh their knowledge and incorporate any additions to the SOP.

Internal Auditing

Internal checks are routinely performed on biomass, soil and leakage plots. The Director of Forest Science and Project Management embark on "check cruises" to evaluate the employees' work and management often audits individual measurements on an as-needed basis. Wildlife Works has also instituted an official Quality Assurance and Quality Control (QA / QC) system for biomass plots, which has been reviewed by the validators (see QA / QC Standard Operating Procedure). As mentioned above, after the data is translated into electronic format, various internal checks are performed to eliminate errors. Wildlife Works management continually reviews the work done by other members of management

to ensure there are no outlying data or unexplained inconsistencies. Wildlife Works' policy is that all work products shall be internally reviewed by at least a second person before publication.

The following is a summary of the plans to monitor Climate, Community and Biodiversity (CCB) impacts on the environment as a result of the carbon Project's direct influence. For details, please refer to the CCB Project Monitoring Plan (PMP), which was provided to the CCB validation auditors. Please also refer to Sections CL3, CM3 and B3 for Climate, Community and Biodiversity monitoring plans, respectively, in the Project's CCB PDD.

Climate Monitoring

As this Project seeks full CCB/VCS accreditation, all climate monitoring is assumed to fall under the VCS monitoring plan, which is fully described in the Project Monitoring Plan sections above, and also in the Project's VCS PD Section 13.14 Monitoring of Carbon Stocks in the Project Area. Additional specific monitoring information can be found in the Standard Operating Procedures for Biomass, Soil and Leakage.

The following Carbon Pools are monitored for KCRPI, as specified under the VCS methodology VM0009 Methodology for Avoided Deforestation of Tropical Forests v1.1:

Table 2: The Carbon Pools that are included in the Kasigau Corridor REDD+ Project Phase I – Rukinga Sanctuary

Pool	Required	Included in Project?	Justification
Above-ground large tree biomass	Yes	Yes	Major pool considered
Above-ground small tree biomass	Yes	Yes	Major pool considered
Above-ground non-tree biomass	Optional	Yes	Major pool considered
Below-ground large tree biomass	Optional	Yes	Major pool considered
Below-ground small tree biomass	Optional	Yes	Major pool considered
Below-ground non-tree biomass	Optional	Yes	Major pool considered
Litter	No	No	Conservatively excluded
Standing dead wood	Optional	Yes	Major pool considered
Lying dead wood	Optional	No	Conservatively excluded
Soil	Optional	Yes	Major pool considered
Long-lived wood products	Yes	Yes	May be a significant reservoir under the baseline scenario

The purpose of the carbon-monitoring plan is to measure:

- The extent to which forest within the Project Area has been protected from any unplanned GHG emissions during the Project crediting period, and;
- Leakage that that can be attributed to the Project.

Emissions reduction (ER) calculations are based on two models, both developed according to the VCS methodology VM0009. The first is a current carbon inventory of the Project Area, conducted using a stratified-random, fixed permanent plot methodology. The second is a heads-up interpretation of historical satellite imagery in the Reference Area covering a period of 20 years prior to the Project start date, empirically measuring the deforestation rate in the reference area and applying it to the project area.

For the first model, we carry out a resampling of 20% of the permanent plots per year. Plot sampling is normally performed at the same time of year as the initial inventory to ensure minimum seasonal variability in carbon stocks, which in southeastern Kenya can be considerable. We re-measure the diameter at breast height (DBH), height, and status of each tree for each plot. Annual resampling is rotated such that every five years we have performed complete (100%) resampling of the forest biomass plot set.

Soil carbon is monitored at least once every five years. The methodology employs a soil carbon decay model, which estimates the release of carbon from soil after being converted from forested land to cropland. This soil model, accepted at the validation of this Project, does not require yearly re-measurement of each soil carbon plot to maintain an accurate depiction of soil carbon behavior.

Disturbance Monitoring

The disturbance monitoring plan monitors for disturbances, reversals, catastrophic events and any other significant negative effect on carbon within the Project. This system is described as follows.

Identification of Disturbances

To quickly identify disturbances in the Project Area resulting from natural events (e.g., fires) or encroachment, we perform the following monitoring activities:

a) Forest ranger patrols and community scouts: Regular patrols of the Project Area are carried out in order to detect encroachment or other disturbance. In addition, designated ‘community scouts’ have been asked to notify the Project Proponent when they observe newly disturbed areas within the Project Area.
b) Analysis of imagery: Analysts periodically examine one or more imagery products in order to detect encroachment or other disturbances. Imagery products may include any index or other remote sensing product, Google Earth imagery, or aerial imagery or videography collected by the Project Proponent.

Frequency of Disturbance Monitoring

In addition to regular forest patrols, we use remotely sensed imagery each year to quickly and accurately identify potential disturbances within the Project Area.

Definition of a Significant Disturbance

A disturbance is considered significant if the total disturbed area is greater than 250 ha, or it results in a decrease in carbon stock estimates (tCO2e/ha) of greater than 5%. The magnitude of the change in carbon stocks shall be determined by comparing the carbon stock estimates of the disturbed area’s stratum prior to disturbance with the results of a set of plots in the disturbed area.

Accounting of Disturbances

If a disturbance is determined to be significant according to the criteria listed above, the Project Proponent shall do the following:

a) Delineate a new stratum for the disturbed area. This delineation can be performed in the field using a GPS handheld or analysis of remote sensing imagery.
b) Install plots and re-measure biomass.
c) Determine new Project Area carbon stocks with the new stratum included.

Community Monitoring

Wildlife Works gathers data relevant to community impact in a variety of ways and at a range of frequencies. At one end of the spectrum is human population data for the Project Reference Area are gathered every ten years from Kenya's national census data. At the finer scale, Dr. Mwangi Githiru conducts biennial household surveys amongst the communities in the Project Area. The focus of these surveys is to collect vital data on demography, household size and composition and livelihoods and income diversification. This household survey is described in detail above in Section 2.2.14.8. To collect suggestions and grievances from communities in the Project Zone, 5 suggestion boxes have been placed village chief offices.

Sales and production data are collected by each of the Project Activities, such as the nursery operations, and reported to the Biodiversity and Social Monitoring Section at Wildlife Works. This information is then reported annually in this report as metrics of their success. Employment, both permanent and temporary, is tracked by the HR Department and reported annually in this report.

As mentioned above in the Climate Impact Monitoring section, Wildlife Works will conduct verifications annually against the VCS and CCB standards. Therefore, once a year, we summarize all of the data collected and include that summary in the CCB and VCS Verification reports for each monitoring period.

Biodiversity Monitoring

Wildlife Works has been gathering systematic data on wildlife populations since 2011. Dr. Mwangi Githiru continues to function as Wildlife Works' Biodiversity and Social Monitoring Director. He oversees the biodiversity monitoring team, whose role is to gather, verify, analyze and report key biodiversity indicators. Additional biodiversity data is collected by the forest rangers, who record the location of HCV wildlife and other points of interest whilst on their daily patrols. The goal is to demonstrate that the project is delivering on the stated commitment to improving the situation of the HCV species present in the Project Area. All biodiversity data that is collected is managed and analyzed by Dr. Githiru and his team at Rukinga Sanctuary. Dr. Githiru produces a robust annual or biennial Biodiversity and Social Monitoring Report. These data on biodiversity presence, population trends, distribution are also occasionally published in peer-reviewed journals, besides being summarized annually in this Monitoring Report (see section 2.2.14).

3.1.4 Dissemination of Monitoring Plan and Results (CL3.2)

Climate monitoring results are included in this document, which is made publicly available, with hard copy availability for review at the Project Office. Additionally, a monitoring report summary has been written and provided to communities throughout the Project Area in English and Swahili. The monitoring report has additionally been posted to the CCB website for public review and comment.

3.2 Quantification of GHG Emission Reductions and Removals

3.2.1 Baseline Emissions

Per the VCS methodology VM0009 v1.1, the cumulative deforestation model (CDM) and a soil emissions Model (SEM) were used to calculate the emissions that would occur under the baseline scenario in the absence of the Project. The CDM predicts the cumulative emissions from biomass as a result of deforestation and is parameterized using observations of historic imagery from the reference area. The soil emissions model is based on a logistic model of ecosystem conversion and assumes that soil organic carbon (SOC) begins to decay in the Project Area at the point in time the patch of land is converted to a deforested state.

The CDM curve is used throughout the Project's lifetime, for the current monitoring period as was all previous periods. Wildlife Works chose a conservative linear baseline prediction for baseline emissions, based on historical deforestation observations and modeled with a logistic deforestation curve. This linear rate adheres to the criteria in VM0009 v1.1, section 6.4.8 'Linear Prediction of Deforestation'. Both the logistic CDM and chosen conservative linear deforestation rate are depicted in the chart below.

Baseline emissions for the current monitoring period (M_8) are calculated as follows:

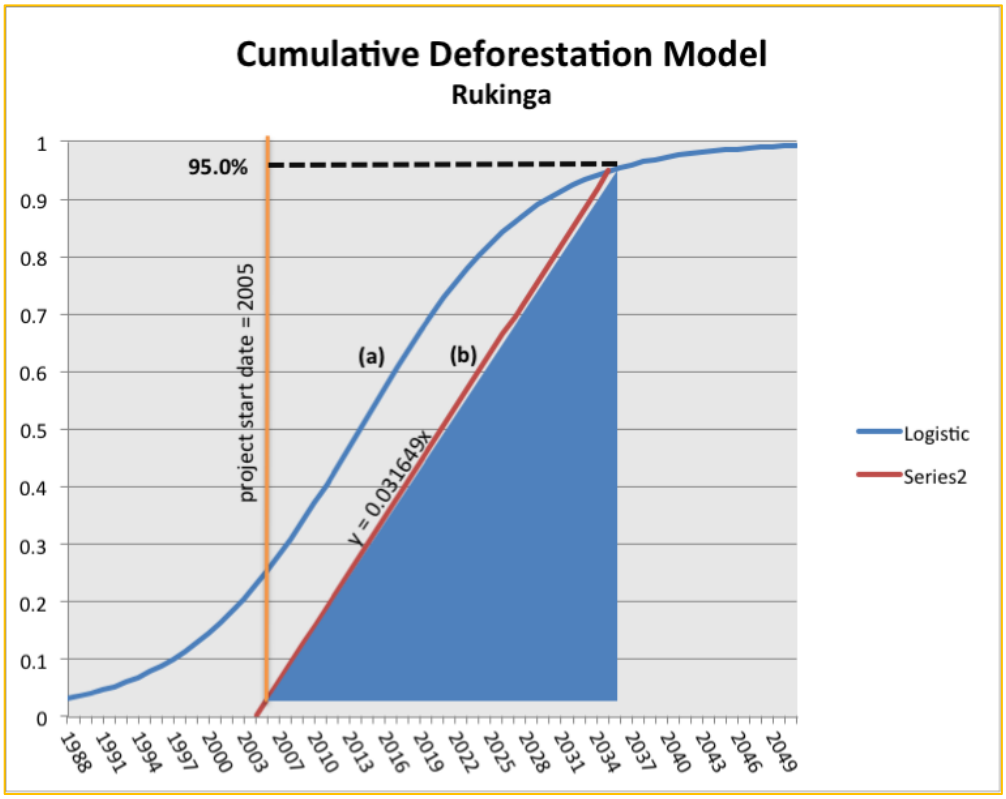


Figure 8: The cumulative deforestation model for Kasigau Corridor REDD+ Project Phase I Project Area.

Table 3: Baseline carbon emissions and reductions to date from the Kasigau Corridor REDD+ Project Phase I.

Component	First monitoring period (M_1)	Second monitoring period (M_2)	Third monitoring period (M_3)	Fourth monitoring period (M_4)	Fifth monitoring period (M_5)	Sixth monitoring period (M_6)	Seventh monitoring period (M_7)	Eighth monitoring period (M_8)	Total to date
Cumulative Baseline deforestation %	11.1%	22.15%	25.32%	31.65%	41.14%	47.47%	50.64%	53.80%	53.80%
Gross ERs (t CO_2e)	1,450,329	250,465	244,944	500,831	774,295	492,198	320,212	270,455	4,303,720
Buffer tonnes to VCS (t CO_2e)	290,066	37,570	36,742	75,125	100,658	63,986	41,628	35,158	680,933
Total ERs (t CO_2e)	1,160,263	212,895	208,202	425,706	744,707	428,212	278,584	235,287	3,693,856

3.2.1.1 Calculating Baseline Emissions from Biomass

Carbon stocks are estimated using the Verified Carbon Standard (VCS) methodology VM0009 'Methodology for Avoided Ecosystem Conversion' v1.1, accepted by VCS in January 2011. Subsequent versions of this methodology have been released to widen its applicability to new geographies and forest types. KCRPI was validated against version 1.1 of the methodology.

All biomass plots must be re-measured at least every five years. Approximately 20% of the biomass plots will be re-measured each calendar year, achieving 100% sample plot coverage at least once every five-years. Plot locations are shown below in Figure 9. Changes in Project carbon stocks are calculated as the difference in Project stocks in each stratum between the current and prior monitoring periods, as determined from in-situ measurement of biomass plots.

Carbon stocks that are lost to burning, wood products, and leakage are accounted for using the procedures and equations included in the methodology. Please refer to the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3xlsm' to view the forest inventory data used for the following equations:

Current baseline emissions in above ground large trees $C_{BE,AGLT}^{[m8]}$ as of the current monitoring period are calculated using equation [F.21] of the VCS Methodology VM0009, Version 1.1. The standing dead is included in the above ground large tree carbon pool:

$$C_{BE,AGLT}^{[m8]} = F_{DF}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}\right) C_{AGLT}^{[m8]} - F_{DF}\left(t^{[m8-1]}, \hat{\eta}^{[m8-1]}\right) C_{AGLT}^{[m8-1]}$$

Where;

$C_{BE,AGLT}^{[m]}$ = baseline emissions in above ground large trees for monitoring period $[m8]$

$F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m]$, given by either equation [16] or a conservative linear model as described in section 6.4.8 of the methodology

$F_{DF}\left(t^{[m-1]}, \hat{\eta}^{[m-1]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m-1]$, given by either equation [16] or a conservative linear model as described in section 6.4.8 of the methodology

$C_{AGLT}^{[m]}$ = carbon stock in above-ground large trees for monitoring period $[m]$

$C_{AGLT}^{[m-1]}$ = carbon stock in above-ground large trees for monitoring period $[m-1]$

Where;

$C_{BE,AGLT}^{[m8]}$ = 56,864 t CO2e

$F_{DF}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}\right)$ = 0.5380

$F_{DF}\left(t^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.5064

$C_{AGLT}^{[m8]}$ = 1,688,347 t CO2e

$C_{AGLT}^{[m7]}$ = 1,681,574 t CO2e

Current baseline emissions in above ground non trees $C_{BE,AGNT}^{[m8]}$ as of the current monitoring period are calculated using equation [F.23] of the VCS Methodology VM0009, Version 1.1:

$$C_{BE,AGNT}^{[m]} = F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right) C_{AGNT}^{[m]} - F_{DF}\left(t_2^{[m-1]}, \hat{\eta}^{[m-1]}\right) C_{AGNT}^{[m-1]}$$

Where;

$C_{BE,AGNT}^{[m]}$ = baseline emissions in above ground non trees for monitoring period $[m]$

$F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m]$, given by either equation [16] or a conservative linear model as described in section 6.4.8 of the methodology

$F_{DF}\left(t^{[m-1]}, \hat{\eta}^{[m-1]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m-1]$, given by either equation [16] a conservative linear model as described in section 6.4.8 of the methodology

$C_{AGNT}^{[m]}$ = carbon stock in above-ground non trees for monitoring period $[m]$

$C_{AGNT}^{[m-1]}$ = carbon stock in above-ground non trees for monitoring period $[m-1]$

Where;

$C_{BE,AGNT}^{[m8]}$ = 2,956 t CO2e

$F_{DF}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}\right)$ = 0.5380

$F_{DF}\left(t^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.5064

$C_{AGNT}^{[m8]}$ = 169,259 t CO2e

$C_{AGNT}^{[m7]}$ = 174,000 t CO2e

Current baseline emissions in below ground large trees $C_{BE,BGLT}^{[m]}$ as of the current monitoring period are calculated using equation [F.24] of the VCS Methodology VM0009, Version 1.1:

$$C_{BE,BGLT}^{[m]} = p_{BGLT}\left[F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right) C_{BGLT}^{[m]} - F_{DF}\left(t_2^{[m-1]}, \hat{\eta}^{[m-1]}\right) C_{BGLT}^{[m-1]}\right]$$

Where;

$C_{BE,BGLT}^{[m]}$ = baseline emissions in below ground large trees for monitoring period $[m]$

p_{BGLT} = proportion of below-ground large tree biomass removed as a result of land conversion to agriculture

$F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m]$, given by either equation [16] or a conservative linear model as described in section 6.4.8 of the methodology

$F_{DF}\left(t^{[m-1]}, \hat{\eta}^{[m-1]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m-1]$, given by either equation [16] a conservative linear model as described in section 6.4.8 of the methodology

$C_{BGLT}^{[m]}$ = carbon stock in below ground large trees for monitoring period $[m]$

$C_{BGLT}^{[m-1]}$ = carbon stock in below ground large trees for monitoring period $[m-1]$

Where;

$C_{BE,BGLT}^{[m8]}$ = 23,418 t CO2e

p_{BGLT} = 1

$F_{DF}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}\right)$ = 0.5380

$F_{DF}\left(t^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.5064

$C_{BGLT}^{[m8]}$ = 675,399 t CO2e

$C_{BGLT}^{[m7]}$ = 671,301 t CO2e

Current baseline emissions in below ground non trees $C_{BE,BGNT}^{[m]}$ as of the current monitoring period are calculated using equation [F.26] of the VCS Methodology VM0009, Version 1.1:

$$C_{BE,BGNT}^{[m]} = F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right)C_{BGNT}^{[m]} - F_{DF}\left(t_2^{[m-1]}, \hat{\eta}^{[m-1]}\right)C_{BGNT}^{[m-1]}$$

Where;

$C_{BE,BGNT}^{[m]}$ = baseline emissions in below ground non trees for monitoring period $[m]$

$F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m]$, given by either equation [16] or a conservative linear model as described in section 6.4.8 of the methodology

$F_{DF}\left(t^{[m-1]}, \hat{\eta}^{[m-1]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m-1]$, given by either equation [16] a conservative linear model as described in section 6.4.8 of the methodology

$C_{BGNT}^{[m]}$ = carbon stock in below ground non trees for monitoring period $[m]$

$C_{BGNT}^{[m-1]}$ = carbon stock in below ground non trees for monitoring period $[m-1]$

Where;

$C_{BE,BGNT}^{[m]}$ = 1,183 t CO2e

$F_{DF}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}\right)$ = 0.5380

$F_{DF}\left(t^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.5064

$C_{BGNT}^{[m8]}$ = 67,703.66 t CO2e

$C_{BGNT}^{[m7]}$ = 69,599.83 t CO2e

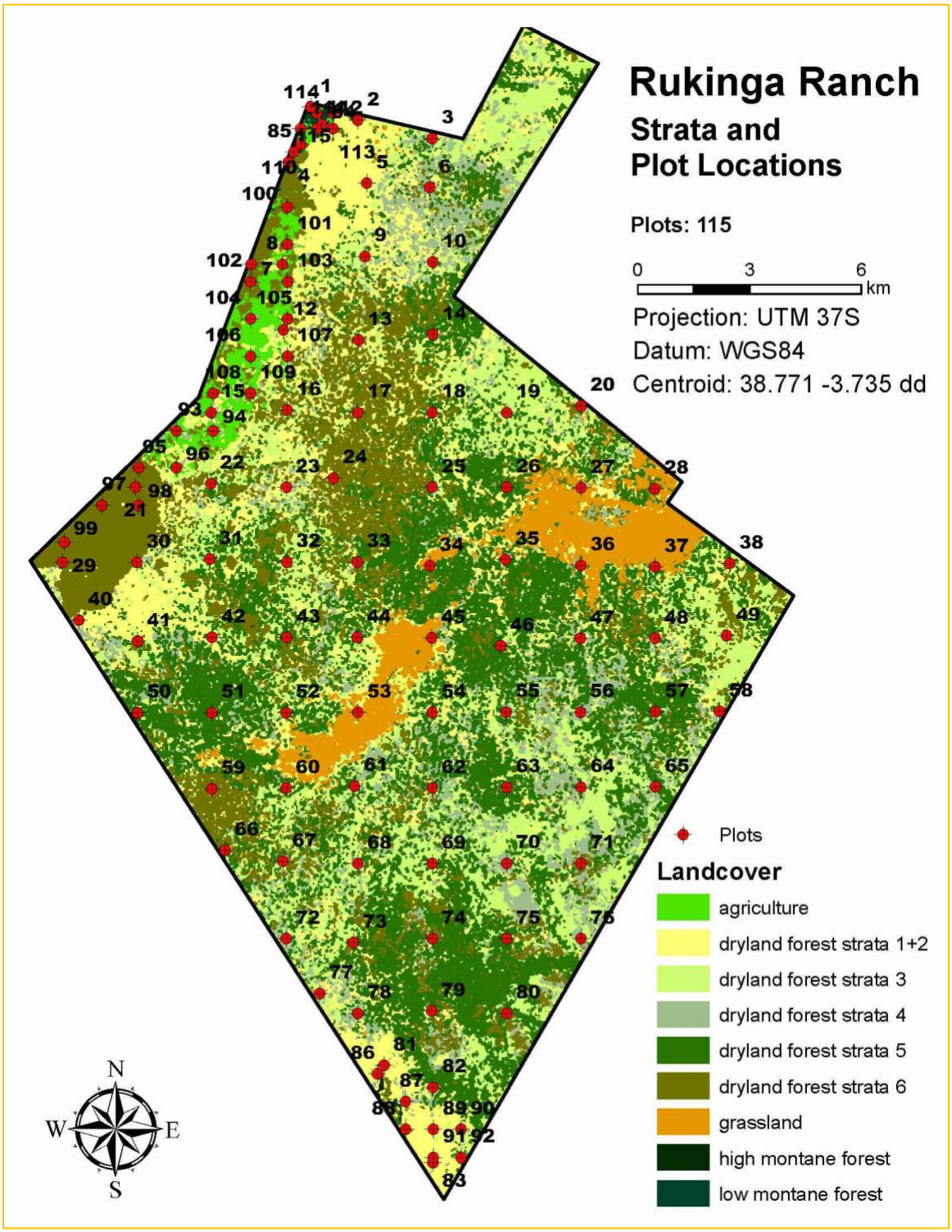


Figure 9: All Biomass sample plot locations in Kasigau Corridor REDD+ Project Phase I Project Area

Table 4 depicts current measured above- and below-ground biomass carbon stocks by land cover stratum. Values have been calculated using the methods of carbon accounting detailed in the VCS Methodology VM0009 and the VCS / CCB validated PD for KCRPI.

Table 4: A summary of current biomass carbon stocks as measured in M_8 within the KCRPI Project Area

Stratum	Area (ha)	Mean carbon stock (t CO_2e / ha)
ag active	706.52	130.73
dryland forest strata 1+2	6,858.93	57.78
dryland forest strata 3	5,622.92	94.03
dryland forest strata 4	2,766.58	100.45
dryland forest strata 5	8,125.52	102.21
dryland forest strata 6	4,324.29	102.58
grassland	1,600.12	15.43
montane forest	55.22	119.89
out	108.56	0.00
Total	**30,168.66**	90.39

3.2.1.2 Calculating Baseline Emissions from Soil Carbon

Wildlife Works employs a soil emissions model (SEM) to measure soil carbon: unlike with forest carbon, complete (100%) soil carbon loss does not occur in the baseline scenario. All soil plots were remeasured during the M_8 monitoring period, in accordance with the monitoring plan. Please see Figure 10 for a map of soil sample plot locations. The methodology specifies a decay curve that eventually settles on a mean SOC value for soil carbon lost through clearing of agricultural land. Prior to Project validation, we measured soil carbon in a number of proxy sites immediately adjacent to the Project Area, on farmland with identical soil, rainfall and climate, which in all cases had been forested less than 20 years prior. An identical procedure is used for soil carbon estimation within the Project Area: 1 m pits dug in two lifts, 0-30 cm and 31-100 cm and samples from each layer were thoroughly mixed, bagged and sent to an independent soil testing lab for bulk density and soil organic matter (SOM) analysis. The results of the soil carbon analysis can be found in the file 'Kasigau Corridor I Soil Calc v2.xlsx'. The results were derived from the following equations:

Current baseline emissions in soil $C_{BE,SOIL}^{[m]}$ as of the current monitoring period are calculated using equation [F.29] of the VCS Methodology VM0009, Version 1.1:

$$C_{BE,SOIL}^{[m]} = \sum_{i \in \mathcal{M}} S\left(t_2^{[m-1]} - t_2^{[m-i-1]}, t_2^{[m]} - t_2^{[m-i]}, \hat{\lambda}, \hat{\ell}_{max}\right)\left[F_{DF}\left(t_2^{[m-i]}, \hat{\eta}^{[m-i]}\right) - F_{DF}\left(t_2^{[m-i-1]}, \hat{\eta}^{[m-i-1]}\right)\right] C_{SOIL}^{[m-i]}$$

Where;

$C_{BE,SOIL}^{[m]}$ = baseline emissions in soil for monitoring period $[m]$

$S\left(t_2^{[m-1]} - t_2^{[m-i-1]}, t_2^{[m]} - t_2^{[m-i]}, \hat{\lambda}, \hat{\ell}_{max}\right)$ = the soil carbon loss function defined in equation [18]

t_i = the time of the ith sample point

$\hat{\ell}_{max}$ = the estimated maximum proportion of soil carbon lost over time

$\hat{\lambda}$ = estimated mean rate of soil carbon loss

$F_{DF}\left(t_2^{[m]}, \hat{\eta}^{[m]}\right)$ = predicted proportion of cumulative deforestation at monitoring period $[m]$, given by either equation [16] or a conservative linear model as described in section 6.4.8 of the methodology

$C_{SOIL}^{[m-i]}$ = carbon stock in soil for monitoring period $[m-i]$

$\mathcal{M}$ = the set of all monitoring periods including $[m]$ where the first monitoring period is $m = 0$.

Where;

$C_{BE,SOIL}^{[m8]}$ = 186,023.31 t CO2e

$S\left(t_2^{[m-1]} - t_2^{[m-i-1]}, t_2^{[m]} - t_2^{[m-i]}, \hat{\lambda}, \hat{\ell}_{max}\right) = 133{,}425.058$ t CO2e

t_i = 16

$\hat{\ell}_{max}$ = 0.4557

$\hat{\lambda}$ = 0.55

$F_{DF}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}\right)$ = 0.5380 %

$C_{SOIL}^{[m8-i]}$ = 13,199,255.70 t CO2e

$\mathcal{M}$ = 8

The estimation employs the soil carbon loss model using equation [F.18] of the VCS Methodology VM0009, Version 1.1:

$$S(t_1, t_2, \lambda, \ell_{max}) = \left(1 - \frac{-\lambda}{\ell_{max}} * (t_1)\right) - \left(1 - \frac{-\lambda}{\ell_{max}} * (t_2)\right)$$

Where;

S = soil carbon loss model

t_i = the time of the ith sample point

ℓ_{max} = the maximum proportion of soil carbon lost over time

λ = mean rate of soil carbon loss

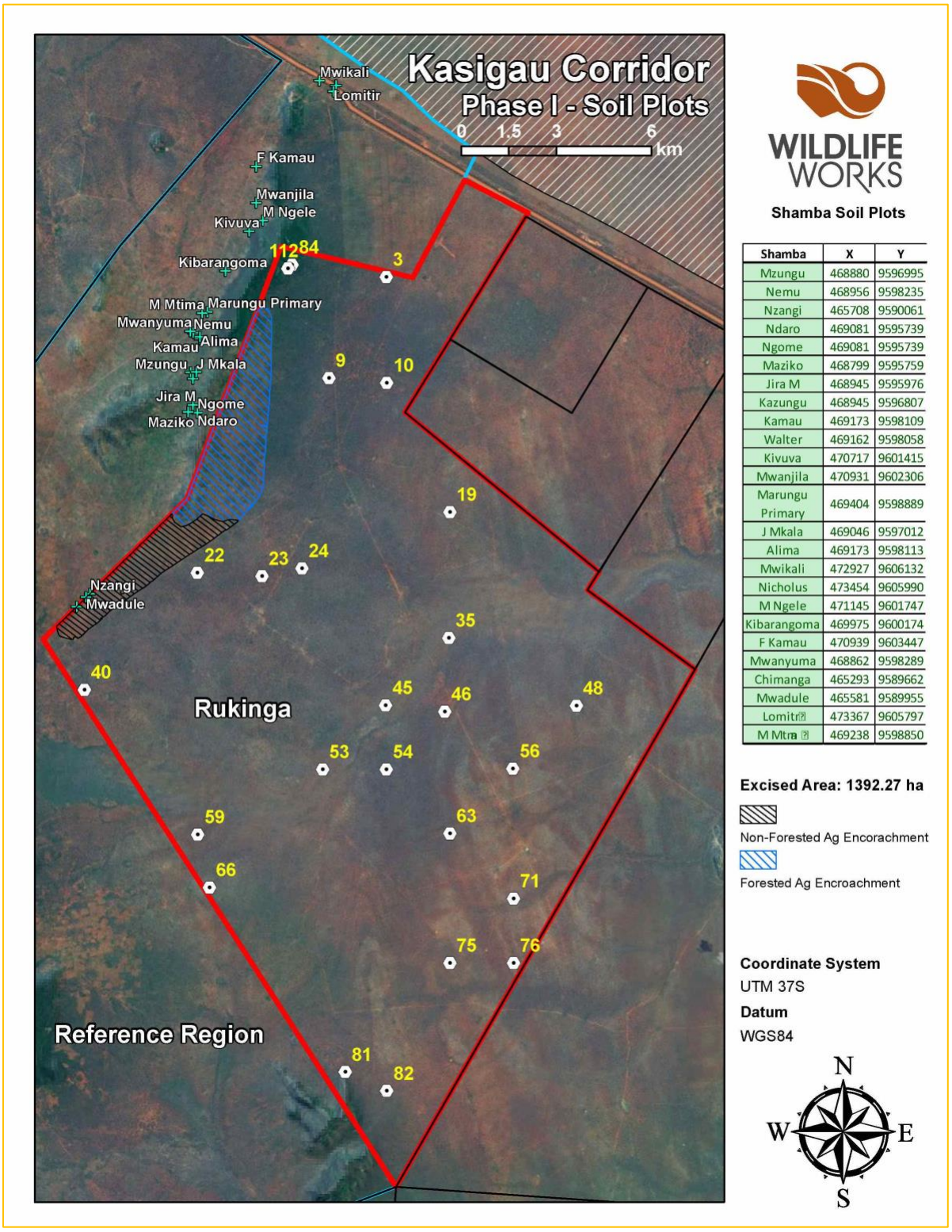
Where;

S = 133,425.058 t CO2e

t_i = 16

ℓ_{max} = 0.4557

λ = 0.55



Shamba	X	Y
Mzungu	468880	9596995
Nemu	468956	9598235
Nzangi	465708	9590061
Ndaro	469081	9595739
Ngome	469081	9595739
Maziko	468799	9595759
Jira M	468945	9595976
Kazungu	468945	9596807
Kamau	469173	9598109
Walter	469162	9598058
Kivuva	470717	9601415
Mwanjila	470931	9602306
Marungu Primary	469404	9598889
J Mkala	469046	9597012
Alima	469173	9598113
Mwikali	472927	9606132
Nicholus	473454	9605990
M Ngele	471145	9601747
Kibarangoma	469975	9600174
F Kamau	470939	9603447
Mwanyuma	468862	9598289
Chimanga	465293	9589662
Mwadule	465581	9589955
Lomitr	473367	9605797
M Mtm	469238	9598850

Figure 10 Soil sample plot locations in KCRPI

Soil carbon analysis yielded a mean difference in soil carbon between the with-Project and without-Project scenarios of 183 tonnes GHG / ha converted to farmland under annual crops, or a 45% reduction in soil carbon value upon conversion.

Table 5: A summary of current soil carbon stocks as measured in M_8 for KCRPI

Area	Soil accounting area (ha)	Mean carbon stock (t CO_2e / ha)	Standard error (t CO_2e /ha)
Project Area	30,059.86	439.10	26.96
Proxy Area	N/A	224.01	15.9

3.2.1.3 Calculating Baseline Emissions from All Pools

Current baseline emissions $C_{BE}^{[m]}$ as of the current monitoring period are calculated using equation [F.20] of the VCS Methodology VM0009, Version 1.1:

$$C_{BE}^{[m]} =. \sum_{j \in C} C_{BE,j}^{[m]}$$

Where;

$C_{BE}^{[m]}$=estimated baseline emissions

C=the set of all selected carbon pools

Where;

$C_{BE}^{[m]}$= 270,445.15

Where;

$$C_{BE}^{[m]} = cumulative\ GER^{[m8]} - cumulative\ GER^{[m7]}$$

Where;

$cumulative\ GER^{[m8]}$= 4,303,720.77
$cumulative\ GER^{[m7]}$= 4,033,275.62

A summary of emissions in the baseline from all pools is as follows:

Table 6: Baseline emissions summary for all pools for KCRPI

Pool	Cumulative Baseline Emissions through M_8 (t CO_2e)	Total Baseline Emissions over the Project lifetime (t CO_2e)
Aboveground and Belowground forest biomass (trees, shrubs, grasses)	1,399,237.40	2,469,242
Soils	2,904,483.37	5,377,387
Total	4,303,720.77	7,846,630
Average Annual Baseline Emissions for the Project Lifetime		**238,357**

3.2.2 Project Emissions

Project emissions are estimated as follows:

- All eligible carbon pools fell under the *de minimis* limit as described in the VCS Methodology VM0009, section 9 Project Emissions and in VCS 2007.1;
- Burning of woody biomass (see VM0009, section 9 Project Emissions) in the Project Area falls below the *de minimis* threshold for this monitoring period (M_8).

There were no disturbances in the KCRPI project area that met the definition of a significant project emission in this m_8 monitoring period.

3.2.3 Leakage

3.2.3.1 Leakage Mitigation Strategies (CL2.2.)

All Project Activities are described in detail in Section 2.2. Project Activities were designed to mitigate deforestation and human-wildlife conflict, and therefore by default serve to mitigate leakage and uphold project permanence. Please refer to Section 4.3.2.1 for a detailed description of the status of implementation for each Project Activity.

3.2.3.2 Activity-Shifting Leakage (CL2.1.)

During the first monitoring period (m1), the leakage lag period, $\hat{\delta}_{LE}$, was measured using empirical leakage plot data. The leakage model was built from this data (see below) and used to measure adjustments for leakage in the subsequent and current monitoring periods, until baseline re-evaluation. Leakage was calculated and deducted from gross emission reductions as follows:

$$\hat{\delta}_{LE}\ (t=0) = -0.762$$

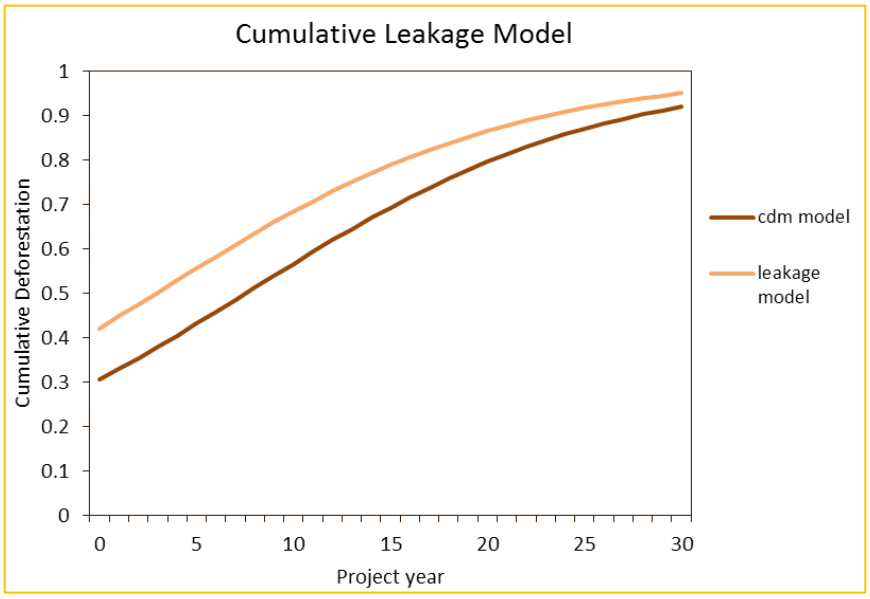


Figure 11: The cumulative deforestation model and leakage model for KCRPI.

For this 8th monitoring period, $\hat{\delta}_t$ is measured as the estimate of cumulative deforestation and degradation in the leakage plots:

$$\hat{\delta}_8 = 0.461$$

And compared to the cumulative leakage model at time t=7, per VM0009 v1.1, equation [33]:

$$Let\ \bar{o}^{[m]} = \frac{1}{\#(\mathcal{J}^{[m]})} \sum_{i \in \mathcal{J}^{[m]}} o_i$$

$$Let\ x = max \begin{cases} F_{LE}\left(t_2^{[m]}, \hat{\eta}^{[m]}, \hat{\delta}_{LE}\right) \\ F_{LE}\left(t_2^{[reevaluation-1]}, \hat{\eta}^{[reevaluation-1]}, \hat{\delta}_{LE}\right) \\ \bar{o}^{[m-1]} \end{cases}$$

$$\hat{r}_{LE}^{[m]} = \frac{a_{LE}}{p_{forest} a_{project}} \times \begin{cases} 0\ if\ \bar{o}^{[m]} - x \leq 0 \\ \bar{o}^{[m]} - x\ o.w. \end{cases}$$

$$\hat{r}_{LE}^{[m8]} = 0\%$$

Where;

$\hat{r}_{LE}^{[m]}$ = leakage factor for monitoring period $[m]$

$\bar{o}^{[m]}$, $\bar{o}^{[m-1]}$ = average of $[m]$ or $[m-1]$

x = the maximum of the three terms given above

$\mathcal{J}^{[m]}$ = set of all observations taken in the leakage area at monitoring period $[m]$

$F_{LE}\left(t_2^{[m]}, \hat{\eta}^{[m]}, \hat{\delta}_{LE}\right)$ = prediction of the cumulative leakage model at monitoring period $[m]$

$F_{LE}\left(t_2^{[reevaluation-1]}, \hat{\eta}^{[reevaluation-1]}, \hat{\delta}_{LE}\right)$ = prediction of the cumulative leakage model prior to the last baseline reevaluation

a_{LE} = the area of the leakage area

$a_{project}$ = the total project area

p_{forest} = the proportion of the project area that is forested

Where;

$\hat{r}_{LE}^{[m8]}$ = 0

$\bar{o}^{[m8]}$=0.461

$\bar{o}^{[8-1]}$ = 0.5158

x = 0.5157

$F_{LE}\left(t_2^{[m8]}, \hat{\eta}^{[m8]}, \hat{\delta}_{LE}\right)$ = 0.76924168

$F_{LE}\left(t_2^{[reevaluation-1]}, \hat{\eta}^{[reevaluation-1]}, \hat{\delta}_{LE}\right)$ = 0.421052632

a_{LE} = 30,169

$a_{project}$ = 30,169

p_{forest} = 1

We then calculate leakage for the current monitoring period, per VM0009 v1.1 equation [32]:

$$C_{LE}^{[m8]} = \hat{r}_{LE}^{[m8]} C_{BE}^{[m8]} = 0 \cdot 270{,}445 = 0$$

3.2.3.3 Market Leakage (CL3.1.)

Market leakage can occur if a project reduces the supply of market goods, such as timber, relative to the baseline. As described in Section 6 of the PD, the most likely baseline scenario is conversion of forest and native grassland to agriculture. This agriculture is primarily subsistence-based, with little production remaining beyond household consumption. Food security in the Project Zone is a serious issue, as detailed in Project's CCB PDD. Without the Project, there would be increasing demand for land and continued low productivity of agricultural production, crop failures from droughts, and few alternatives for income generating activities available to local communities. Given that the agents and drivers practice subsistence farming, and a key Project Activity is to work with local farmers to increase yields on land that is currently farmed, no net reduction in agricultural production due to the Project is anticipated.

3.2.4 Net GHG Emission Reductions and Removals

3.2.4.1 Determining Reversals

There have been no reversals in KCRPI during this M_8 monitoring period, or at any point during the Project's lifetime.

3.2.4.2 Determining Deductions for Uncertainty

Error analysis for the current monitoring period (M_8) is also included in the table below. It should be noted that the error analysis was performed on data from the full plot set, with the re-measured plots being pooled with the data from previous monitoring periods for those plots not selected for re-measurement during the M_8 monitoring period.

The standard error is first calculated for each component of the baseline emissions calculations, including Equation [15] from the methodology VM0009 for the CDM, Equation [67] for the biomass carbon pool and Equation [19] for the soil carbon pool. Equation [36] is then used to combine these standard errors into an uncertainty for carbon stock. Equation [35] is used to determine if an uncertainty deduction is required, and if so, the amount. For the M_8 monitoring period, KCRPI was not required to make a deduction for uncertainty. Please see Table 8 for results of this process and refer to both the file 'KCRPI Forest Carbon Inventory Model & NERs M=8 v1.3.xlsm' and the equations below for detailed calculations.

Average uncertainty in carbon stocks and the baseline model as of the current monitoring period are calculated using equation [F.36] of the VCS Methodology VM0009, Version 1.1:

$$U^{[m]} = \sqrt{\left[C_{TOTAL}^{[m]} U_{DF}^2 + C_{TOTAL}^{[m]} \left(U_{TOTAL}^{[m]}\right)^2 + C_{SOIL}^{[m]} U_{SCL}^2\right] \left(2C_{TOTAL}^{[m]} + C_{SOIL}^{[m]}\right)^{-1}}$$

$U^{[m]}$ = average uncertainty in carbon stocks and the baseline model at monitoring period $[m]$

U_{DF}^{m} = estimated uncertainty in the cumulative deforestation model

$C_{TOTAL}^{[m]}$ = estimated total carbon stock in the project area at monitoring period $[m]$

$U_{TOTAL}^{[m]}$ = estimated uncertainty of total carbon stocks at monitoring period $[m]$

$C_{SOIL}^{[m]}$ = estimated soil carbon stock in the project area at monitoring period $[m]$

U_{SCL}^{m} = estimated uncertainty in the soil carbon loss model

Where;

$U^{[m8]}$ = 10.4%

U_{DF}^{m8} = 5.9%

$C_{TOTAL}^{[m8]}$ = 15,799,903.01

$U_{TOTAL}^{[m8]}$ = 10.4%

$C_{SOIL}^{[m8]}$ = 13,199,254.70

U_{SCL}^{m8} = 13.9%

The following equation [F.35] applies a confidence deduction if the uncertainty in project stock estimates is less than an allowable error of 15% of the mean.

$$C_U^{[m]} = \begin{cases} 0 \; if \; U^{[m]} \leq 0.15 \\ \dfrac{C_{BE}^{[m]}\left(U^{[m]} - 0.15\right)}{1 - 0.15} \; o.w. \end{cases}$$

Where;

$C_U^{[m]}$ = confidence deduction

$U^{[m]}$ = average uncertainty in carbon stocks and the baseline model

$C_{BE}^{[m]}$ = estimated baseline emissions for monitoring period $[m]$

Where;

$C_U^{[m8]}$ = 0

$U^{[m8]}$ = 10.4%

$C_{BE}^{[m8]}$ = 270,455

3.2.4.3 Determining Buffer Account Allocation

Buffer account allocation was calculated according to the VCS Standard 4.0, VCS Registration and Issuance Process requirements v4.0 and the VCS Non-Permanence Risk Tool v4.0. Overall risk rating was calculated at 13% and buffer account allocation for KCRPI is summarized below.

Table 7: KCRPI Buffer Account Allocation

Component	2021 Value (t CO2e)	Total Value (t CO2e)
Gross GHG emission reductions or removals (t CO_2e), M_8	270,445	270,445
Emissions from Leakage (t CO_2e), M_8	0	0
Project Emission (t CO2e), M_8	0	0
ERs to VCS pooled buffer account (t CO_2e, (13%), M_8	35,158	35,158
VCS pooled buffer account return (t CO_2e), M_8	0	0
Total ER Issuance (t CO_2e), M_8	235,287	235,287

3.2.4.4 Quantifying Net Emission Reductions (CL1.1)

Based on the above factors, Table 8 shows the final quantification of KCRPI emission reductions.

Table 8: The baseline deforestation percentage, Baseline Emissions, Total Emission Reductions and VCS Buffer Pool contribution for the M_8 monitoring period for the Kasigau Corridor REDD+ Project Phase I

Component	Value (tCO_2e, unless otherwise indicated)
Baseline deforestation percentage (%), M_8	53.80
Project Emission, M_8	0
Project Reversal, M_8	0
Uncertainty Deduction, M_8	0
Emissions from Leakage, M_8	0
Baseline emissions, M_8	270,445
ERs to Buffer Pool, (13%), M_8	35,158
Buffer Pool Return, (15%), M_8	0
Total emission reductions (ERs), M_8	235,287
Standard error of the total carbon stock, M_8	840,070.12
Total Error (%), M_8	10.4

3.2.4.5 Estimation of NERs (CL1.2 & 1.4)

This equation [F.34] estimates total net GHG Emission Reductions and Removals (NERs) for the current monitoring period. It is important to note that the buffer contribution for this period was also subtracted from the estimated baseline emissions for the current monitoring period:

$$C^{[m]} = C_{BE}^{[m]} - C_{U}^{[m]} - C_{PE}^{[m]} - C_{LE}^{[m]} \text{- buffer}$$

Where;

$C^{[m]}$ = net GHG Emission Reductions and Removals (NERs) for monitoring period $[m]$

$C_{BE}^{[m]}$ = estimated baseline emissions for monitoring period $[m]$

$C_{U}^{[m]}$ = confidence deduction for monitoring period $[m]$

$C_{PE}^{[m]}$ = estimated project emissions for monitoring period $[m]$

$C_{LE}^{[m]}$ = estimated emissions from leakage for monitoring period $[m]$

Where;

$C^{[m]}$ = 235,287

$C_{BE}^{[m8]}$ = 270,445.15

$C_{U}^{[m8]}$ = 0

$C_{PE}^{[m8]}$ = 0

$C_{LE}^{[m8]}$ = 0

buffer=35,158

Table 9 shows the final accounting for KCRPI GHG reductions. One note is that this table does not include the 13% annual buffer pool contribution nor the 15% buffer pool return, which is the reason for the difference shown between the baseline emission removals and the Net GHG emission reductions.

Table 9: GHG reductions, project emissions, emissions and net emission reductions (NERs) for the current monitoring period, specified by vintage.

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
2021	**270,445**	0	0	**235,287**
Total	**270,445**	**0**	**0**	**235,287**

3.3 Optional Criterion: Climate Change Adaptation Benefits

Africa is identified as the continent that will be struck most severely by the impacts of climate change[18]. Given its geographical position, Africa will be particularly vulnerable due to considerably limited adaptive capacity, exacerbated by widespread poverty and the existing low levels of development. The IPCC report further predicts that by 2020, between 75 and 250 million people in Africa are Projected to be exposed to increased water stress due to climate change. In addition, also by 2020, in some countries yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries, is projected to be severely compromised, which would further adversely affect food security and exacerbate malnutrition. It is expected that these impacts hold true for the communities living in the Project Zone and would therefore severely impact the communities' well-being. This indicates a pressing need to focus on adaptation and climate change mitigation measures.

3.3.1 Activities and/or Processes Implemented for Adaptation (GL1.4, V3: GL1.3.).

The following are some examples of Project Activities that could assist communities and/or biodiversity to adapt to the probable impacts of climate change.

[18] IPCC Fourth Assessment Report: Climate Change 2007 (AR4)

Table 10: Project climate change adaptation benefits

Climate change risks	Potential effects	Potential mitigative/adaptive strategies
More intense and longer droughts	Low land productivity or complete crop failure, less pasture for livestock and wildlife, more severe fires	Reduce dependence on livestock and land through alternative IGAs, promote cultivation of drought resistant crops, improve storage facilities and management of crops, water harvesting and water storage, raise awareness of danger of fires,
Seasonal rivers drying out	Negative effects on water availability	Water harvesting methods could be implemented, construction of boreholes.
Low capacity of local populations to adapt to frequent natural disasters	Increase in periods of food insecurity, potential increase in disease and deaths with continuing very low health standards, potential for increasing inter-community conflict	Increase support of local institutional structures including the norms and rules of governance to help develop adaptive strategies, increase literacy levels, diversification of livelihood activities and income generation projects, involve women to a greater degree in decision making processes, increase general participation in decision making at the local level
Decreased biodiversity, loss of forest cover to drought, temperature change	Reduction in species, more species at risk	Help to maintain intact and interconnected ecosystems through protection of ecosystems, ensure landscape connectivity to allow migration, regeneration activities using indigenous, drought-resistant trees

3.3.2 Activities and/or Processes Implemented for Adaptation (GL1.4)

Wildlife Works' approach to climate adaptation has been to develop sustainable economic opportunities not dependent on forest resources. Our first initiative was to build a factory and teach the local women how to sew, a radical departure from traditional conservation thinking. This approach was designed to reduce the communities' dependence on slash and burn agriculture and other activities that lead to deforestation through the development of alternative income sources.

The expansion of our Project to include revenues from carbon credit sales derived from the protection of the forest will increase the options for the creation of additional alternative, non-destructive jobs. This will enable us to employ more community members, and to further decrease the number of community members solely reliant on subsistence agriculture.

The funding from carbon sales will additionally enable the expansion of our dryland-farming scheme. We have started to implement the use of Jojoba and diverse citrus trees (oranges and lemons) as cash crops incorporated within our pilot climate-smart agriculture systems. These species were selected because they can survive in very arid conditions and are not targeted by elephants, and thus can be much more productive per hectare than maize or the other annual crops traditionally grown by the community. As these crops require much less land area, they can also be more-easily irrigated or protected, e.g., using metal strip deterrent fencing. This is highly beneficial if / when natural rains fail for extended periods, as is common in this project area.

4 COMMUNITY

4.1 Net Positive Community Impacts

4.1.1 Community Impacts (CM1.1)

In measuring and monitoring impacts of KCRPI on local communities, Wildlife Works applies the cause-and-effect logic (causal model) and associated theories of change. A theory of change is a hypothesis about how a project intends to achieve its intended objectives. Since they are based on several assumptions about the cause-and-effect relationships, carefully selected indicators are needed to monitor these assumptions in a causal chain analysis. The main strength of this logic lies in presenting a credible response to the challenge of attribution: indicators measure progress towards achieving the desired project outcomes and impacts from project activities and strategies. To this end, Wildlife Works holds Social and Biodiversity Impact Assessment (SBIA) community workshops to engage the community in thinking about the key issues they can benefit from the project, how things would have been without the project, how they may be with the Project, and any potential risks and / or negative impacts.

Wildlife Works has had a permanent, on-the-ground presence in this area since 1998 in the KCRPI region. When we first began operating on the landscape, we sought out the consent of the surrounding communities and stakeholders. Throughout our history in the area, we maintained a near constant consultation and feedback gathering process. With the development of the REDD+ mechanism in 2008, WWC sought to utilize it as a long-term, sustainable funding mechanism. In 2009 WWC began a formal consultative process with the stakeholders of the Project Area and to the surrounding communities. These formed the basis of the first SBIA community workshop held in 2011. The following five Focal Issues were identified by the communities during this initial workshop as the key issues facing the community that the project could help with: (i) Governance: incorporating leadership and gender inclusivity; (ii) Poverty: jobs and income-generating activities; (iii) Human-wildlife conflict; (iv) Environmental degradation: including deforestation and agricultural issues; and (v) Education. A result chain diagram was produced for each Focal Issue, which formed the basis of indicator identification and the KCRPI monitoring plan (the original workshop proceedings are available and can be provided to the VVB on request). Five follow up SBIA workshops have been held (2013, 2014, 2015, 2017, 2019 and during the current monitoring period, 2021) following up on these issues by reviewing project implementation issues and household survey data, plus assessing whether there have been any major changes or emerging issues.

For the 2 community groups identified in the PD, the Taita and the Duruma, the impacts of the project activities are generally equal. All project activities are freely open to all, and are not operated in consideration of any community group or ethnicity. From our randomly selected household level survey dataset, the overall proportions of the major ethnic community groups in the project area (n = 230): Taita 54%; Duruma 26%; Kamba 12%; Sanya 2%; Kikuyu 1%; Other 5% (see Figure 12 for the distribution of these ethnic communities across the six administrative locations). While some communities are dominant in some locations, e.g., Duruma in MacKinnon Road and Taita in Mwatate and Sagalla especially, it is important to note that there are no systematic separations of these communities spatially. Thus, whereas certain Locations are dominated by Taita or Duruma, at village level, the two very often live side-by-side, as well as with other ethnic community members. Thus, all of project activities touch on diverse community groups living in an area rather than being targeted to a specific group, and each group has similar impacts as each other.

In addition, the key decision-making organization on the spending of the community funds resulting from the carbon sales are the Locational Carbon Committees (LCCs). These committees are elected every two years and determine the apportionment and distribution of benefits allocated to each Location. The composition of these committees closely mirrors the proportions of the different ethnic community groups (Figure 12), which is an indication that the committees ensure that the various groupings are well-represented during the making of key decisions on spending for project activities and are receiving equal impacts.

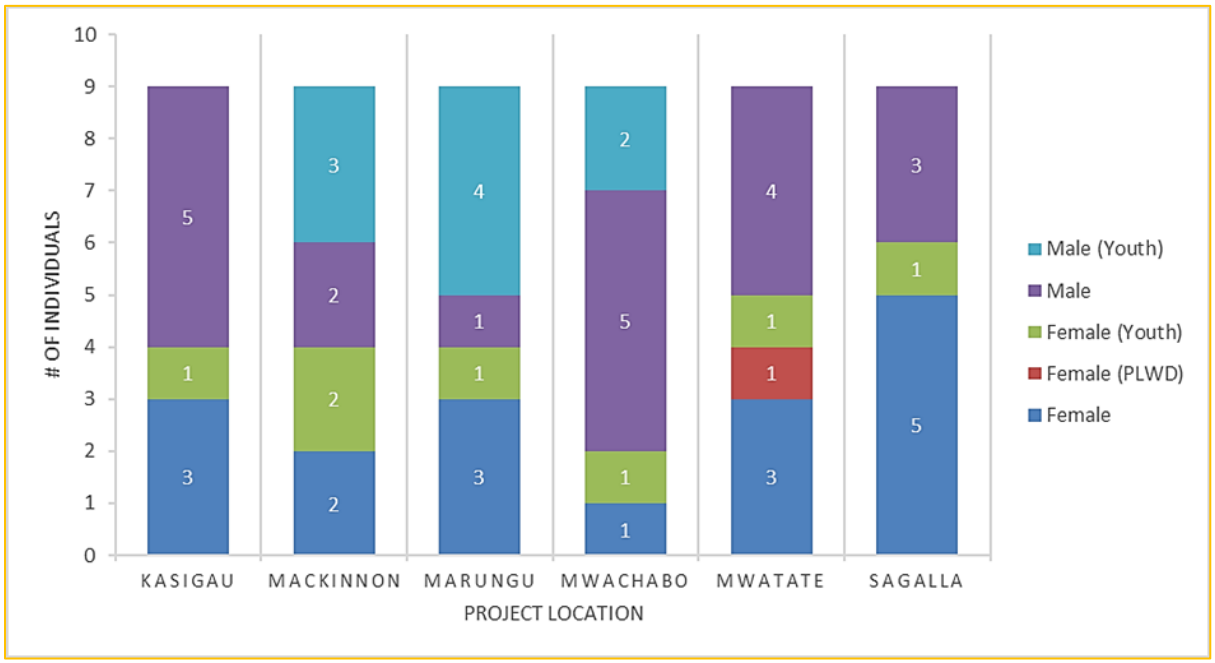


Figure 12: Composition of the previous Locational Carbon Committees (LCCs) in the six project Locations.

4.1.1.1 Risks and negative impact analysis (CM2.1.)

The SBIA community workshop participants were also tasked with identifying possible risks to Project success, plus unexpected side effect(s) from the REDD+ Project successfully realizing the desired results (based on the Focal Issues they identified and associated theories of change above). Additionally, they were required to gauge the likelihood and magnitude of these unintentional side effects then propose possible mitigation action. This then formed the basis of the risks and negative impact assessment from the community's perspective.

4.1.1.2 Describe the expected changes in the well-being conditions and other characteristics of Communities under the without-project land use scenario

Participants in the original community workshop were divided into working groups, one for each focal issue. Given these were the main issues they identified that they would like the Project to address, they were used as the basis for undertaking without-project projections. First, they needed to produce problem flow diagrams, which provide an analysis of the status quo with these problems i.e., direct and indirect factors contributing to the Focal Issue problems. They then projected what they thought would happen with the major direct threats (causes) identified for each Focal Issue in the short-to-medium term in the absence of the Project (i.e., without-project baseline scenarios). Overall, governance was projected to

improve due to devolution under the then recently promulgated Constitutional dispensation, while the other four were projected to get progressively worse. Thus, the REDD+ project activities could initially focus on any of the four issues projected to get worse without the Project. Subsequent SBIA Community workshops including the March-2021 workshop have the opportunity to review and modify these original focal issues as they may deem appropriate. However, from this 2021 workshop, the participants still felt that these are still some of the most pressing issues they face and that the proposed theories of change are still realistic in their view for their communities. So these are retained and continue to guide project activities and implementation for the KCRPI.

4.1.2 Net Positive Community Well-Being Impacts (CM1.1)

The community project activities undertaken and summarized under Section 2.2 were all determined by the community themselves (through their elected representatives to the LCCs); LCCs are the community organizations with executive authority on making decisions on community projects to be undertaken. Their decisions are based on the SBIA workshop outcomes, specifically on the main (focal) issues that the Project has undertaken, as described under Section 4.1.1 above.

Consequently, based on the theory of change logic, we argue that the Project is having positive impacts to the local communities by addressing the main problems they identified e.g., through water and health projects, school infrastructure improvement, bursary schemes, employment and income-generating activities, agri-business schemes etc. Whereas most of the community impacts are long term, the results chain demonstrates how they will be realized from the current project activities (Table 11).

Table 11: Without-project projections for the key causes of the focal issue problems identified during the original SBIA Community Workshop, and the ongoing project activities to improve them.

Focal Issue	Focal Issue Aspect	Projected status in short to medium term	Project activities so far
Human-wildlife conflict	Lack of vegetation and water	Will worsen because of increasingly unpredictable weather patterns	Dam scooping and drilling wildlife-only boreholes within the KCRPI area to help keep elephants on ranches longer after rainy season
	Poaching	Will increase as the increasing population seek means of survival	Employment and equipping a ranger force of about 100 with 6 outposts for better patrolling and enforcement
Poverty	Lack of education and awareness	Worsen with recycling the same problems due to lack of awareness, fees and negative attitudes to education	Improved school infrastructure and bursary scheme will reduce household pressure with fees payment and eventually improve education access
	Food insecurity	Worsen with decreasing yields	Agri-business community greenhouse Projects and training through the greenhouse will lead to agriculture diversification and livelihood improvement
	Low income	Will decline leading to increasing crime and disputes over resources	Job creation at Wildlife Works and through various project activities and enterprises (e.g., through Hadithi and the EPZ), as well

			as Landowner payments from carbon revenue share contribute to household incomes in KCRPI
Governance	Poor application of laws	Fair: new constitution promises a new dispensation of justice and reform of the judicial system that will lead to better application of laws	The ranger force undergoes continuous training including making arrests and air-to-ground communication, thereby improving evidence gathering and handling of crime scenes to improve chances of prosecution for wildlife crimes
Education	Negative attitude towards education	Better: through various sources, parents are beginning to appreciate the importance of education	Wildlife Works' community engagement department as well as other initiatives like GLOW, MAP, other school healthcare programs plus frequent motivational engagements in schools and the community promote the importance of education
	Poor infrastructure (mainly buildings and teaching material)	Better: improvements underway as the Government allocates more money in the education sector	School classroom construction, renovation and provision of critical infrastructure like desks, lab equipment and textbooks or examination revision material
	Lack of school fees	Slight improvement: government, donors and well-wishers providing bursaries and scholarships to needy children	Wildlife Works' Bursary Scheme complements these other efforts and provides critical full or partial funding to needy and able students
Environmental degradation	Deforestation	Increase: tree cutting will continue leading to more aridity	Wildlife Works' greenhouse's organic tree nursery initiative encourages the community to plant tree through purchasing seedlings from them, nurturing them and giving them back to the community to enhance tree cover outside KCRPI ranches
	Poor farming methods	Worsen: little soil and water conservation measures	Ongoing agricultural greenhouse and other planned farming projects (e.g., through climate-smart agriculture under the Earthwatch Institute supported Sustainable Agriculture and Elephant Project) will improve farming techniques and reduce associated environmental degradation.

4.1.3 Protection of High Conservation Values (CM1.2)

The main High Conservation Value (HCV) entity identified in KCRPI related to community well-being is the Mt. Kasigau ecosystem, which provides critical ecological services (especially water) and other cultural values. Wildlife Works' greenhouse provides tree seedlings to the community including schools and individuals around the mountain to reduce pressure from unsustainable tree harvesting from the

landscape over the long term. Additionally, the community greenhouse located in Kulikila village that had been initially funded, and continues to be supported, by Wildlife Works is meant to promote tree planting alongside agri-business ventures. Lastly, Wildlife Works continues to support the Kasigau Development Trust (KDT), a community-based organization which has a long-term goal to protect and preserve the Mt. Kasigau forest and the services associated with the ecosystem.

4.2 Offsite Stakeholder Impacts

4.2.1 Mitigation of Negative Impacts on Other Stakeholders (CM2.2)

The potential negative impacts on offsite stakeholders were mitigated through actions towards avoiding or reducing human-wildlife conflicts, broadening of incomes sources within these communities to reduce reliance on Wildlife Works as the sole income source (through employment), plus regulated access for grazing during the dry periods (see details under Section 4.2.2).

Thus, Wildlife Works submits that there are no net negative impacts on offsite stakeholders as a result of KCRPI because there was no legal harvest of forest resources or wildlife from the Project Area. On the contrary, we believe that Wildlife Works has had a very positive impact on offsite stakeholders, regionally in the Project Zone, nationally in Kenya, and internationally. Regionally, we have encouraged communities to set aside additional threatened land for conservation. Nationally, we have been recognized within Kenya for our innovative approach to balancing the needs of communities with the needs of wildlife. Internationally, KCRPI has emerged as a gold standard REDD+ project, as evidenced by the many large conservation organizations utilizing the example that Wildlife Works has set with KCRPI.

4.2.2 Net Impacts on Other Stakeholders (CM2.3)

Though the various KCRPI project activities, focusing on the reduction of human-wildlife conflicts (through active patrols and response, testing various deterrents and improved farming methods), diversifying the incomes of the community to reduce reliance on Wildlife Works as the sole employer, and working with the community (local) landowners to resolve their grazing issues (e.g., through improving their livestock and reducing the need to accept environmentally detrimental grazing leases, which are frequently abused), the net impacts from KCRPI are positive to the local communities within and outside the Project Zone as further expanded upon below:

1) Human-wildlife conflict: any potential increase in human-wildlife conflicts due to the project was checked by habitat improvements within the ranches to retain wildlife inside (e.g., dam scooping and borehole sinking for water provision), and increased patrols and responses to incursions by Wildlife Works and KWS ranger teams

2) Dependence on Wildlife Works: an exclusive dependence on Wildlife Works for livelihood was lessened by growing ecotourism ventures and other revenue streams such as Hadithi (for weavers) to diversify revenue sources, and developing agro-business schemes with women groups to enhance food security and build income base

3) Grazing: the need for grazing land by the surrounding community was ameliorated by diversification away from only livestock keeping through introducing new income generating alternatives, and where necessary, providing well-regulated dry season access made possible by the reduction in external leases to (mostly) Somali grazers

4) Alternative farmland: A need for alternative farmland for the Duruma people predominantly living in and around the Sasenyi area was also diminished through some direct and indirect effort like providing alternative livelihoods through job creation, plus other project benefits e.g., school support and bursaries, and agricultural improvement including climate-smart agriculture and fence deterrents at Sasenyi.



Figure 13: Pictorial collage from Sasenyi Valley showing several soil and water conservation methods, elephant fence deterrents and crops under the climate-smart agriculture program.

4.3 Community Impact Monitoring

4.3.1 Community Monitoring Plan Development (CM3.3)

The community monitoring plan was developed following the SBIA processes outlined under Section 4.1. From the theory of change process, appropriate indicators were developed from the community workshop and reviewed and revised into a final list of indicators for KCRPI. These range from output to impact indicators reflecting the various stages (operations and outcomes) expected from a 30-year Project like KCRPI (see details under Section 4.3.2).

4.3.2 Community Monitoring Plan Results (CM3.1, CM3.2, GL2.5)

Table 12 below shows details and results for M_8 for the indicators identified during the community SIA. As indicated in the section 4.1.1.1 and Figure 12, projects are implemented based on the LCC's decisions and directions, and since the different ethnic community groupings are not spatially separated, all our projects touch on these groupings with a primary focus on their presence and proportion in that specific location. Therefore, in communities where one community group is dominant, the dominant group will receive a higher amount of benefits. All project activities provide positive impacts broadly to the general community, as all were designed to impact the entire household. For example, although providing a bursary to cover school fees directly impacts the child's ability to go to school, it also provides significant

benefit to their household by reducing one of their most significant expenses. In turn, this frees up that money for other expenses or the time that would have been required to earn the money for fees. Furthermore, human-wildlife conflict in the project area can cause major loss of crops, and therefore income, damage to property and serious injury or death, all negatively impacting household income. The construction of boreholes, implementation of wildlife deterrents, and patrolling all seek to reduce human/wildlife conflict. Jobs and other income generating activities also likewise seek to increase household income and therefore positively impact all members of the household and community.

Table 12: M_8 Indicator results from the KCRPI community monitoring plan.

Focal Issue	Direct Result	#	Indicator description	Type	Lead	Result	Notes
Human-wildlife conflicts	Adequate vegetation and water	1	# water holes scooped within the Project Zone for wildlife and/or cattle	Output	Ops	3	Including maintenance of the wildlife-only boreholes at Salama Dam and 5-5 Base Camp.
		2	# wildlife/cattle using the water holes year-round	Outcome	BSMT		
		3	# persons accessing new water sources	Outcome	WWCT	4,029	2 water-related projects in 2021 including, piping, storage tanks and harvesting.
	Reduced encroachment and poaching	4	# rangers and security guards employed	Output	HR	23	Maintained an average of 14 rangers and 4 security guards during 2021.
		5	# training courses held for skills development	Output	HR	4	General training for 43 WW staff on diverse issues including HR policy, Health and safety policy, First Aid and Snake Awareness. Rangers and Security Guards undertook specialized Training.
		6	# outposts established and operational	Output	Security	3	All the ranger base posts in Phase 1 remain fully operational and received continuous improvement including water tanks and other amenities.
		7	# patrols and/or distance travelled	Outcome	Security	177 walk and drive patrols from six base	In addition to regular foot and driving patrols, we maintained the aerial surveillance using two resident gyrocopters, and incorporated near real-time

						stations, covering 18,131km 60 aerial patrol days/tracks covering 12,060km	monitoring and communication by trialing the Sensing Clues' Cluey App. (https://sensingclues.org/cluey)
		8	# poachers and illegal charcoal producers arrested	Outcome	Security	3	Including wildlife poachers, transporters and charcoal producers.
		9	# snares recovered	Outcome	Security	9	Predominantly medium (74%) but a few large and small snares too.
		10	# carcasses/injured animals recorded	Impact	Security	8	Carcasses of Dikdik. Common Zebra, Eland, Lesser Kudu, Buffalo, Elephant and one injured Buffalo recorded.
		11	# hectares deforested, excised or converted into farmland	Impact	RS/GIS		
	Better wildlife containment	12	# and type of deterrents deployed	Output	Ops	1 metal-strip fences	This was previously deployed and was maintained at Sasenyi during this period.
		13	# human-wildlife conflict encounters	Impact	Sec/BSMT	3	Based on ranger patrol data for 2021, mostly comprising elephant-caused crop damage and one human fatality.
Education	Increased enrolment	14	# awareness meetings/events /activities on REDD+ and education matters in schools	Output	Community Liaison	2	In 2021, although schools had resumed, external meetings in schools were still impacted by lingering COVID-19 protocols and restrictions.
		15	# students supported by the WW bursary scheme	Output	WWCT	632 students supported	Partial scholarships were awarded to 632students under Phase 1 in 2021.

		16	Amount of money spent on WW bursary scheme	Output	WW CT	KES 2,983,140	Approximately USD 26,168
		17	% students not in school due to lack of fees	Impact	BSM T	<1% primary level; 2% secondary; 1% tertiary	Our household-level survey shows that fees in this areas are mostly footed by the households themselves. Still, from our most-recent survey, 28% of the households interviewed said they had received support from Wildlife Works. In comparison, 17% households mentioned government and 11% NGOs.
		18	Performance of pupils supported (full scholarship)	Impact	Community Liaison	8 of 9 passed	5 attained the university entry cut-off mark. Monitoring performance of partially supported students has started for students supported while on their final year of high school, but no final exams were held in 2021.
	Better education infrastructure	19	# classrooms constructed or other school renovations	Output	Ops/ WW CT	2 schools	Projects mainly involved classroom and toilets construction and renovation, providing students and teachers a better learning environment.
		20	# and type of education infrastructure installed	Output	Ops/ WW CT	4 schools	School had kitchen room, store and eco-jiko installed, including one that had electric wiring installed in 8 classrooms.
		21	# pupils using the infrastructure built	Outcome	Community Liaison	1,610	Including students and teachers using the classrooms and other facilities built in the schools.
Environmental degradation	Increased tree cover in landscape	22	# and types of trees propagated in the WW nursery	Output	Ops/ GH	≈5,425	Mean monthly #: 3,663 indigenous and 1,762 fruit trees were under propagation at any one time in the organic greenhouse.

		23	# trees planted and surviving beyond the 3rd year outside KCRPI	Outcome	GH	≈752	Of the 2,212 seedlings planted in 2021 in community sites, random monitoring returned about 34% survival after the 1st year, projected to decline to about15% by 3rd year.
		24	% households obtaining fuelwood and other needs from the Project ranches	Impact	BSM T	≈18%	From the most recent household-level survey, about 18% of the respondents said they obtained some livelihood needs from communal areas, ranches and other off-farm sources.
	Improved forest quality and cover	25	# charcoal bags and kilns recorded	Outcome	Sec/ BSM T	30	In 2021, there was a single encounter of charcoal bags and 29 charcoal kilns recorded in Phase 1.
		26	# log heaps recorded	Outcome	Sec/ BSM T	18	In 2021, there were 18 log heap incidents recorded.
		27	# and diversity of wildlife in the Project ranches year-round	Impact	BSM T	All HCVs	High Conservation Value species seen regularly in Project Area including Grevy's zebra and African elephant, (both confirmed breeding), African Wild Dog, Secretarybird, Bateleur, and Martial eagle White-backed and White-headed vultures, plus Cheetah and Lions with cubs.
Governance	Good leadership	28	# and location of Notice Boards and Suggestion Boxes used for KCRPI purposes	Output	WW CT	2	Located at Chief's Offices and other central areas that are recommended by the community members.
		29	# community awareness meetings/events /activities on REDD+ and other matters	Output	Community Liaison	93	Meetings included community (barazas), various project committees' meetings, presentations and trainings

		30	# complaints or questions on project implementation and LCC's functioning filed and acted upon	Outcome	WW CT	10	All feedback was received through Suggestion Boxes. While most were suggestions or compliments, the single complaint regarded the relationship between WW staff and the communities. It was resolved through a friendly match and continuous dialogue between the community and WW.
		31	% community understanding link between environmental protection, REDD & livelihoods	Output	BSM T	32%	From our latest household-level survey, most community members cited various livelihood-related benefits from interaction with KCRPI including education-related support, employment, tree seedlings and water.
Poverty	Diversified livelihoods & food security	32	# agro-processing, value-addition, storage initiatives	Output	Ops/ WW CT	0	
		33	Proportion of households with on-farm production for home use or sale	Impact	BSM T	99%	From our most recent household survey, over 90% of all on-farm products were consumed by the household or used on farm; about 30% also selling part of their on-farm produce for cash.
		34	# agriculture-related training courses or extension events	Output	Greenhouse	4	Field (on-site) training visits to the Greenhouse picked up in 2021 after being disrupted by COVID-19 restrictions in Kenya. The 2021 visits, involved a total of 93 community members from schools and various community groups.
		35	# new/improved practices on farms	Output	Ops/ BSM T	1	Several climate-smart agriculture (e.g., Zai pits and U-bands) and fence deterrent (metal strips) techniques have been rolled out on several frontier farms in Sasenyi

							community neighbouring Rukinga Ranch.
		36	# community (agri-business) greenhouses established	Outcome	Greenhouse	1	Kulikila Women Group continues to receive follow-up support mainly on planting and care of vegetables and seedlings, but also on group organization, dynamics and financial management.
	Increased and stable income	37	# local community members employed at WW	Output	HR	58	There were 58 new employees at the end of this monitoring period, of whom about 28% were female, 99% are Kenyan, with about 85% being local (i.e., from the Project Zone and or Taita Taveta County).
		38	# training courses/workshops held for skill/personal development	Output	HR	4	Staff trainings picked up again in 2021 after being disrupted by COVID-19 restrictions in 2020. The 4 training sessions involved 43 staff members trained mostly on health and safety, Code of conduct and specialized training like First Aid and snake handling.
		39	total amount and sources of income earned by household	Impact	BSMT	<1,500 9% 1,500-5000 23% 5,000-10,000 25% 10,000-20,000 22% 20,000-50,000 15% >50,000 5%	These amounts reflect good/normal years based on our most-recent household-level survey in the Project Zone, suggesting an increasing proportion of community members earning above 10,000 (42%) compared to the baseline (23%).

4.3.2.1 Project Activity M_8 Implementation Status

The following is a list of Project Activities for KCRPI. All Projects are currently operational and were operational for the entirety of the M_8 monitoring period. A current description of the implementation status is provided below in this section.

Wildlife Works Carbon Trust

- Wildlife Works Carbon Trust: School Construction and Renovations, Infrastructure provision, Bursary Scheme, Agri-business, and Water and health-related Projects
- Support to Community Based Organizations: Marungu Hill Conservancy Forum (MHC) and Kasigau Development Trust (KDT)
- Financial Aid to Community Organizations, e.g., the Marungu Hill Conservancy Association

Wildlife Works business activities

- EcoFactory expansion and print factory
- Local Production Clothing Factory
- Wildlife Works Soap Factory
- Wildlife Works Greenhouses and selling point
- Tree nursery and Amiran Greenhouses
- Jojoba propagation
- Reforestation of Mt. Kasigau and surrounding area
- Wildlife Works Eco-Charcoal Production Facility
- Ecotourism Projects
- Support to establishing the Rukinga Conservancy
- Wildlife Works Health Projects
- Community Wildlife Scouts
- Project Product Sales and Marketing

Conservation and Project infrastructure

- Forest and Biodiversity monitoring
- Security and Ranger patrols
- REDD+ Carbon Inventory Monitoring
- Group Ranch Office Renovations / Construction

All Project Activities are described in full detail in the PD, section 6.1 ‘Baseline Scenario’. Project Activities were designed to mitigate deforestation, forest degradation and human-wildlife conflict, and therefore by default serve to mitigate leakage and uphold project permanence. Some project activities listed in the PD have been discontinued or modified after they were found to be financially infeasible and/or the community groups involved requested to end investment in them. One such activity was the propagation of mushroom farms on elephant dung. Additionally, the project activities Kasigau Rangelands Trust and Ecolodge, Saghasika Wildlife Conservancy Trust and Ecolodge on Zagitisa Hill and the Kasigau Corridor and Kasigau Wildlife Forum Tourism development have all been discontinued by the partner organizations.

Employment

Wildlife Works retains a workforce of between 49-58 at KCRPI on average. At the end of 2021 (the M_8 reporting period), there were 58 employees in total, 2 in senior management positions. Of the 58, 28% are female and about 85% are from the local area (i.e., from either the Project Zone or the larger Taita Taveta County). In 2021, 43 staff members attended various training courses, mainly on health and safety requirements, as well as professionalism and workplace issues.

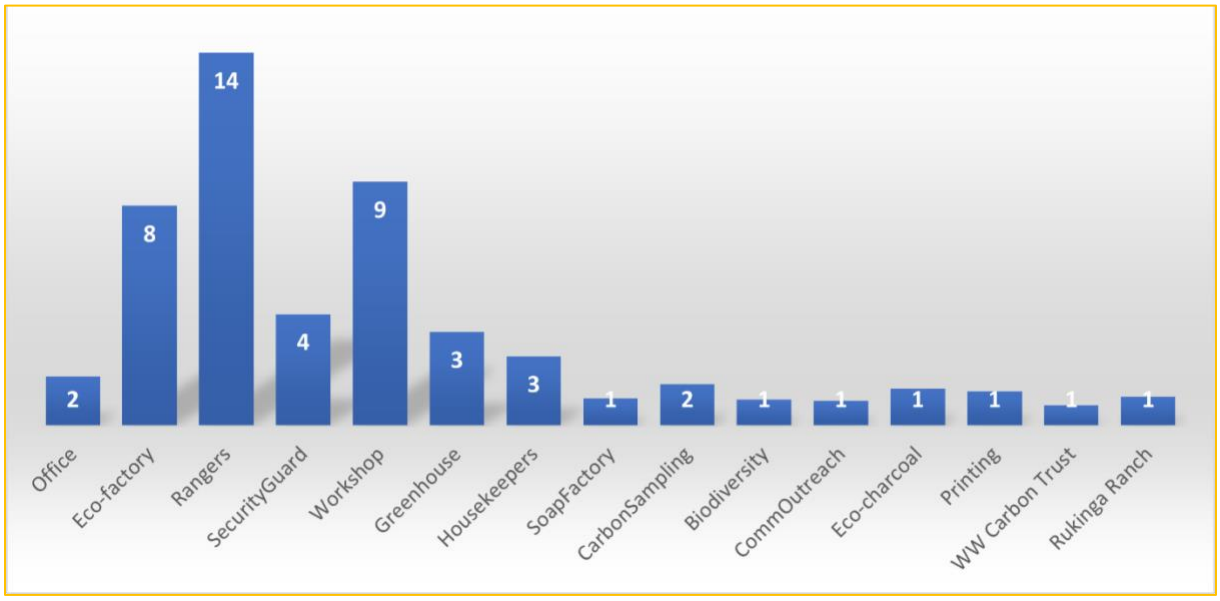


Figure 14: Wildlife Works' KCRPI employee statistics and trends at the end of the M_8 reporting period (2021) broken down by department

Wildlife Works Carbon Trust

Wildlife Works Carbon Trust (WWCT): The WWCT remains the custodian of all finances allocated for implementation of projects and project activities funded by the community component of the carbon revenues. This is done primarily through the Locational Carbon Committees (LCCs) with oversight from the Disbursement Committee. The major activities selected by the LCCs during the reporting period (2021) included the usual ones like school construction or renovation projects, bursary schemes, agri-business and water projects, as well as health-related activities. Aside from educational bursaries (see next section), a total of 13 Projects were commissioned during the reporting period in Phase I, (Table 13, Figure 15). School projects have predominantly involved classroom renovation and furniture provision, whereas water projects entail improvements to collection and harvesting, including pipeline construction; other COVID-19 related activities were distribution of hand washing buckets, water tanks and liquid soap. The total cost for these projects was KES 8,904,794(≈$USD 78,112).

Table 13: Description of the KCRPI projects initiated during the monitoring period (2021) by the LCCs through the Wildlife Works Carbon Trust and project partners

Location	Category	Sub-category	Start	End	Status	Cost	#Beneficiaries
Marungu	Water	Water harvest & storage	15-Apr-21	05-May-21	Completed	600,000	310
Marungu	School	Water harvest & storage	12-Apr-21	21-Apr-21	Completed	237,570	30
Marungu	Water	Water harvest & storage	12-Apr-21	21-Apr-21	Completed	420,580	216
Marungu	Water	Water pipeline	12-Apr-21	20-Apr-21	Completed	44,050	160
Marungu	Health	Health & Sanitation	10-May-21	20-May-21	Completed	295,800	6,000
Marungu	School	Classroom renovation	02-Jun-21	08-Jul-21	Completed	3,331,961	140
Marungu	Water	Construction	08-Jun-21		Ongoing	2,213,802	
Marungu	Social amenities	School Furniture	01-Jul-21	14-Jul-21	Completed	371,700	50
Marungu	Water	Water pipeline	10-Aug-21	22-Aug-21	Completed	82,220	120
Marungu	Water	Water pipeline	10-Aug-21	22-Aug-21	Completed	102,230	2,500
Kasigau	Water	Rehabilitation	20-Feb-21	24-Jun-21	Completed	598,857.58	5,000
Kasigau	Water	Rehabilitation	18-Feb-21	04-Mar-21	Completed	775,846.16	2,000
Kasigau	Water	Rehabilitation	02-Feb-21	24-Jun-21	Completed	1,159,880.50	2,000

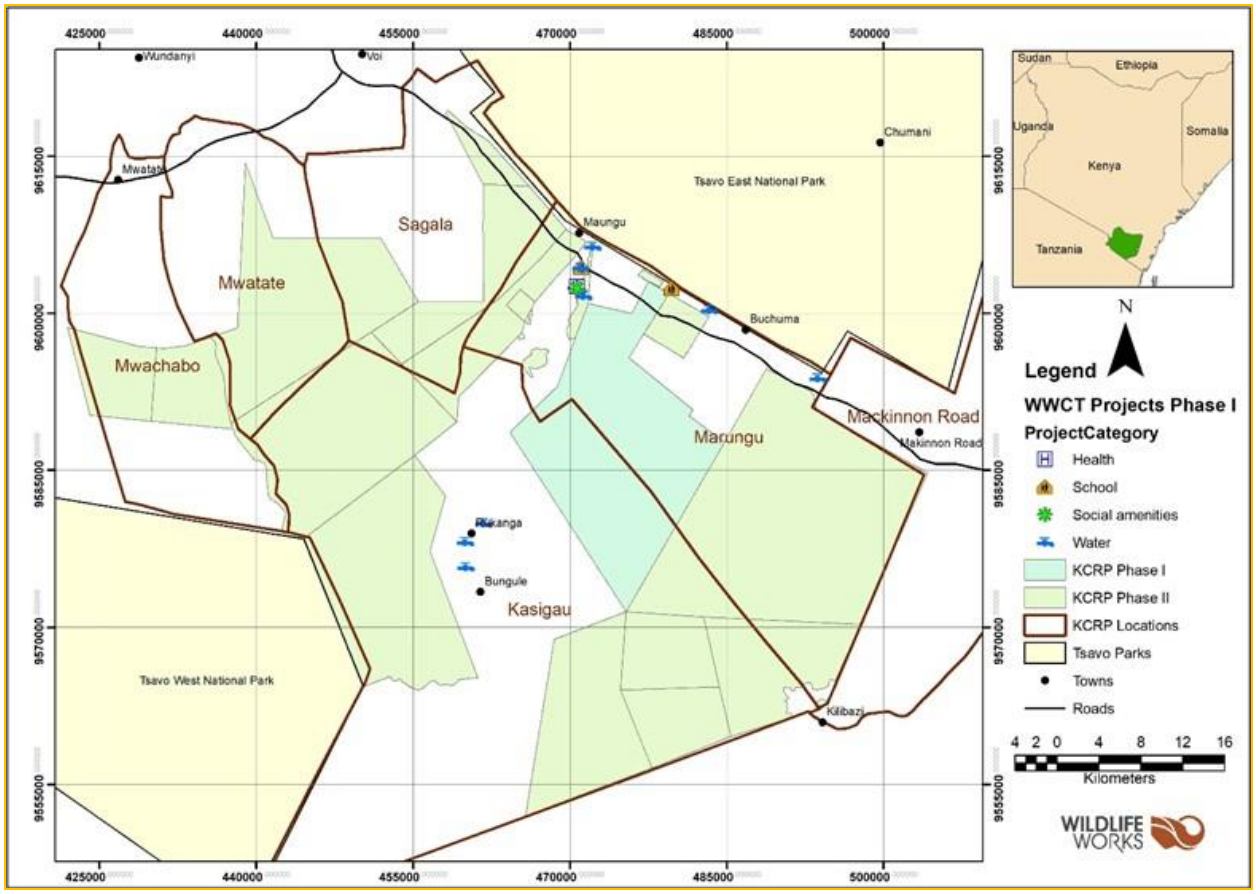


Figure 15: Distribution of the projects initiated through the WWCT during the reporting period 2021 for the KCRPI Project Zone.

Bursary scheme: The WWCT, through the LCCs and the Bursary Sub-committees in each Location, also administer the school bursary program for students within KCRPI. The LCCs previously provided full scholarships to secondary school students but have since discontinued them in-favour of partial scholarships.

In the 2021 academic year, a total of 632 students received partial sponsorship through the Wildlife Works' bursary scheme, (Figure 16) of which about 51% were girls. The total cost of sponsoring these students during the M_8 reporting period was KES 2,983,140(≈USD 26,168); (Figure 17).

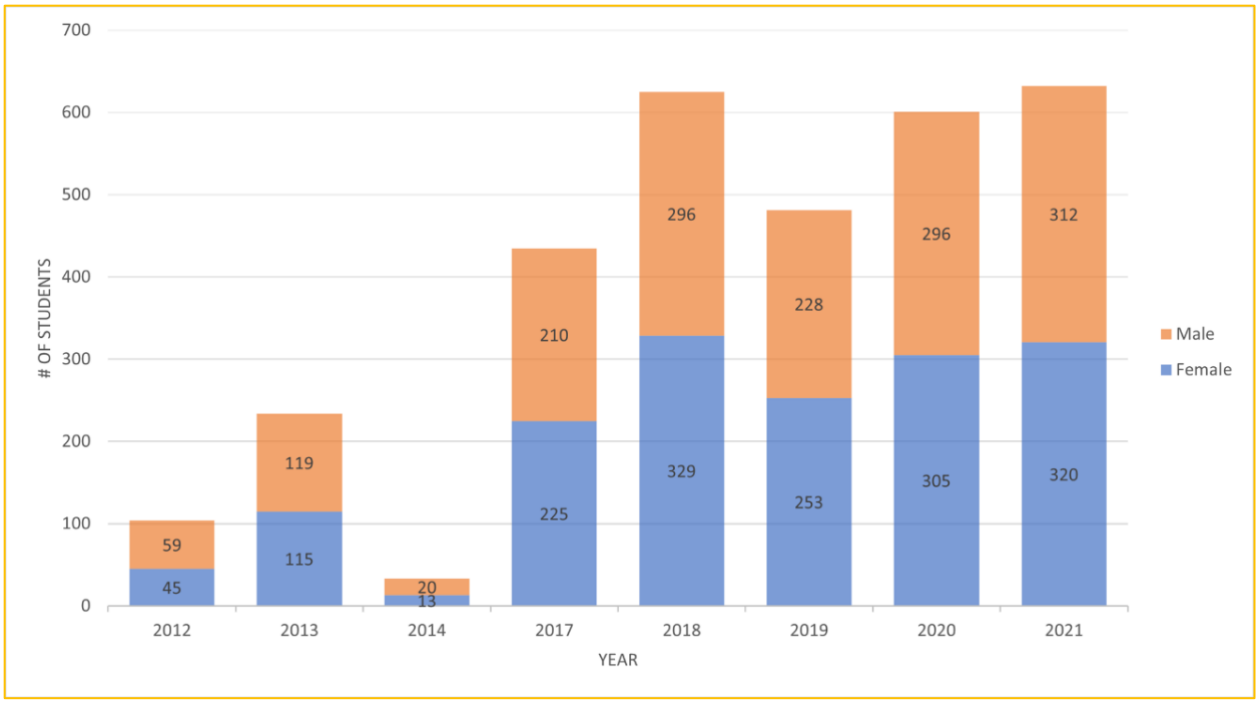


Figure 16: Total number of partially sponsored students (male and female) for across the project locations of KCRPI combined from 2012 to the current reporting period 2021.

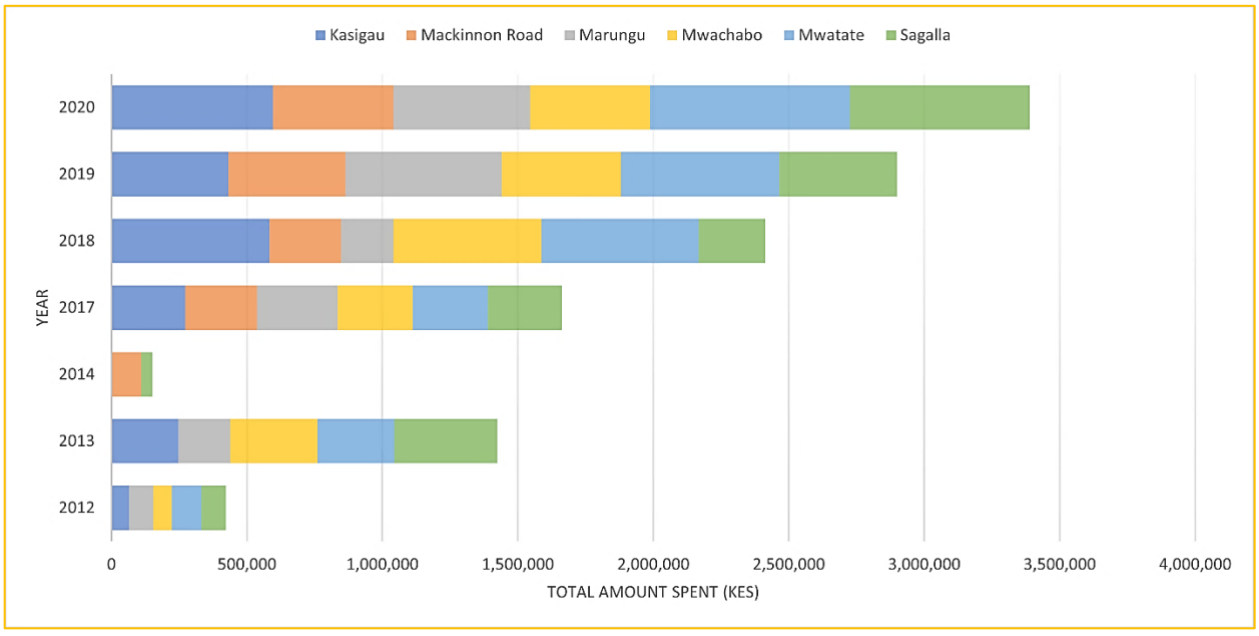


Figure 17: Total amount spent annually on partially sponsored students across KCRPI for each location including the current reporting period (2021) and back to 2012.

Support to Community Based Organizations (CBOs): Through the WWCT, KCRPI continues to support capacity development and some recurrent expenditure for the partner CBOs that are in-charge of

operating and reporting on selected community projects. The included CBOs are: Marungu Hill Conservancy Forum (MHC) and Kasigau Development Trust (KDT). During the current reporting period, a total of KES 3,259,132 was spent on the CBOs across the project locations (Figure 18). The figures after 2018 are high compared to the previous years as allowances and reimbursements for LCC and CBO joint meetings including project handing-over expenses were paid by Wildlife Works parent company previously, but since mid-2018 have been transferred to WWCT and reflected under CBO spending. This was done as they are essentially community expenses, which are now determined and allocated by the LCCs as part of the community allocation.

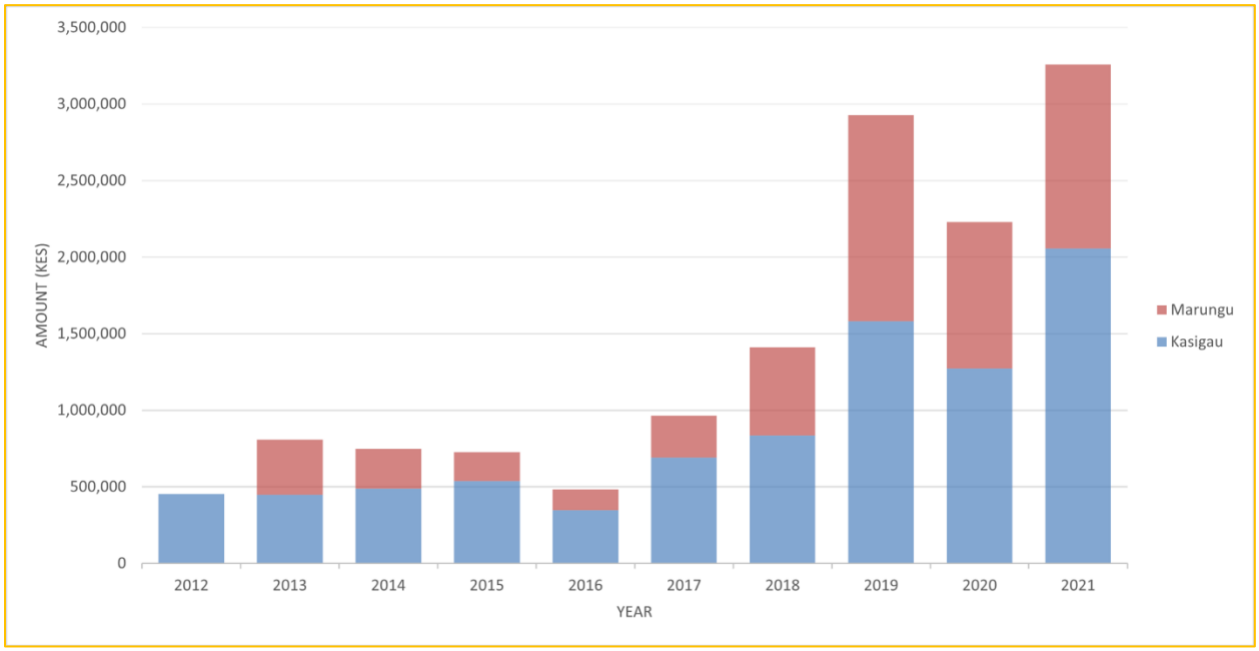


Figure 18: Total amount spent by the KCRPI on CBOs development and operations (recurrent expenditure) between 2012 and the current monitoring period, 2021.

Stakeholder Engagement and Community Meetings

During the reporting period, 93 community meetings were held across KCRPI dealing with diverse range of issues related to climate change, REDD+ and the implementation process and plans for KCRPI (Figure 19). A cumulative total of almost 2,813 local community members attended these meetings across all six locations. In terms of mode of presentation, most of the meetings were discussion-type interactive meetings but other forms included trainings, sports and theatre (films, short plays and skits). Content-wise, a wide array of topics were covered, including Project implementation updates (e.g., bursaries and community Projects), environmental conservation, agriculture and forestry, climate change and REDD+, financial management, water and human-wildlife conflict issues. Others included election of LCCs and bursary committees and health meetings (e.g. on family planning, communicable and non-communicable diseases).

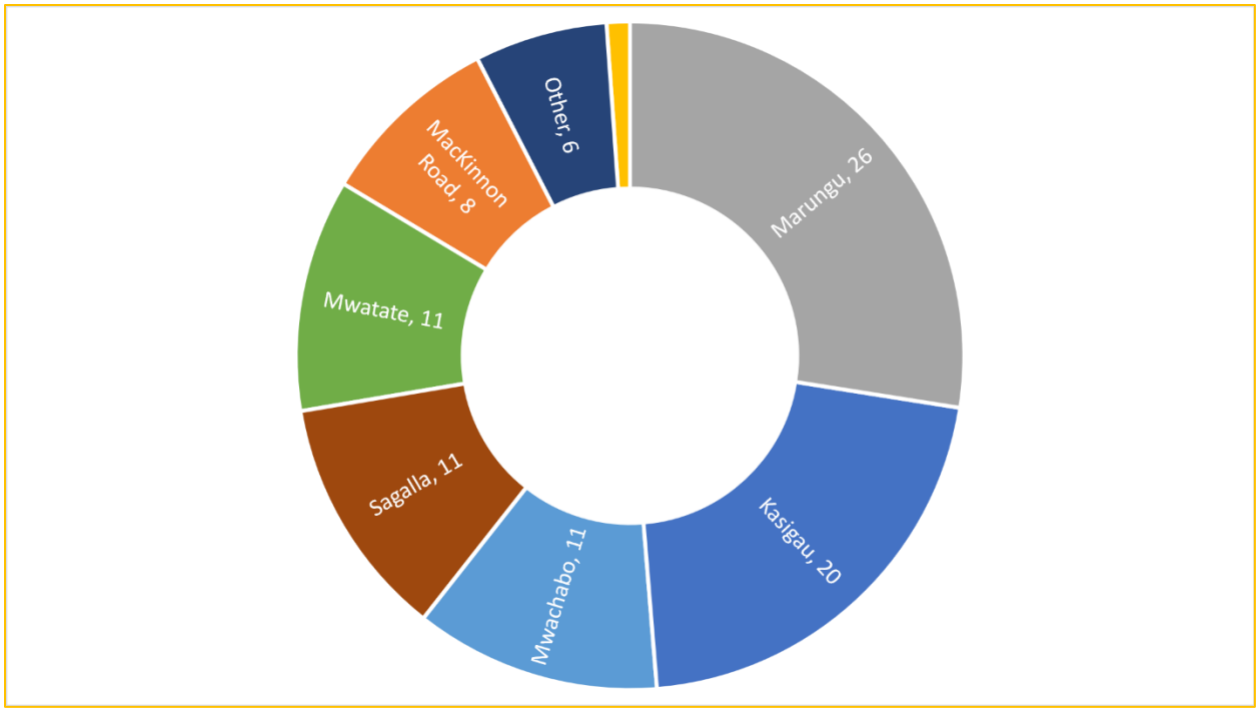


Figure 19: Distribution community meetings held during the reporting period, 2021, disaggregated by Location

During the reporting period, a total of 7 awareness meetings were also held in local schools, involving a cumulative total of about 347 students. Most of the meetings were held in secondary schools (6) and one in a tertiary institution (polytechnic). Most were interacting with selected classes (4) and the rest (3) involved the entire school. All the engagements involved interactive discussions (presentation and discussion. Content-wise, most involved discussions around environmental conservation, REDD+ awareness, health talks on drug abuse, early pregnancies, mental health and HIV/Aids.

Finally, 5 meetings were held in-person in 2021 involving Rukinga Ranch shareholders. These meetings involved Landowner's Committees, and largely addressed the international carbon markets' outlook and sales projections in conjunction with the financial position of the company (and other ranches in the project), security, infrastructural developments, the upcoming KCRP verification, issues around the National REDD+ process, policy and nesting and how it may impact KCRP, increasing diversification of activities within ranches and the requirement for EIAs with the National Environment Management Authority (NEMA) , and diverse ranch management issues including grazing, water and habitat improvement, security and mining.

Wildlife Works business activities

EcoFactory expansion and print factory: though the eco-factory has continued to show stable growth in recent years towards breaking even, this was adversely impacted by the COVID-19 pandemic. Supported by the international marketing and design team based in California, production was rejuvenated during this 2021 reporting period, with the number of employees maintained at 8. Wildlife Works maintained its relationship with the SOKO eco-factory from Mombasa including running of the Stitching Academy in Maungu Town, where potential seamstresses continue to receive specialized skills and training that

enable them to directly work in any eco-factory at Wildlife Works' EPZ, or elsewhere. Besides training as seamstresses, these women also acquired new skills for several printing and other support positions, like sales and marketing.

- *Local Production Clothing Factory*: to support production in the EPZ, a printing arm has been maintained and has grown to nine employees. In addition, the printing arm acts as a local production factory outside of the EPZ and is able to supply local demand, further growing production and local jobs. Wildlife Works established several shop outlets in the big cities and key tourist destinations of Kenya (Nairobi, Mombasa and Lamu) to grow local sales and develop employment opportunities.
- *Wildlife Works Soap Factory*: the small Wildlife Works soap factory is still ongoing, with diversified production and maintained the three staff members. Different soaps are produced using locally sourced additives and extracts like jojoba oil, coconut milk and lime and sold to niche markets in Nairobi and Mombasa, mainly consisting of lodges and hotels. While sales were severely disrupted by the COVID-19 restrictions on local and international travel to destinations that serve as key clients, production remains constrained by seasonality and availability of the required additives like jojoba oil.
- *Wildlife Works Greenhouse*: The greenhouse project contains two components: (i) the tree nursery and selling point, and (ii) agricultural greenhouses (see Figure 20). The greenhouse team responsible for implementing and managing both components was maintained at 4 staff members at the end of the 2021 reporting period. Production has grown and diversified beyond the sale of grafted fruit tree seedlings (like citrus, mango and avocado) to include sale of organically produced vegetables and ornamental plants for landscaping purposes. The selling point established along the main Nairobi-Mombasa Highway continues to grow sales. Lastly, throughout the year, the Kulikila Women Group community greenhouse was provided with follow-up support from the Wildlife Works' Greenhouse and Community Outreach Departments on a broad range of their activities.



Figure 20: Photo collage of some of our Greenhouse activities including fruit tree grafting, vertical farming and engaging community members in tree planting.



Figure 21: Recent pictures of the Wildlife Works supported community greenhouses as an illustration of the basic set up and production mirrored on the demonstration site at Wildlife Works (Figure 20)

- *Indigenous seedling purchase*: Wildlife Works runs a Greenhouse tree planting programme under which there is a seedling purchase program. The objective is to stock the indigenous tree nursery, buying seedlings of specified trees from the community members, nurturing them to the point they can be out planted, and providing them for free back to the community, mainly through

schools and community groups for reforesting the landscape. During this monitoring period, a total of 14,752seedlings were bought from 228 individuals and groups within the community for a total of KES 230,870 (≈$USD 2,025).

- *Indigenous trees in nursery*: Of the indigenous trees bought from the community and nurtured at the Wildlife Works' greenhouse, the common species were *Melia volkensii, Gardenia volkensii, Acacia robusta, Terminalia prunoides, Lannea schweinfurthii, Balanites aegyptiaca, Cassia abbreviate, Berchemia discolor, Sclerocarya birrea and Acacia nilotica* (Figure 22). On average, there were around 3,663indigenous trees in the Greenhouse nursery every month, though this varied based on out-planting seasons and purchasing times (Figure 23).

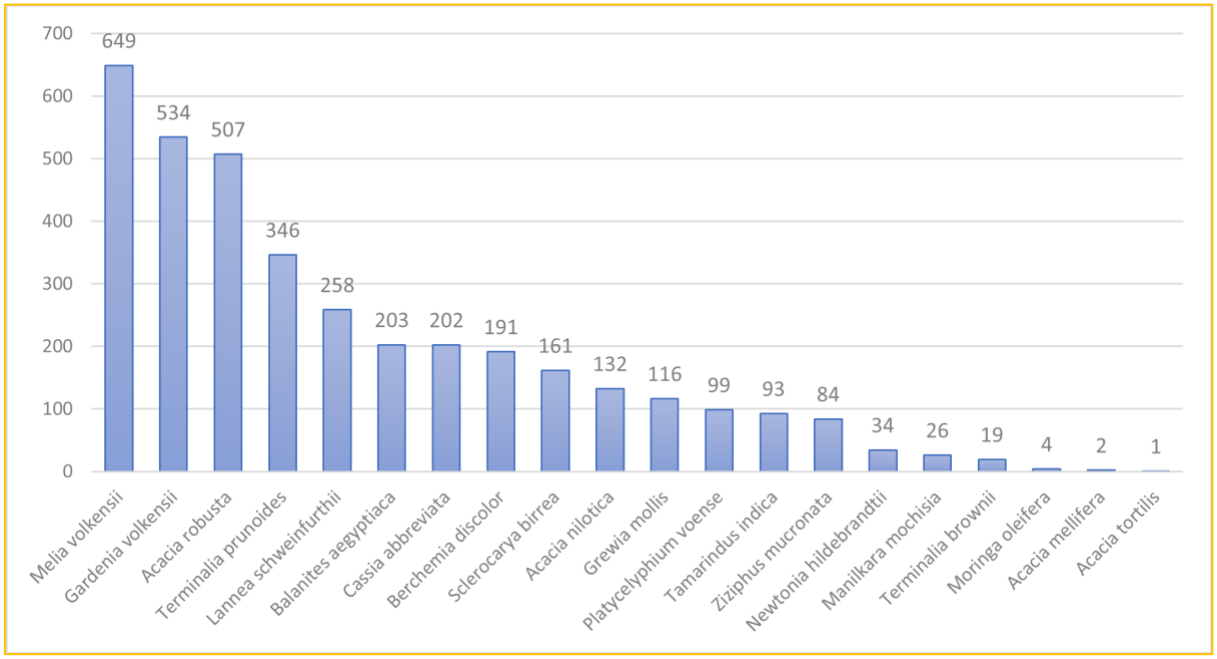


Figure 22: Mean monthly tally of top-20 commonest indigenous tree seedlings at the Wildlife Works' tree nursery during the 2021 reporting period

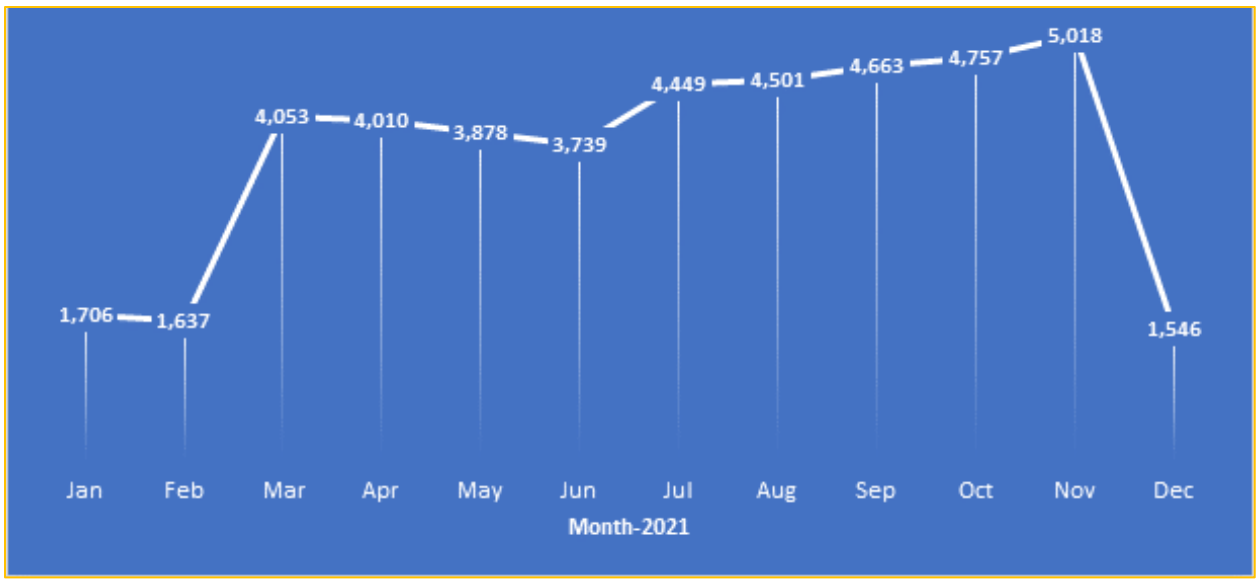


Figure 23: Total number of indigenous tree seedlings at the Wildlife Works' tree nursery each month during the reporting period, 2021

- *Fruit trees in nursery*: Of the fruit trees grafted and nurtured at the Wildlife Works' greenhouse, the Mango and Avocado root stocks, followed by Pixie, Apple Mango and Washington Navel were the most common plants (Figure 24). On average for Phase I, there were around 264 fruit tree seedlings in the nursery at any one time, though this varies based on sales and season (Figure 25).

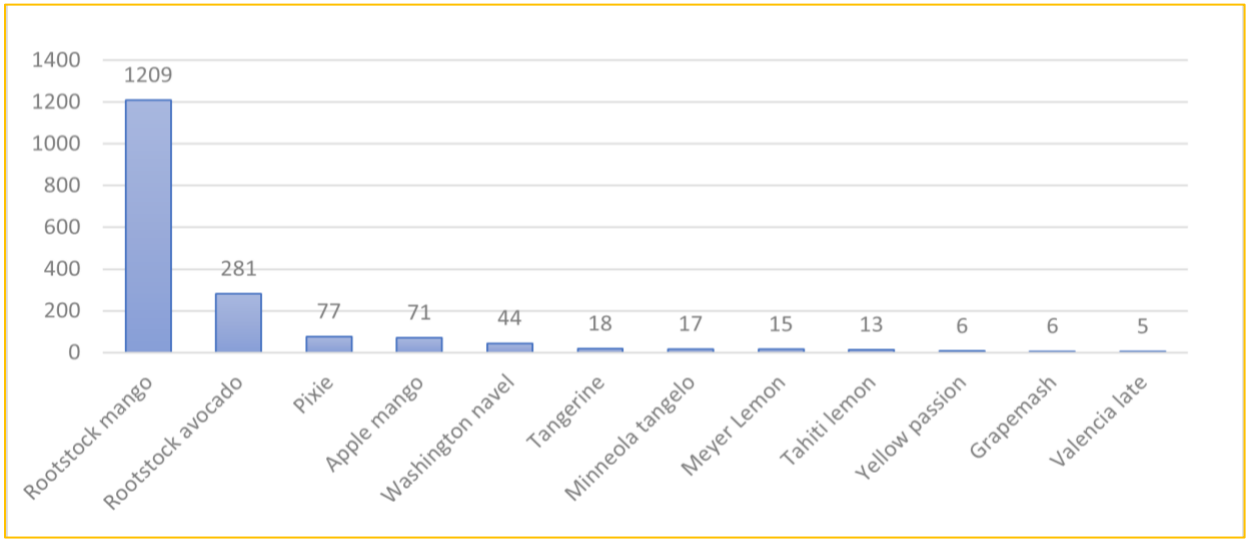


Figure 24: Mean monthly tally of Phase I fruit tree seedlings at the Wildlife Works' tree nursery during the 2021 (M_8) reporting period.

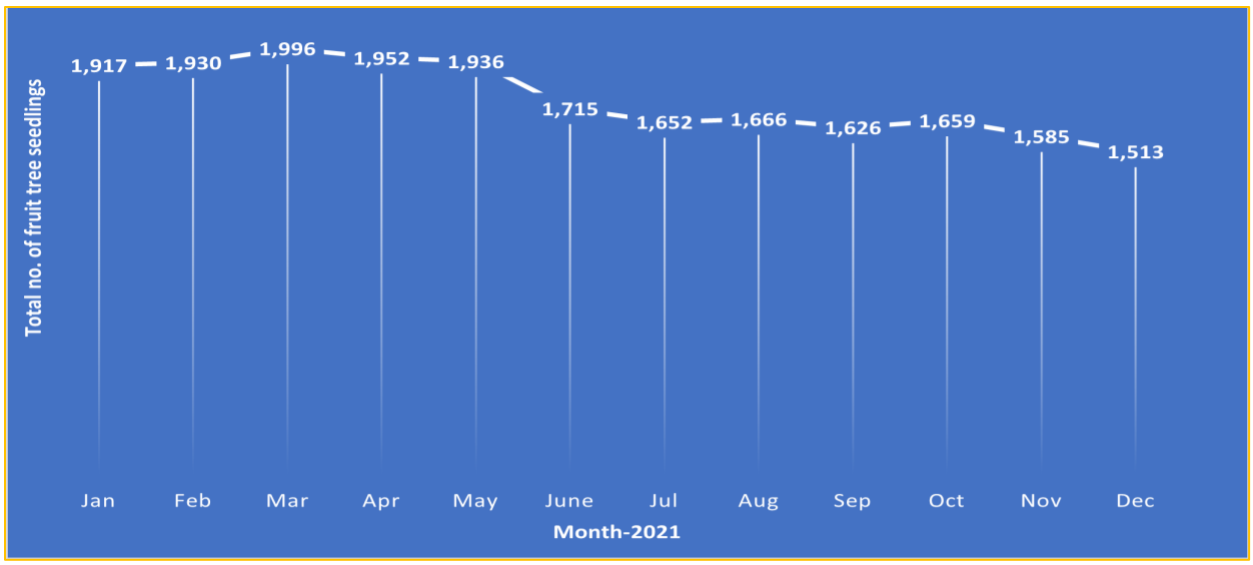


Figure 25: Total number of Phase I fruit tree seedlings at the Wildlife Works' tree nursery each month in the reporting period, 2021.

- *Out-planting and monitoring*: during the reporting period, a total of 2,701 seedlings were planted in the KCRPI Project Zone, on both community and private lands. Our long-term monitoring data show that there is about a 30% survival rate of the seedlings in the first year, dropping to about 15-20% by the third year.
- *Outreach and training*: During the reporting period, four visits were made to Wildlife Works' Greenhouse comprising 93 individuals for outreach, training or information purposes. The visitors mainly comprised community groups, a women group and a secondary school (Table 14). The established community greenhouse at Kulikila is a product of this organic greenhouse outreach program, further expanding the greenhouse's role as a test and training ground for the local community on agri-business and tree planting issues.

Table 14: Number and identity of visitors to Wildlife Works' Greenhouses during the reporting period, 2021

Date	Group/Institution name	Category	# Visitors
10-Feb-21	Zongwani Marapu	Community group	15
10-Mar-21	Kisimenyi women group	Women group	25
14-Apr-21	Buguta Kikongorinyi group	Community group	18
10-Dec-21	Kasigau girls secondary school	Secondary school	35

- *Jojoba propagation*: Under the Greenhouse Department, Wildlife Works runs an active Jojoba plantation as a breeding and test ground for production of Jojoba in this area (see Figure 20). Semi-commercial plants are maintained in the Wildlife Works site, in addition to providing some

seedlings to farmers as test for application as hedges and alternative cash crop in the project area. Wildlife Works also acquired a Jojoba press to press oil which has a niche and growing market in Kenya, besides being used as a popular additive in our Soap Factory.

- *Reforestation of Mt. Kasigau and surrounding area*: During the reporting period, a total of 394 seedlings were planted around the mountain in neighbouring schools, institutions and private farms to reforest the landscape and also to reduce pressure on the trees on the mountain. Seedlings were planted 9 different sites mostly comprising individual farms and schools, including Moi Boys High School, Jora Primary School, Rukanga Primary School, Kiteghe Primary School, Buguta Primary School and Kasigau Girls Secondary School.
- *Wildlife Works Eco-Charcoal Production Facility*: Wildlife Works still maintains the eco-charcoal facility that was moved to a larger production area near McKinnon Road township at an area reserved for this production by Taita Ranch. Nine staff members run all the current operations spanning harvesting, carbonation, briquetting and sales. At present, the team can press 1,000-1,500 0.5 kg briquettes every week. The business plan was further supported by the Kenya National Research Fund towards scaling up through mechanization of production and improving sales and marketing. During the reporting period 2021, the mechanized briquette press, a grinder, and mixer were sourced for producing smaller pillow-shaped briquettes, in addition to an improved kiln which was fabricated and tested on-site (Figure 27). Full mechanization of the production process will enable scaling up to semi-commercial status.



Figure 26: Clockwise L-R: The various testing, modification and fabrication stages of the improved kiln including loading points and breathers during the M_8 monitoring period

- *Ecotourism Projects*: Wildlife Works continues to support management of Kivuli Camp within Rukinga Sanctuary. During the reporting period 2021, a total of 135 guests were booked at Kivuli Camp, spending a total of 417 nights and 690 bed-nights. Kivuli Camp remains fully operational and hosts a mix of foreign and local guests including tourists and educational visitors (http://tsavoconservancy.com/visit-us/kivuli-camp/).
- *Support in establishing the Tsavo and Rukinga Conservancies*: Progress towards establishing and formal registration of the Tsavo Conservancy has slowed down since 2018-2019 due to bureaucratic uncertainties around the registration process under Kenya's devolved governance structure. The Kenya Wildlife Conservancy Association has since ironed out the process with

KWS and County Governments so it can be picked up again. Nonetheless, Wildlife Works remains committed to supporting the process once it is back on track, and in the meantime is actively laying the groundwork, including raising the profile and building the reputation of the area through its involvement with developing Kivuli and Satao Camps which are likely to be the Conservancy's hub. Additionally, Wildlife Works has now started the process of supporting Rukinga Wildlife Sanctuary apply for formal conservancy status too

- *Wildlife Works Health Projects*: Wildlife Works is committed to supporting community projects as we feel these can be the most important tools to developing self-sufficient and self-governing communities. One of our main focuses is on education, especially for women and girls, but also for male students. During the reporting period-2021, health education through our girl-child programme that targets girls from vulnerable families held 2 sexual health and sanitation training sessions for 72 girls and boys on sexual health, sanitation and drug abuse in various schools within KCRPI. Additionally, 39 re-usable sanitary pads were distributed to the girls.
- *Community Wildlife Scouts*: Wildlife Works maintains a community-based wildlife monitoring scheme, currently expanded to 3 areas within KCRPI: Makwasinyi; Buguta; and Kale-Birikani. In each of these sites, a community member records all incidences of key wildlife (High Conservation Value) sightings and human-wildlife conflict. In addition to collecting information that can feed into the national compensation scheme (run by KWS), these data show trends and patterns of crop-raiding and livestock predation, which Wildlife Works uses plan for swift response actions (e.g., deploying deterrents) and other mitigation measures. In the 2021 reporting period, a total of 407 incidents were recorded involving seven species: buffalo, bushpig, eland, elephant, leopard, lion, and spotted hyaena. about third (33%) did not do any damage, 31% and 30%, respectively, damaged crops (including fruit trees) and livestock; the rest damaged other property and infrastructure.
- *Project Product Sales and Marketing*: Wildlife Works' core mission is to harness the strengths of the marketplace for conservation. Thus, improving access to markets through use of technology remains a critical component of our enterprise development model. Wildlife Works continues to build and improve access to markets for various products in KCRPI using technology, such as through the Wildlife Works' Export Processing Zone (EPZ) for apparel and Hadithi umbrella CBO for community handicrafts. As of December 2021, 8 local community members (75% women) were trained or employed in Wildlife Works' eco-factory at the EPZ, mainly as seamstresses but also in several printing and other support positions like sales and marketing. The local community-based umbrella organisation, Hadithi, under KCRPI now provides marketing and sales support to 10 craft groups, comprising over 273 members, mostly women. Through Hadithi, a substantial amount of revenue from salaries or sales accrues to these local communities, especially directed to women, which greatly empowers them and their societies in general. In 2017 for instance, under KCRPI, Hadithi spent KES 735,000 on crafts made by women's group, paid cash in hand to the individual women. This figure rose to KES 1,575,000 in 2018, again paid cash in hand to the individual women. In 2019, KES 2,237,000 was spent on crafts cash in hand to the women (approximately $USD 22,500), growing to KES 2,589,000 (USD 25,800) in 2021. In the 2021 reporting period, Hadithi sales under KCRPI grew to KES 4,581,811 (USD 40,191). Besides sales, Hadithi has expanded to providing training. In 2021, basket weaving trainings were provided to thirty two groups where members were trained from scratch and are already able to make baskets to sell.

Conservation and Project infrastructure

- *Forest and Biodiversity monitoring*: The detailed biodiversity and social monitoring activities outlined in Sections 4 & 5 illustrate Wildlife Works' efforts to maintain high quality data collection to aid in evaluating Project impacts and informing adaptive management. The Monitoring Department has five permanent staff for undertaking social and biodiversity surveys and assessments or collating data on various project impacts collected by other departments; additional staff/volunteers/interns are engaged during survey periods. The Wildlife Works' Research Camp has been maintained since 2012 and was expanded between 2014-2016 with the establishment of camping grounds, which was furnished and equipped into a fully functional and independent camping facility able to house short-term guests and visiting researchers.
- *Security and Ranger patrols*: Wildlife Works has instituted several permanent initiatives to enhance security, especially around poaching including increasing our ranger force to about 25 (with about 10% being women) who undertake daily foot and driving patrols from 3 outposts distributed across KCRPI. All ranger outposts (bases) are maintained to ensure they remain under good state of repair, especially in terms of reliable solar power and water supply. Because Wildlife Works rangers remain an unarmed force, a working relationship with the KWS Special Operations Teams initiated in 2012 has been maintained and mainstreamed. Currently, KWS has several permanent mobile teams based in the ranches along the Kasigau Corridor (most of which are within the REDD+ Project). The project still operates two gyrocopters to enable aerial surveys almost on a daily basis collecting vital information for security and biodiversity monitoring purposes. This has resulted in both improved monitoring of High Conservation Value species as well as enhanced detection of incidents; over ¼ (25%) of all incidents recorded during the reporting period were originally detected from an aerial patrol. Lastly, Wildlife Works has engaged Sensing Clues (https://sensingclues.org/), to develop and adopt their Cluey App which helps capture and relay ground and aerial patrol data near real-time. This makes it safer for the ranger teams working on the ground and more effective in responding to incidents, especially those detected from the air.
- *REDD+ Carbon Inventory Monitoring*: As per VM0009 and the VCS Project Description (PD), 20% of the 106 forest biomass plots have been sampled per year of the monitoring period for the monitoring of the carbon stocks by Wildlife Work's team of 13 samplers. The soil carbon plots were resampled during this monitoring period (m_8). The teams have also worked on the Leakage and Quality Control plots.
- *Group Ranch Office Renovations / Construction*: To manage and coordinate activities under KCRPI, Wildlife Works maintains the Carbon office and equipment maintenance facility within the Project Area. This office is fully financed by proceeds from carbon credit sales, in addition to all key amenities including water and power supply.

4.3.3 Dissemination of Monitoring Plan and Results (CM3.3)

The results from monitoring plan implementation are disseminated to the communities either through community meetings or barazas (see section 2.3 on Stakeholder Engagement) or the annual / biennial SIA Community Workshops (see section 4.1.1). The last SIA workshop was held in March 2021 where results from the 2020 Household Survey were presented to and discussed by the workshop participants which served as the validation exercise for the key findings from that survey. Implementation issues were also discussed including clarifying any issues around LCC functions other implementational issues. The

next Community Workshop is slated for 2023, where data from the 2022 Household Survey is expected to be discussed.

4.4 Optional Criterion: Exceptional Community Benefits

KCRPI has not sought the Gold Level for exceptional community benefits.

4.4.1 Barriers to Benefits (GL2.3)

KCRPI has not sought the Gold Level for exceptional community benefits.

4.4.2 Protections for Poorer and More Vulnerable Households and Individuals (GL2.4)

The KCRPI has not sought the Gold Level for exceptional community benefits.

Potential negative impact	Not Applicable
Households or individuals affected	Not Applicable
Impact aversion and mitigation	Not Applicable

5 BIODIVERSITY

5.1 Net Positive Biodiversity Impacts

5.1.1 Biodiversity Changes (B1.1)

5.1.1.1 Estimated Changes in Biodiversity in the Project Zone as a Result of the Project (B1.1.)

Similar to the community section above, Wildlife Works applies a similar cause-and-effect logic when measuring and monitoring impacts of KCRPI on biodiversity. A theory of change is a hypothesis about how a project intends to achieve its intended objectives. Because they are based on several assumptions about the cause-and-effect relationships, carefully selected indicators are needed to monitor these assumptions in a causal chain analysis. The main strength of this logic lies in presenting a credible response to the challenge of attribution: indicators measure progress towards achieving the desired project outcomes and impacts from project activities and strategies. To this end, Wildlife Works holds Social and Biodiversity Impact Assessment (SBIA) workshops to engage experts and the community in thinking about how things would have been without the Project, envisage how they may be with the Project, and identify any potential risks and / or negative impacts.

For KCRPI, Wildlife Works held the seminal Biodiversity Impact Assessment (BIA) workshop in 2011 involving representatives from the various sections whose work touched on biodiversity issues. Additional insights were obtained from the SIA workshop described in the preceding section. They identified the following four Focal Issues that they felt the Project should address: (i) safeguarding HCV wildlife – reducing poaching; (ii) protecting the habitat including Mt. Kasigau; (iii) Reducing human-wildlife conflicts; and (iv) Corridor maintenance. For each of these, the result chain diagrams were produced along with their associated theory of change statements. This formed the basis of indicator identification and monitoring plan development.

As we demonstrate under the Monitoring Plan section, Wildlife Works' core activities are aimed at protecting, safeguarding or improving the status of biodiversity and wildlife across the entire KCRPI area, with a focus on HCV species. Consequently, the monitoring plan results, based on the underlying causal logic in our theory of change analysis (see 5.3.1 for the Pressure-State-Response framework), indicate existing or potential improvement in the four Focal Issues above, in particular:

i. Safeguarding HCV species – improved monitoring, patrol and law enforcement which will lead to reduced poaching, plus improved habitats (e.g., from water provision through dam scooping);
ii. Protecting the habitat including Mt. Kasigau – through planting of trees in the surrounding landscape to reduce future pressure on the forest resources on the mountain;
iii. Reducing human-wildlife conflicts – through deployment of emergency response teams, continued close liaison with KWS Community Engagement Team and Problem Animal Control Units, and improvement of habitat (including water) within KCRPI to retain wildlife within the ranches; and
iv. Corridor maintenance – by enhancing conditions within KCRPI for wildlife including reduced poaching and improved habitats, KCRPI is at a better position to function as a corridor habitat, both for dispersing and wide-ranging species like elephants, wild dogs and big cats.

Comparison between the 'Without Project' and 'With Project' scenario

For KCRPI, the baseline scenario is mainly deforestation due to unplanned agricultural expansion by subsistence farmers. This is normally preceded by charcoal production and pole harvesting which are the major causes of forest degradation. Other activities in the Project Area included grazing (through provision of grazing leases) and low-level ecotourism ventures. Under this baseline, or "without-project scenario", biodiversity (both flora and fauna) would be adversely affected through reduced habitat quality, poaching or other forms of disturbance and persecution. It is difficult to determine with certainty whether there has been any increase in the HCV species abundance, population size, trends or range during this monitoring period due to natural fluxes in these variables. However, the successful protection of critical dryland forest during this monitoring period and documented throughout this report denotes that the size, quality and diversity of habitat has been maintained (and improved e.g., from the provision of water), as has overall landscape connectivity from avoided forest loss and fragmentation. This has provided an area of high-quality habitat and a key migratory corridor linking vital habitats and protected areas, reducing the potential for the animals to cause conflict with communities and the risks to them that would result. These are clear pointers that the biodiversity within KCRPI is better than it would have been in the absence of the Project.

5.1.2 High Conservation Value Protection (B1.2)

As indicated under Section 2.2.6, in addition to the fact that KCRPI is set up on the whole to protect critical wildlife habitat and ecosystem functions, there were several actions specifically undertaken during the reporting period towards the enhancement of HCVs in KCRPI including security, habitat enhancement and improved monitoring.

5.1.3 Invasive Species (B1.3)

No non-native species were used anywhere in the Project Accounting Area during the M_8 reporting period (or at any other time). All trees propagated at the Wildlife Works' Greenhouse that were used in any out-planting or reforestation within the Project Zone were native tree species that were initially germinated by

the local communities themselves. All other plants grown in the Greenhouse, including jojoba and fruit trees that were not local, have been propagated in this area for many years without any invasive tendencies (see section 5.1.4 below).

5.1.4 Impacts of Non-native Species (B1.4)

Species	Jojoba (*Simmondsia chinensis*)
Justification of Use	Potential commercial tree that is suited for arid conditions and not palatable to elephants
Adverse Effect	Weed risk assessments[19] have shown jojoba to be low-risk species for invasiveness based on several criteria including viable seed production, broad climate suitability, tolerating many soil types, mutilation, cultivation, and fire, plus tendency to form dense thickets amongst others. This study found that jojoba was slow to attain reproductive maturity, seeds are not easily dispersed, and this species was not found to be naturalized or weedy anywhere.

Species	Various fruit and nut species including assorted citrus, mango, passion and cashew
Justification of Use	Commonly used fruit and grafted trees are adapted to drylands
Adverse Effect	These species have been commonly grown throughout the region for hundreds of years[20] and/or are considered a vital tool in transforming Kenya into a middle-income nation as outlined in the Kenya Vision 2030[21]. Furthermore, after a thorough literature review, no research has been found which suggests that the various citrus and nut species grown in the region are invasive or have any adverse effects.

5.1.5 GMO Exclusion (B1.5)

No GMOs were used to generate GHG reductions or removals in KCRPI, or in any associated project activities.

[19] Buddenhagen CE, Chimera C, Clifford P (2009) Assessing Biofuel Crop Invasiveness: A Case Study. PLoS ONE 4(4): e5261. doi:10.1371/journal.pone.0005261

[20] Webber, H.J. 1967 History and development of the citrus industry, p. 1–39. In: W. Reuther, H.J. Webber, and L.D. Batchelor (eds.). The citrus industry 1. History, world distribution, botany, and varieties. Univ. of California, Berkeley

[21] Government of Kenya (1999). Vision 2030, Department of Development Co-operation. National Poverty Eradication Plans 1999-2015. Nairobi: Government Press.

5.2 Offsite Biodiversity Impacts

5.2.1 Negative Offsite Biodiversity Impact Mitigation (B2.1, B2.2)

The potential negative impacts for biodiversity from our project implementation are increased poaching outside the project area and increasing human-wildlife conflicts due to growing wildlife populations. As indicated under our PDD, we believe that these are not likely to happen in this project area due to three key reasons related to our theory of change:

1. The project area is a wildlife corridor mostly surrounded by National Parks and agricultural areas. Thus, it would host wildlife even in the absence of the project. Additional protection provided by the Project would only further foster benefits for biodiversity.

2. Ranches outside the project area: additional protection within the project area ranches should not have any adverse effect on biodiversity within ranches that fall outside of the project area.

3. HWC: while additional wildlife would be thought to potentially increase the conflicts with surrounding communities, we believe the simultaneous project activities such as livelihood improvement, community awareness initiatives, and conflict deterrent activities reduce the redistribution and intensification of conflict in adjacent communities.

Therefore, the Project does not have any negative offsite biodiversity impacts. As described in the above sections, KCRPI has been shown to have potential positive impacts on biodiversity, across different wildlife species and ranging from individuals and populations to ecological functions. Additionally, Wildlife Works routinely patrols areas outside KCRPI either on routine patrols or under the direct request of the landowners in these ranches. Being out of our jurisdiction, when Wildlife Works does not have express authority from the landowners, we engage the resident KWS Teams to make any required follow ups.

5.2.2 Net Offsite Biodiversity Benefits (B2.3)

As documented in section 5.2.1 the Project will not result in any negative offsite biodiversity impacts. However, in the case that any did occur, these impacts would be minor in comparison to the far more significant benefits provided by the project. The project provides a vital and secure wildlife habitat, with water sources that are maintained in the dry season. The Project Area also serves as the only secure corridor linking Tsavo East and Tsavo West national parks, enabling safe movement by wildlife away from area farms, infrastructure and communities. Therefore, the Project's biodiversity benefits are positive in comparison to any negative offsite biodiversity impacts that were to occur.

5.3 Biodiversity Impact Monitoring

5.3.1 Biodiversity Monitoring Plan Development (B3.3)

Wildlife Works employs the Pressure-State-Response framework to develop the biodiversity monitoring plan for KCRPI. This framework is based on a theory of change analysis whereby pressures or threats (e.g., deforestation, grazing, or hunting) negatively impact the state or status/condition of biodiversity (e.g., species abundance or habitat area), but responses or project interventions (e.g., tree planting or enhanced security) are taken to reduce pressure, which in turn is expected to improve the state of biodiversity. While it is often the state indicators that most directly inform project managers of actual changes in biodiversity and hence project impacts, they are also often the hardest to measure and the

slowest to change. In contrast, response indicators are relatively easy to measure and can change rapidly because they measure actual interventions that a project makes, but they are the least informative about changes in biodiversity, because it is not always automatic that these activities will reduce threats or otherwise improve the state of biodiversity. Pressure (or threat) indicators offer a good compromise: they are moderately easy to measure and provide a reasonably accurate image of the status of biodiversity on the ground.

Response indicators

Response indicators are mostly extracted from the Biodiversity Impact Assessment indicators and monitoring plan (see Section 4.3.2, Table 12) and includes indicators for the following aspects:

- Habitat improvement: both vegetation and water
- Security enhancement: rangers, equipment and infrastructure
- Other anti-poaching efforts: cameras, sniffer dogs
- Employment of local community members: Eco-charcoal, EPZ, soap factory
- Alternative sources of income or livelihoods: e.g., from eco-charcoal, ecotourism
- Human-wildlife conflict alleviation efforts: Jojoba hedges, deterrent fences e.g., metal strip and beehive fences[22], ranger response units

Pressure indicators

These are largely extracted from the Social Impact Assessment indicators (see Section 4.3.2, Table 12) and are grouped the following:

- Population size (from the Government census and other project-specific demographic and livelihoods data)
- Human-wildlife conflict (HWC) incidents: crops, livestock, human-related
- Other incidents: carcasses, snares, encroachment, fire, charcoal production and arrestees (poachers).

State indicators

- The wildlife (especially HCVs)
    - Species richness, relative abundance and diversity
    - Species distribution and movement
- The vegetation
    - Species occurrence, composition and diversity (including structural)
    - Habitat disturbance – human, elephant, other
    - Vegetation regeneration – abundance of saplings, seedlings.

[22] Von Hagen L, Kasaine S, Githiru M, Amakobe B, Mutwiwa U & Schulte BA. 2020. Metal strip fences for preventing African elephant (*Loxodonta africana*) crop foraging in the Kasigau Wildlife Corridor, Kenya. African Journal of Ecology 00: 1-6. DOI: 10.1111/aje.12821

5.3.2 Biodiversity Monitoring Results (B3.1, B3.2)

Monitoring plan development and data collection

The biodiversity-related indicators are also provided in Table 12 under Section 4.3.2, alongside community indicators. The main strategies used to obtain data for these indicators were:

- **In-house reporting**: this pertains to all the biodiversity or social indicators that different Wildlife Works' departments can report on based on their routine activities and reporting mechanisms, e.g., ranger patrol and community engagement reports. This is primarily for Response and Pressure indicators
- **Fieldwork**: data for most State indicators are collected through specially designed surveys or other (external or internal) research projects. This mainly involves wildlife surveys and monitoring for all species including HCVs using permanent road transects, camera traps, during ranger patrols, aerial patrols, anecdotal records, and other species-specific research projects.

Wildlife monitoring results

Road transects: From 2011 to the end of the 2021 reporting period, a total of 28 road transect sessions have been carried out across KCRPI (a transect session entails covering all of our 6-permanent road transects); during the m_8 reporting period, four transect sampling sessions were conducted S29, S30, S31 and S32 (Figure 27). Overall, total of 88 different wildlife species have been recorded along the road transects since 2011, with a relatively consistent trend in overall encounter rates over this time including during the reporting period (Figure 27).

- Figure 27During this 2021 monitoring period, the most common species encountered were Kirk's Dikdik and the unstriped squirrel (Figure 28).



Figure 27: Total number of wildlife encounters recorded on the 28-permanent road transects across KCRPI since the project start date.

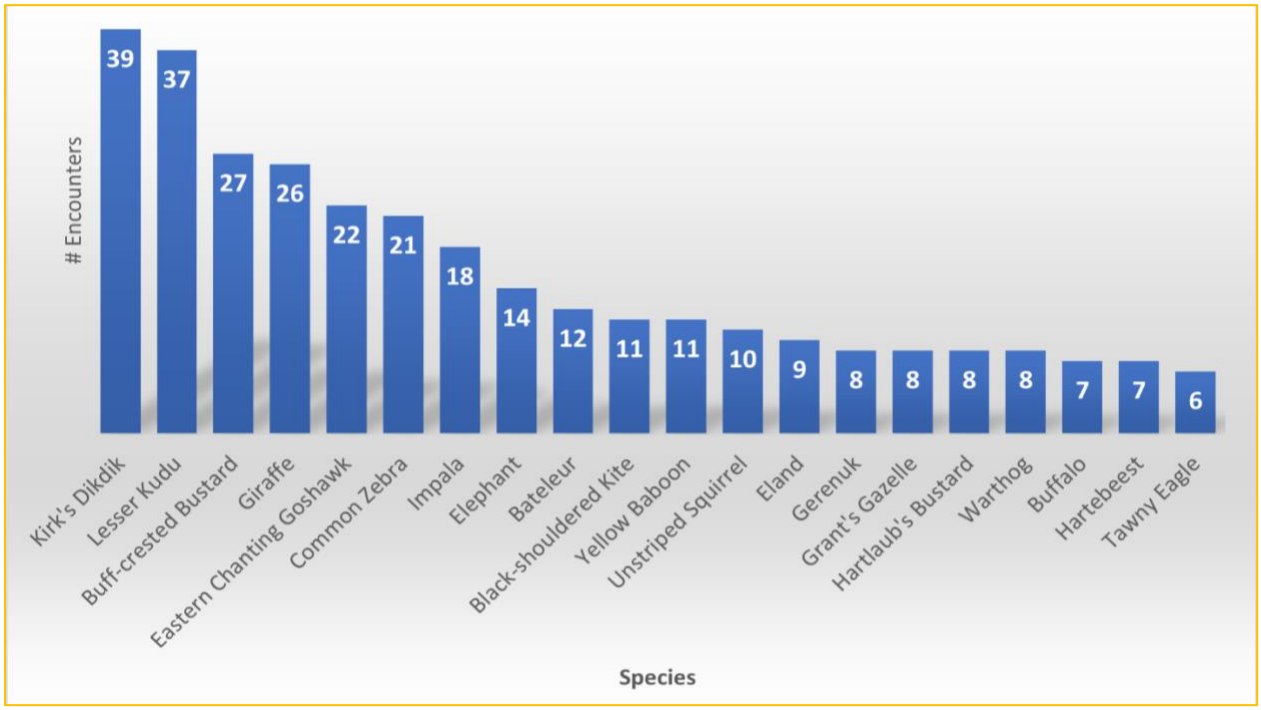


Figure 28: Total number of encounters of the top-20 wildlife species recorded on the 25-permanent road transects across KCRPI during the 2021 monitoring period

Ranger patrol dataset

- *Effort:* The six Wildlife Works' ranger outpost teams continued to undertake both foot and vehicle patrols across KCRPI. The rangers undertook a total of 178 patrols during the reporting period, covering about 18,131km in total KCRPI. These patrols crisscrossed the entire KCRPI Project Area and beyond (Figure 30). Besides the three outposts within Rukinga Ranch, the other outposts also occasionally help in patrolling this area, and our Head of Security operates a mobile patrol team that supports the outposts with information, logistics and / or back-up rangers when needed. Overall, patrol effort and effectiveness were maintained during this reporting period compared to recent years, especially considering the increased and consistent use of aerial patrols (see next section).

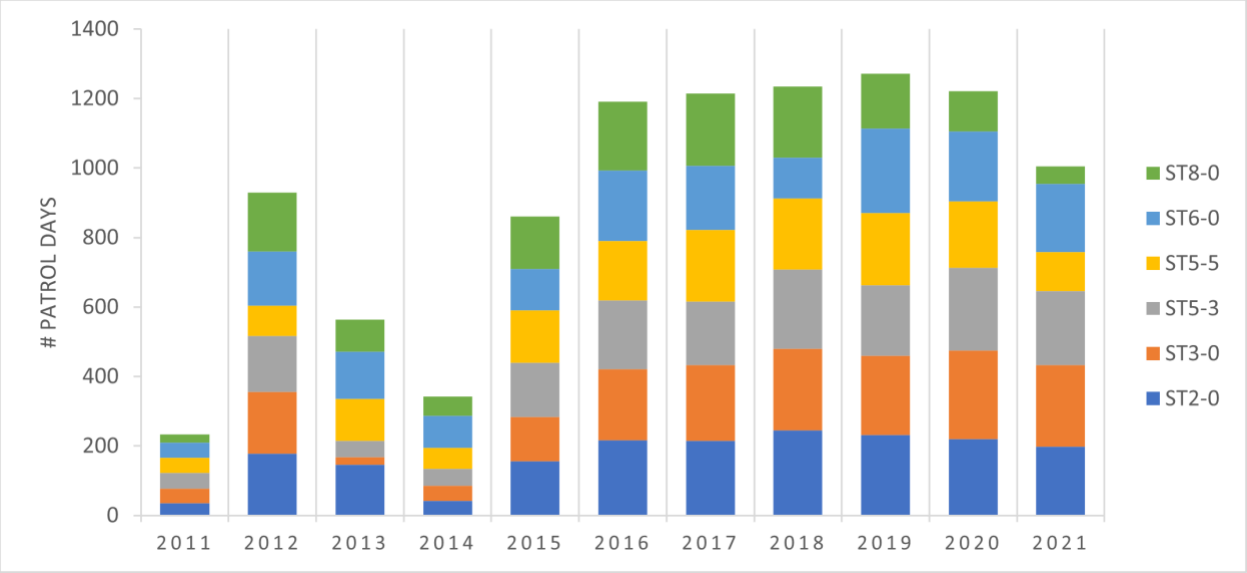


Figure 29: Number of patrols recorded for each of the six ranger outposts across KCRPI from 2011 to 2021

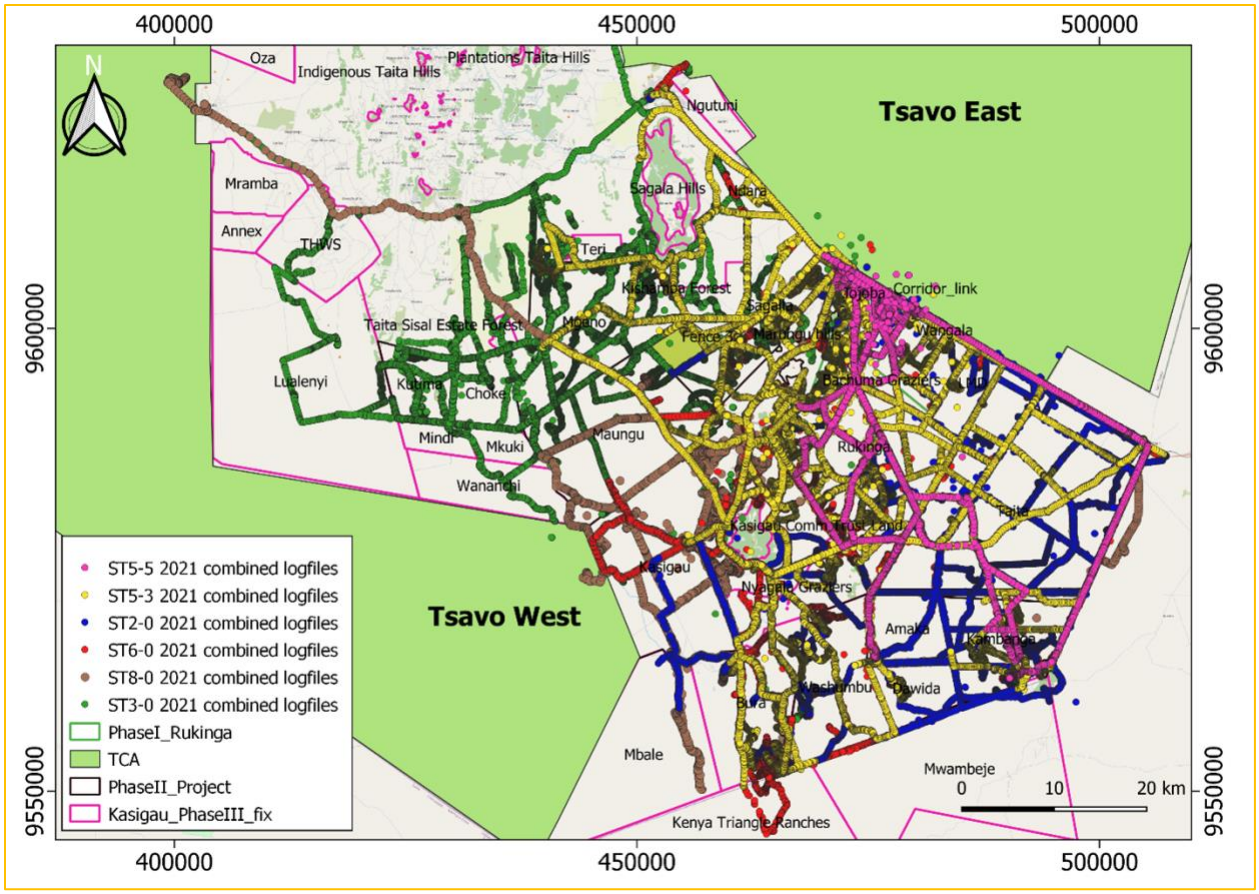


Figure 30: Coverage by ground (foot and vehicle) patrols conducted across KCRPI during the reporting period, Jan-Dec 2021.

- Species: During the period of January to September 2021, the ranger ground patrol teams recorded a total of 465 encounters with wildlife in Phase 1. These comprised a total of 32 different species. Lesser Kudu, Giraffe, Impala, Elephant and Common Zebra were the top-five most encountered species (Figure 31). Other species of conservation concern observed regularly included Lion, Secretary bird, Grevy's Zebra, and Cheetah.

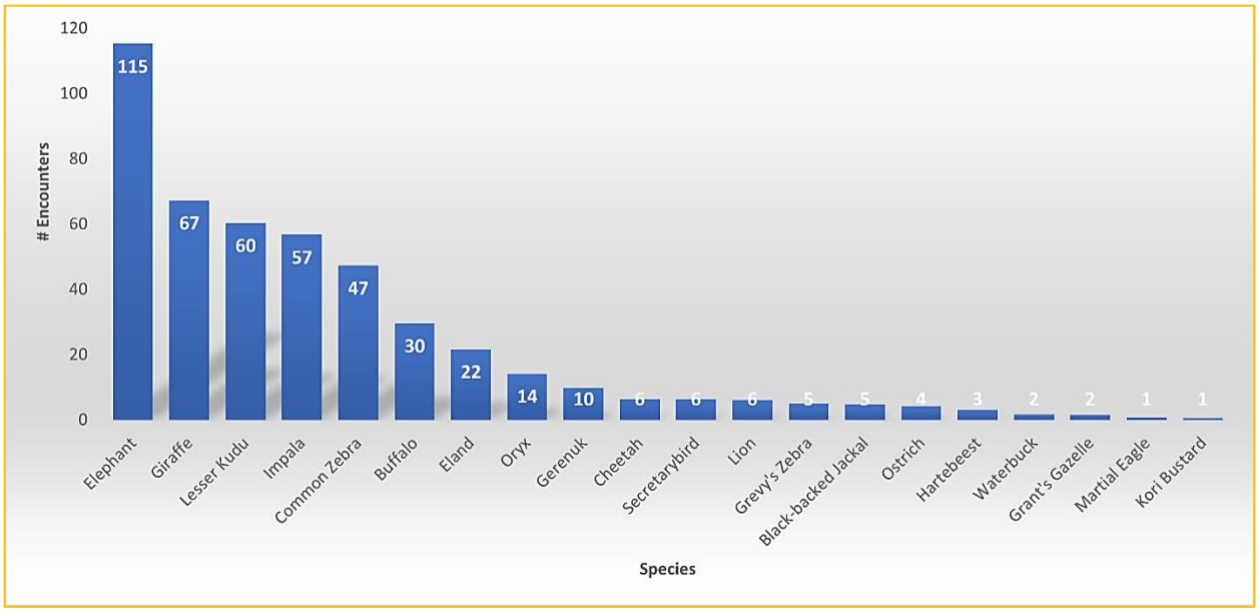


Figure 31: Top-20 commonest species encountered during ranger ground patrols across KCRPI during the 2021 reporting period.

- HCV: Overall, there was not a significant difference in recent years of HCV species encounter rates based on the ranger dataset across the KCRPI (Figure 32).

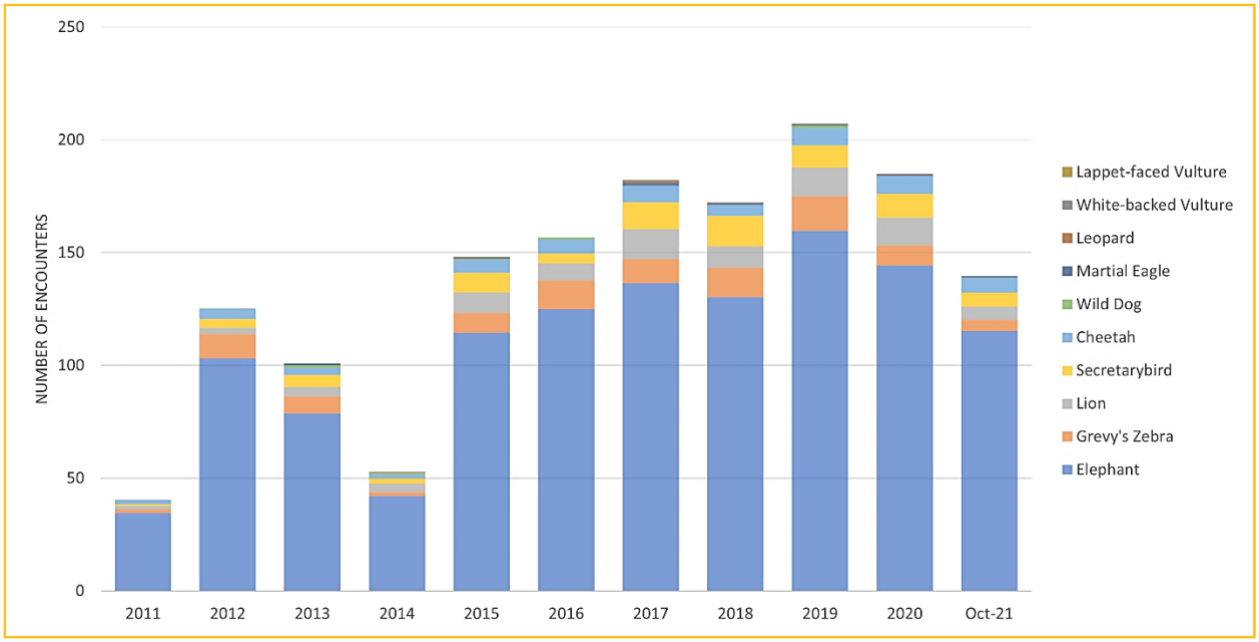


Figure 32: Total number of encounters of the key HCV species recorded during ranger patrols across KCRPI from 2011 to the 2021 reporting period.

- Incidents: The Wildlife Works' security team recorded a total of 140 incidents within KCRPI during the reporting period, with about ⅓ being originally detected from an aerial patrol. Though the

figure below suggests an increasing trend in number of incidents, the growing use of aerial patrols since 2017 (see next section) has enhanced effectiveness of locating incidents, especially log heaps and charcoal kilns (Figure 33). Additionally, the 2021 monitoring period revealed a significant increase in recording of human-wildlife conflicts regarding elephants disrupting community members' normal activities which was not previously captured; this now forms the bulk of the incidents (48). An effectiveness analysis is currently underway to try understand major explanatory variables for this trend including increasing effort, growing ranger experience, different methods amongst others.

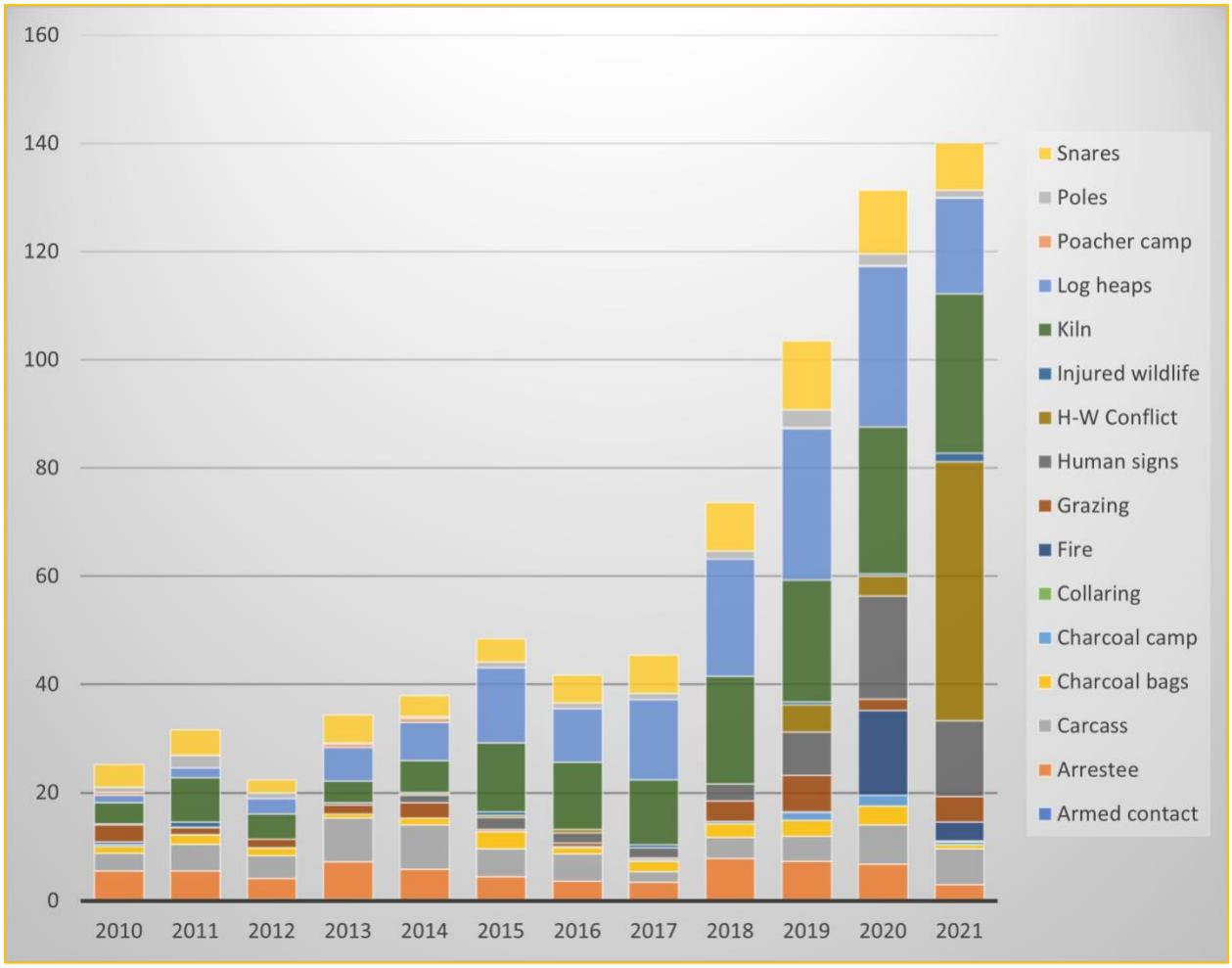


Figure 33: Total number of different incidents recorded by the six ranger outposts across KCRPI from 2010 to the current reporting period, 2021.

Aerial patrol dataset

There were sustained aerial patrols conducted during the M_8 reporting period which improved detection for both wildlife and other incidents. Our two resident gyrocopters maintained their aerial support to ground teams throughout the year. In 2021, there were 60 aerial patrol days/tracks in the KCRPI project area from the two gyrocopters, covering a total of 12,060km (see monthly trends in Figure 34) and

traversing the majority of the Project Area (see Figure 35). Aerial patrol effort has steadily grown since 2015 to-date, especially with the addition of the second gyrocopter (Figure 36).

The incidents and HCV species data from aerial transects were captured either through our Daily Log or Ranger Patrol data. This increasing aerial support has resulted in both improved monitoring of HCV species as well as enhanced detection of incidents, given more than 35% of all incidents recorded during the reporting period were originally detected from an aerial patrol. Species-wise, a total of 129 wildlife sightings (encounters) were recorded during the aerial patrols during the 2021 reporting period, comprising 21 species. The commonest species recorded was elephant (69%) followed by Grevy's zebra (10%).

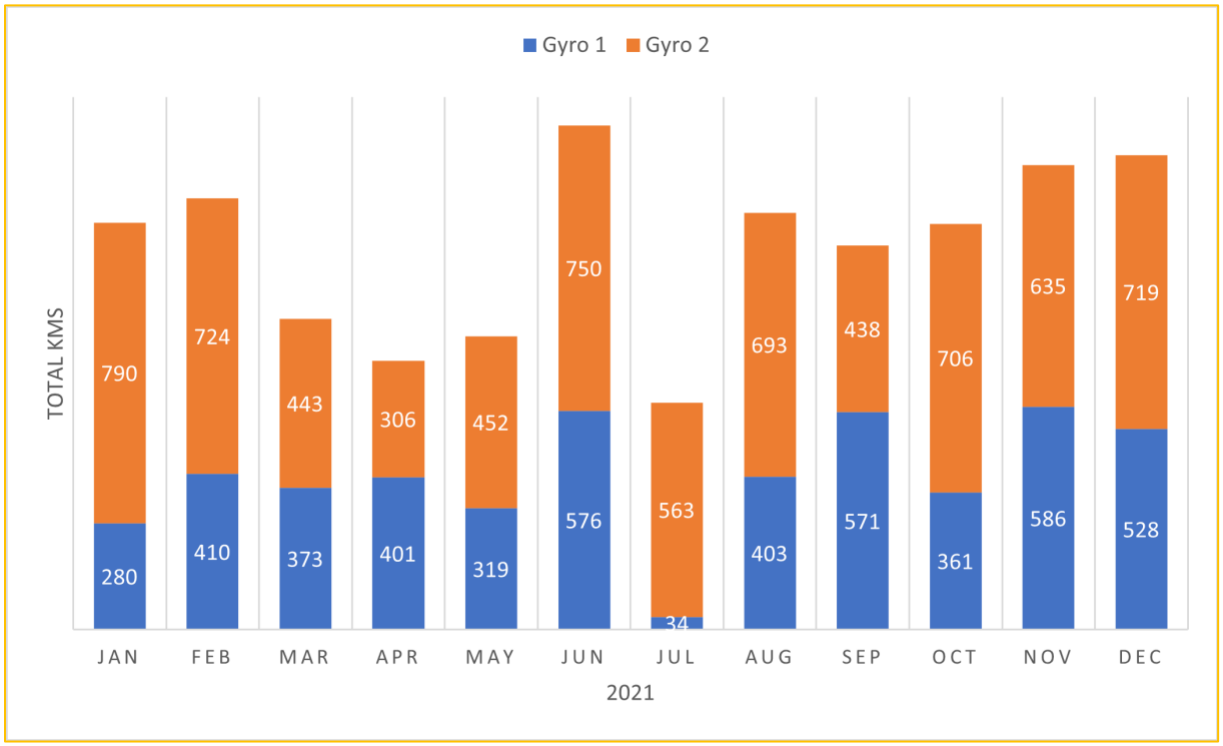


Figure 34: Monthly distances covered by the two resident gyrocopters traversing the KCRPI during the 2021 reporting period.

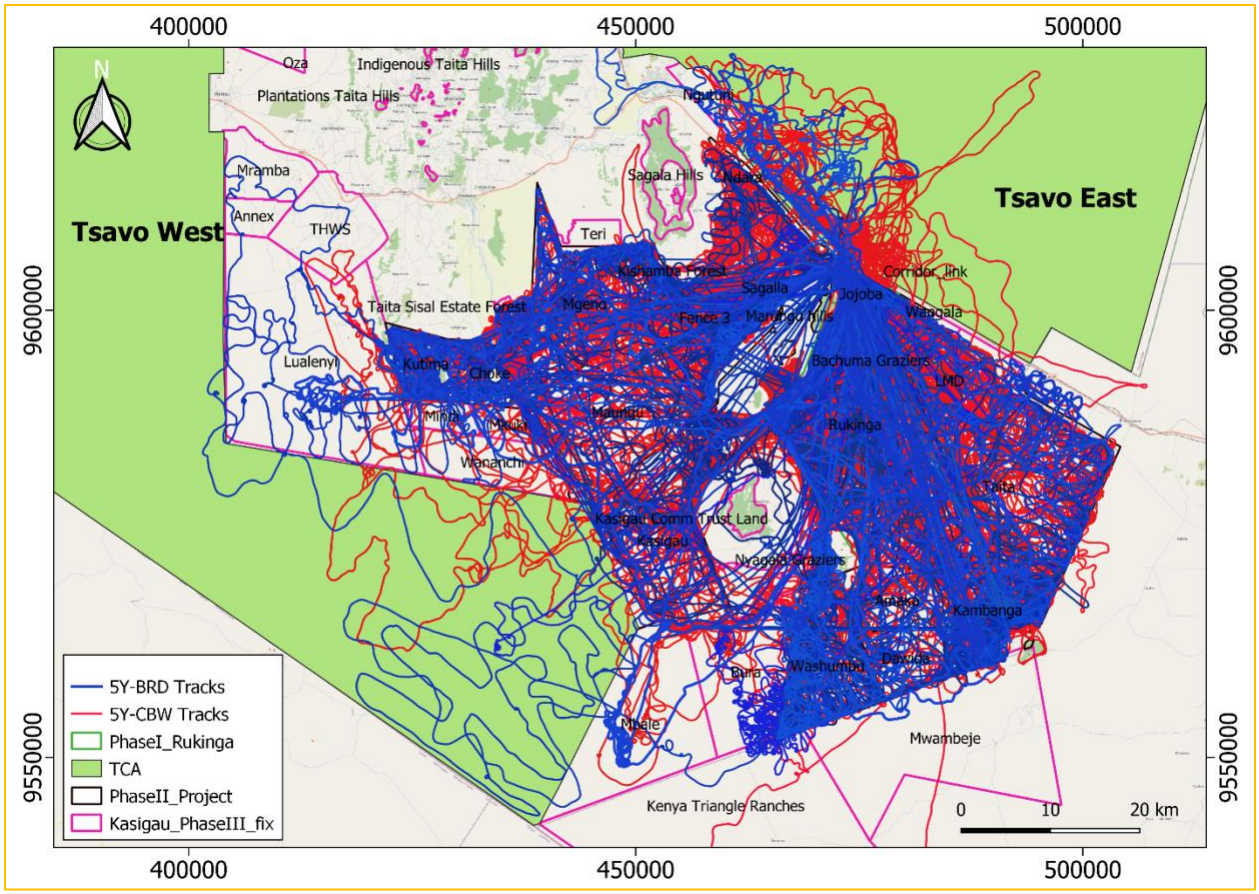


Figure 35: Coverage by aerial patrols conducted across KCRPI by the two resident gyrocopters during the reporting period, 2021.

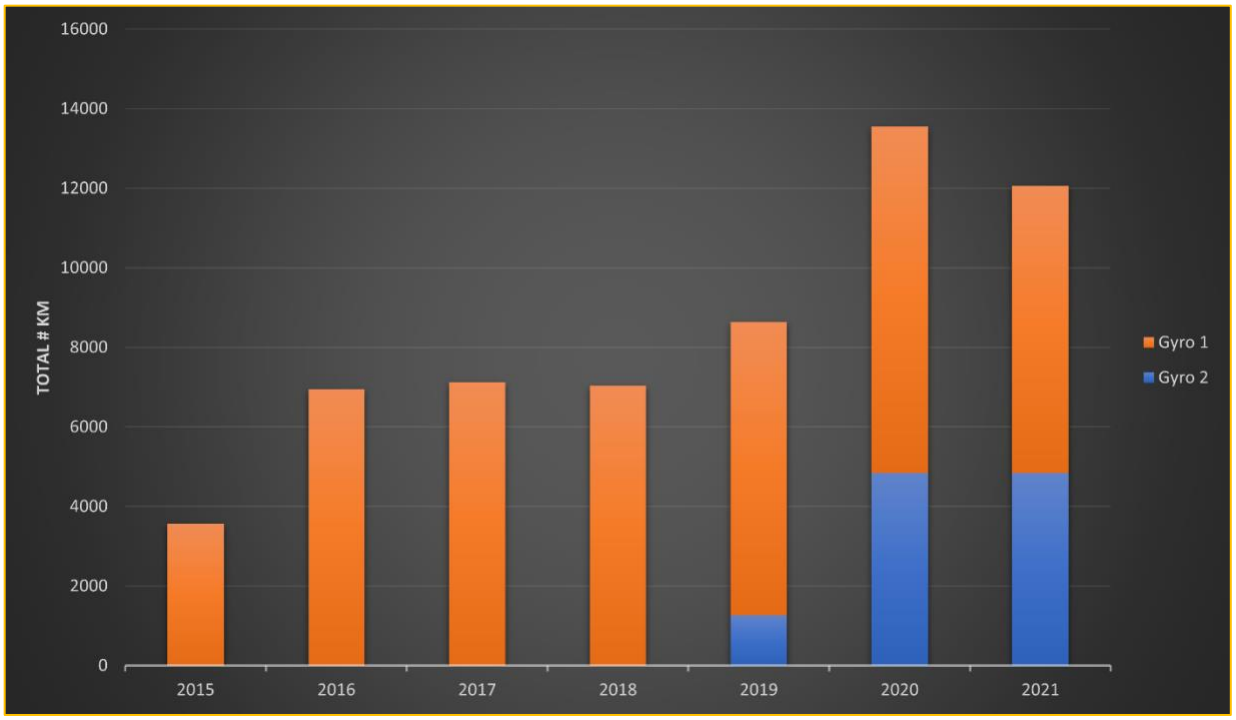


Figure 36: Annual distances covered by the resident gyrocopters across the KCRPI from 2015 to the 2021 reporting period

- Daily logs: During 2021, 527 valid records were collected from KCRPI through our anecdotical reporting system for HCV species. These are sightings of key species recorded either during ranger or aerial patrols, or by other staff or visitors travelling within the Project area for other reasons. Overall, sightings were dominated by elephants (53%); other commonly spotted species of conservation interest (HCVs) were Lion (40%), and Secretary Bird (9%). See distributions of key HCVs (Elephant, Grevy's Zebra, African wild dog, Lion, Cheetah and Secretary bird) based on this Daily Logs dataset that mostly comprises of aerial survey data (Figure 37 & Figure 38).

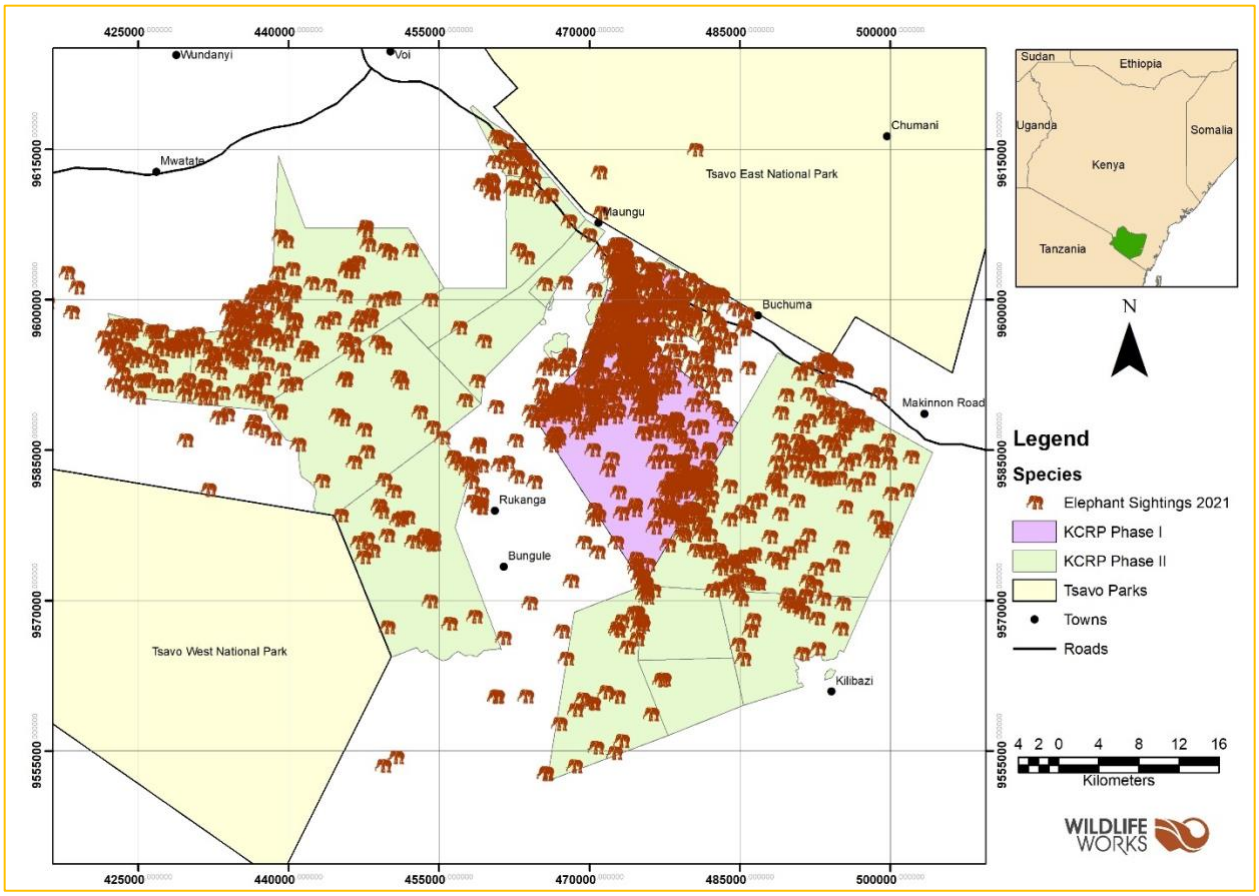


Figure 37: Distribution of elephant sightings across KCRPI (in purple) based on daily logs and aerial patrols during the reporting period 2021

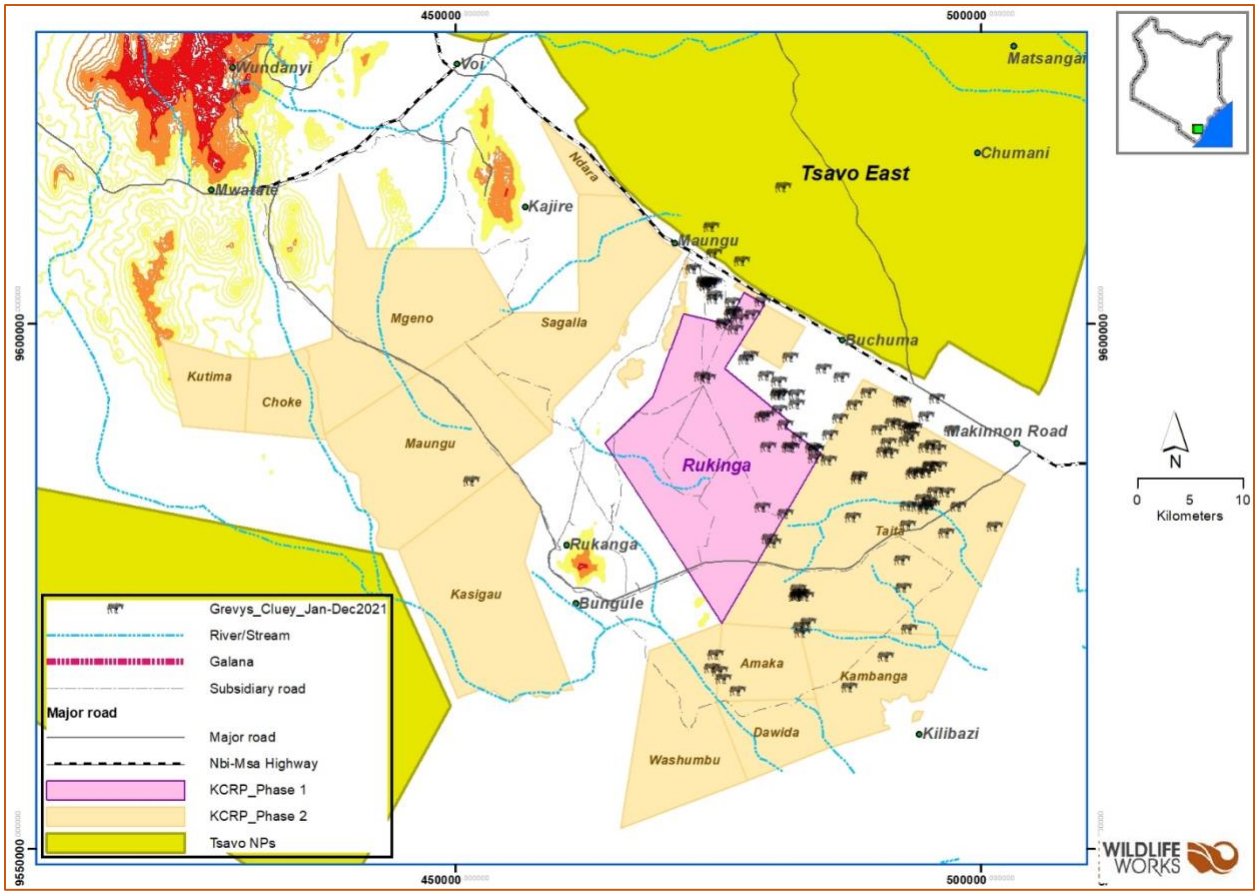


Figure 38: Distribution of Grevy's zebra sightings across KCRPI (in purple) during the reporting period 2021 based on daily logs and aerial patrols.

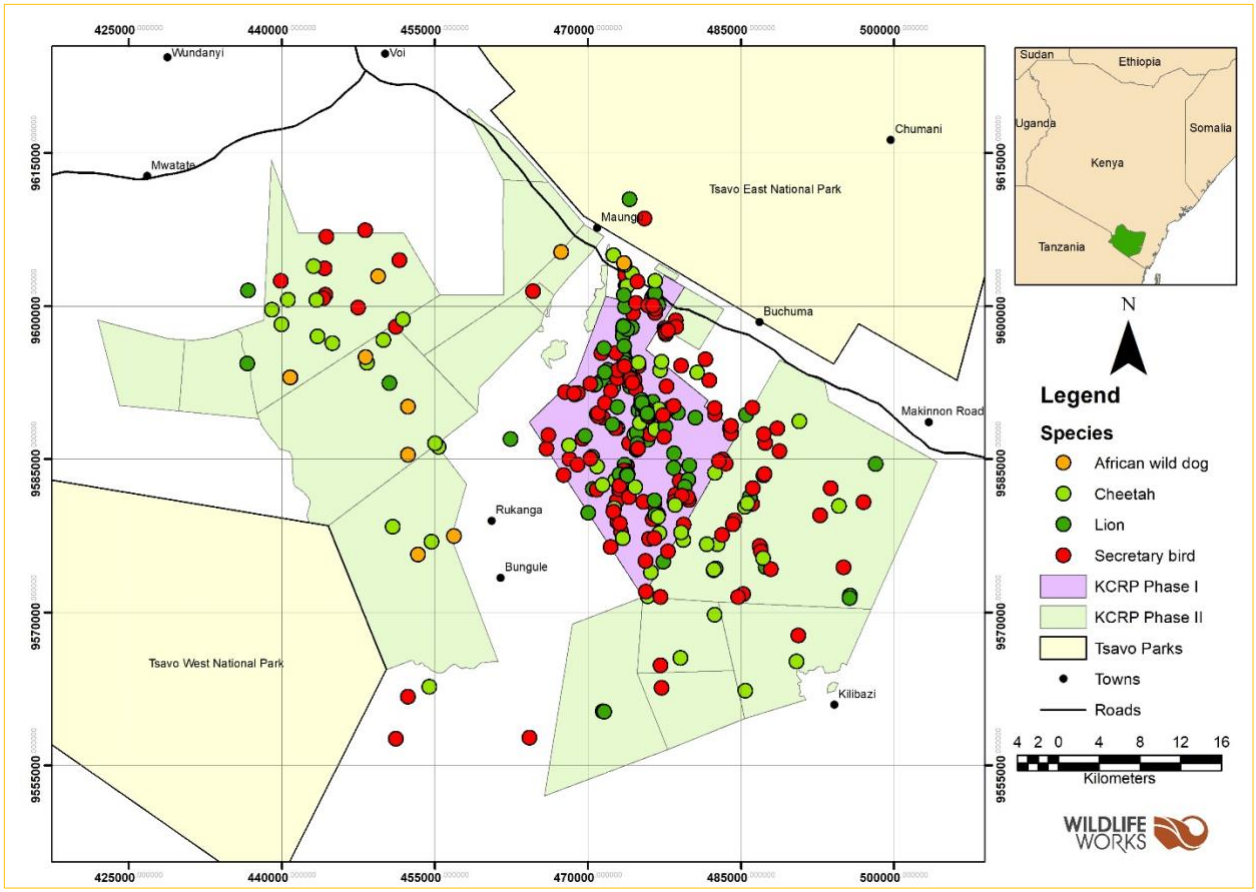


Figure 39: Presence and distribution of four HCV carnivores (African wild dog, lion, cheetah and secretarybird) during the reporting period 2021 based on anecdotal sightings and aerial patrols across KCRPI.

- Community monitors: During the reporting period-2021, a total of 407 human-wildlife conflict or encounters with HCVs were reported by our 3 community monitors across the Project Zone. Most incidents were in Kale (40%) followed by Buguta (16%) and Makwasinyi (44%). Species-wise, Elephants and Spotted Hyena dominated, comprising about 67% and 27% of all the reported incidents, respectively. Other important species were Lion (3%) and Buffalo (2%). All incidents were reported to KWS through our Head of Security for guiding planning of patrols and problem animal control activities.

5.3.3 Monitoring Plan and Results Dissemination (B3.3)

Results from monitoring plan implementation are disseminated online through the VCS / CCB website and popular and / or scientific publications, and key or relevant highlights disseminated to the communities either through community meetings or Barazas (see Section 2.3 on Stakeholder Engagement) or the annual/biennial SIA Community Workshops (see Section 4.1.1). During the M_8 reporting period, the SIA Community Workshop was held in March-2021 whereby the results of the biennial Household Survey, which was undertaken in 2020, including some wildlife monitoring data, were

presented to and discussed by the workshop participants. Additionally, several scientific publications or unpublished reports were published during the M_8 reporting period, including:

- Amakobe B., Wambugu M & Githiru M. *Bird species assemblages along a tropical elevation gradient in Mount Kasigau, South East Kenya*. In Prep.
- Von Hagen, R.L., Schulte, B.A., Dunning, K., Githiru, M., Zohdy, S., Lepczyk, C.A. *Socioeconomic Factors Shape Relationships of Rural Farmers to Deterrent Measures for Mitigating Crop Raiding by African Elephants*. Conservation Biology, Submitted
- Githiru, M., Lenjo, L., Mwakima, J. & Kasaine, S. *Local Democracy and Political Pluralism in Kenya: the role of private sector REDD+*. African Journal of Governance & Development, Submitted

5.3.4 Optional Criterion: Exceptional Biodiversity Benefits

5.3.4.1 Vulnerability: Critically Endangered (CR) and Endangered (EN) species - presence of at least a single individual (GL3.1)

As demonstrated in the preceding sections, all the key High Conservation Value species that are listed under some category of threat globally in the latest IUCN Red List – African elephant, Grevy's zebra, Lion, African Wild Dog, Leopard, Cheetah, Secretarybird, Martial Eagle, Bateleur and several vulture species – were repeatedly recorded across KCRPI during M_8, including evidence of breeding from Elephant calves, Grevy's Zebra foals, Lion and Cheetah cubs.

5.3.4.2 Describe measures needed and taken to maintain or enhance the population status of each Trigger species in the Project Zone (CCB V3: GL3.3.).

As indicated in Section 5.1.1, the core of Wildlife Works' operations under KCRPI are specifically geared towards improvement of habitat and biodiversity. Additional measures towards HCV improvement during the reporting period are highlighted under Section 2.2.6.

5.3.4.3 Include indicators of the population trend of each Trigger species and/or the threats to them in the monitoring plan and demonstrate the effectiveness of measures needed and taken to maintain or enhance the population status of Trigger species (GL3.4.)

Given the long-term nature of wildlife impacts, plus bearing in mind natural population fluctuations, it is not possible to indicate concrete population trends at this stage in the Project for trigger species. Nonetheless, given our theory of change logic and baseline scenario of worsening habitats and escalated poaching activities, we believe that the broad distribution and frequent encounters of these species across KCRPI – including evidence of breeding Grevy's Zebra and African Wild Dogs, alongside evidence of breeding Elephants, Lion and Cheetah amongst others – strongly suggests that project activities have had a positive impact on these species. Indications will become clearer in the future when we are able to control for natural fluxes and other external influences within our datasets, given that this is a wildlife corridor with expected fluctuations for most of these wide-ranging species. This is demonstrated in the HCV distribution maps above.