THE KASIGAU CORRIDOR REDD+ PROJECT PHASE I – RUKINGA SANCTUARY

7TH MONITORING REPORT (M_7)



Document Prepared by Wildlife Works Carbon

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Monitoring Period of this Report	01 January 2020 – 31 December 2020
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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 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 population of about 35-60 individuals of this species are found within Rukinga Wildlife Sanctuary or its project zone. We believe

[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

	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 including cheetah (*Acinonyx jubatus*), lion (*Panthera leo*), African elephant *Loxodonta africana*, Secretarybird *Sagittarius serpentarius* and Martial eagle *Polemaetus bellicosus.* • 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 providing 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 20
2.1 Project Description 20
2.2 Project Implementation Status 26
2.3 Stakeholder Engagement 35
2.4 Management Capacity and Best Practices 38
2.5 Legal Status and Property Rights 50
3 Climate 51
3.1 Monitoring GHG Emission Reductions and Removals 51
3.2 Quantification of GHG Emission Reductions and Removals 120
3.3 Optional Criterion: Climate Change Adaptation Benefits 139
4 Community 141
4.1 Net Positive Community Impacts 141
4.2 Offsite Stakeholder Impacts 145
4.3 Community Impact Monitoring 146
4.4 Optional Criterion: Exceptional Community Benefits 175
5 Biodiversity 176
5.1 Net Positive Biodiversity Impacts 176
5.2 Offsite Biodiversity Impacts 178
5.3 Biodiversity Impact Monitoring 179

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 program	Health education through our children's program that focuses on girls from vulnerable families: Held trainings for 153 girls on sexual health, sanitation and drug abuse: 3 meetings held, attended by a range of 15-93 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 7 school meetings or training camps have been held since 2016, with each having an attendance of between 20-150 students.
2) Hadithi	Provided marketing and sales support to 7 craft groups in 2020, comprising of a total of 226 women. Approximately KES 2,589,825 ($USD 25,500) 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 7 craft groups undertaking traditional and practical basket weaving and beadwork. This comprises over 226 women. Cumulatively, a gross of more than $USD 78,000 in funding has been provided to these local groups in the period of 2015 to 2020.
3) Eco-tourism	While all tourism activities were ceased for most of 2020 due to national and international travel restrictions and other COVID-19 disruptions, 4 staff at Kivuli Camp within Rukinga Wildlife Sanctuary	2.1.1	One permanent and several regular short-term staff have been employed, and the venture has been self-sufficient and profit-making since 2016 but was adversely affected by the

	were retained under employment		COVID-19 disruptions in 2020.
4) Eco-charcoal production	1 permanent staff manually processing 150-226 0.5 kg briquettes/week. Long-term monitoring system for a rotational harvest plan set up, and leveraged R&D funds from the National Research Fund (Kenya) have helped to procure improved kilns, grinder, mixer and briquette press for improved production	2.1.1	Pioneered and tested the sustainable charcoal production using finger-sized twigs. One permanent staff manually processing 150-226 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) have helped to procure improved kilns, grinder, mixer and briquette press for improved production. Now the scaling up process is underway which will hopefully move the Project towards attaining commercial level.

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	278,584 tCO_2e	3.2.4.5	3,571,754 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 Q2 and Q3 2020, no visits were organised to the Greenhouse due to travel restrictions in Kenya from the COIVD pandemic. However, visits resumed in Q4-2020 where 21 local community members (mostly women, youth and school groups) visited the Greenhouse	2.1.1	A total of 241 local community members 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 2020, the one Women's Group (Kulikila) was provided with follow-up support from the Wildlife Works' Greenhouse and Community Outreach Departments, mainly on planting and care of vegetables and seedlings, but also on group organisation,	2.1.1	One group (Kulikila) 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
		dynamics and financial management		
Employment	Total number of people employed in of project activities,[7] expressed as number of full-time[8] or contracted employees	There were 53 employees at the end of this monitoring period, of whom 15 (29%) were female, and over 90% are local (i.e., from the Project Zone or Taita Taveta County). Additionally, there were 3 employees contracted with the project during this past monitoring period. 100% of the contracted employees were from the local project area.	2.1.1, 4.3	Average over past three years of 50 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	15 (29% of total)	2.1.1	Long-term average between 25 and 30% of workforce

[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])

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
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 (e.g., water, health, employment, bursaries), our 2020 household survey reported that 48% of all the respondents stated that KCRPI had had a positive livelihood effect. Most cited various livelihood-related benefits were education-related support, employment, tree seedlings and water	2.1.1	48% of randomly selected households view the REDD+ project positively, due to having received some benefit from KCRPI, especially education bursaries, but also employment, tree 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., one women's group with greenhouses for agri-business and new women's groups working with Hadithi), about a half of the population who would be beneficiaries from	2.1.1	In addition to women-targeted efforts (e.g., four women's groups with greenhouses for agri-business and seven groups (226 women) working with Hadithi), about a half of the population who would be beneficiaries from the livelihood improvements at

[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
		the livelihood improvements at household level are female.		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 dispensaries which have been renovated through the WWCT, the Voi Diagnostic Lab at Moi District Hospital tested 1,832 patients who undertook 5,939 tests, despite COVID-19 travel restrictions that reduced the number of patients visiting the hospital in 2020. Wildlife Works also supported Government efforts by providing basic COVID-19 prevention infrastructure to schools and communities	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 neighboring counties. It has grown from handling about 75 patients per month since opening in March 2014 to more than 150 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	2.1.1	Based on County statistics, about 50% of those seeking services at the Lab would be women, and about half of the

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
		healthcare school program participants are girls. 375 sanitary pads, and 375 girls' underwear were distributed to various schools in the project area		healthcare school program 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: 601 students • Amount: KES 3,390,000 spent on classroom construction or renovation: 2 schools • Other infrastructure (power, desks and chairs): 1 schools, 75 desks/chairs • Examination revision materials: 9 primary schools.	2.1.1	• Bursary recipients: 2,512 • Total amount spent: KES 12,361,932 • 10 school-projects involving construction or renovation of classrooms, each with an average of 40 students. • Infrastructure: including dining halls and kitchen installation, furniture (3 schools) and other supplies like books, examination material and lab equipment (10 schools) and water harvesting (2 schools).

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	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	Community projects were affected by COVID-19 disruptions in 2020. However, after Q3, disbursement meetings were allowed, which enabled operations to resume. Two water storage tanks were constructed in Q4	2.1.1	Since 2012, 5 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 8,123 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.
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	2.1.1, 4.3	In addition to the livelihoods, health, education and water-related improved wellbeing above, there are also three

[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
		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.		community organizations (LCC, Bursary Committees and Community-based Organizations) that have either been created or strengthened through KCRPI. 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.
Biodiversity conservation	Change in the number of hectares significantly better managed by the Project for biodiversity conservation,[11] measured against the without-project scenario	30,168.66	5	30,168.66

[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.

Category	Metric	Achievements during Monitoring Period	Section Reference	Achievements during the Project Lifetime
	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 the KCRPI Project Area. There were several encounters of White-headed and White-backed vultures across the Sanctuary too	5.1.2	3 Critically Endangered species: Grevy's zebra (confirmed breeding in project area), White-backed and White-headed vultures sightings.

[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 7th monitoring period for the Kasigau REDD+ Project Phase I – Rukinga Sanctuary (KCRPI). As the Project has now been in operation for 15 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.

As poverty is a major driver of forest loss, a primary focus of the Project Activities are improved livelihoods either through direct employment with the Project or through 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 53 employees in total, 2 in senior management positions, and 3 contracted staff members. Of the 53, 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). During this monitoring period, 3 contracted staff members were employed from directly from the local project area. In addition to the core project operations, the Wildlife Works Carbon Trust (WWCT) receives revenue from carbon credit sales which is used to fund self-determined community projects. Under the WWCT, 9 Projects were initiated (either ongoing or completed) by the Locational Carbon Committees (LCCs) during the reporting period (2020). Major activities included school infrastructure or supplies, construction/renovation projects (5), water (1), health (2) and other infrastructure (1) projects. School projects have predominantly involved construction/ renovation of classrooms as well as provision of other infrastructure including examination material for students disrupted by the COVID-19 pandemic. Health projects in 2020 involved distribution of hand washing buckets, water tanks and liquid detergents. Water projects focused on improvements to collection and harvesting, including pipeline construction. The total amount spent during this monitoring period on community Projects alone was KES 5,691,946 (approximately $USD 57,000). This excludes school bursary schemes, which totaled an additional KES 3,390,000 (approximately $USD 33,750). 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_7) monitoring period are 278,584 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
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Title	Founder and CEO
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Email	mike@wildlifeworks.com

2.1.4 Other Entities Involved in the Project

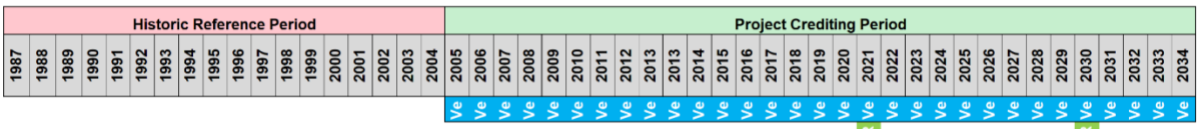
No other entities are involved in KCRPI.

2.1.5 Project Start Date (G3.4)

The Project start date is January 1st, 2005. This monitoring period (M_7) is the seventh monitoring period. It started on January 1st, 2020 and ended on December 31st, 2020.

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 a Kenyan jurisdictional 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).

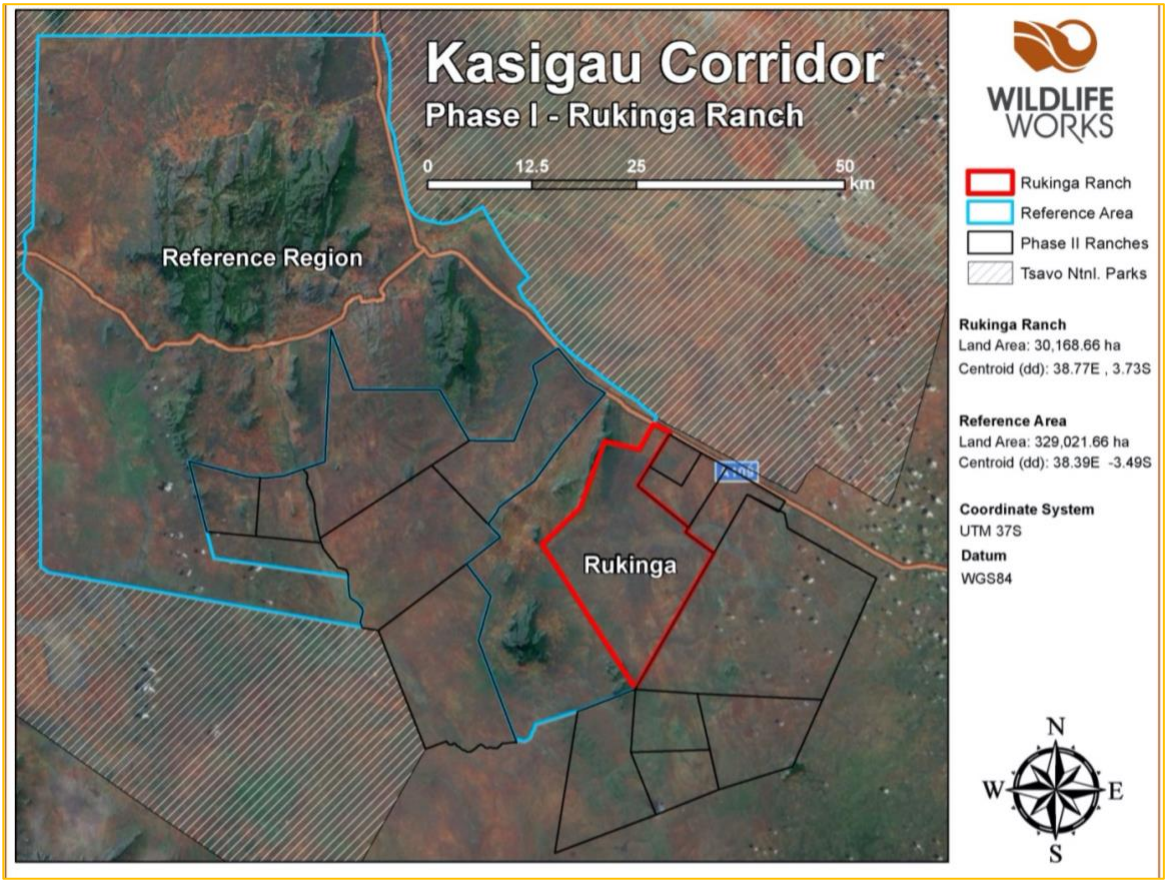


Figure 2: The Kasigau Corridor REDD Project Phase I – Rukinga Sanctuary Project Area and Reference Area Spatial Boundaries.

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.

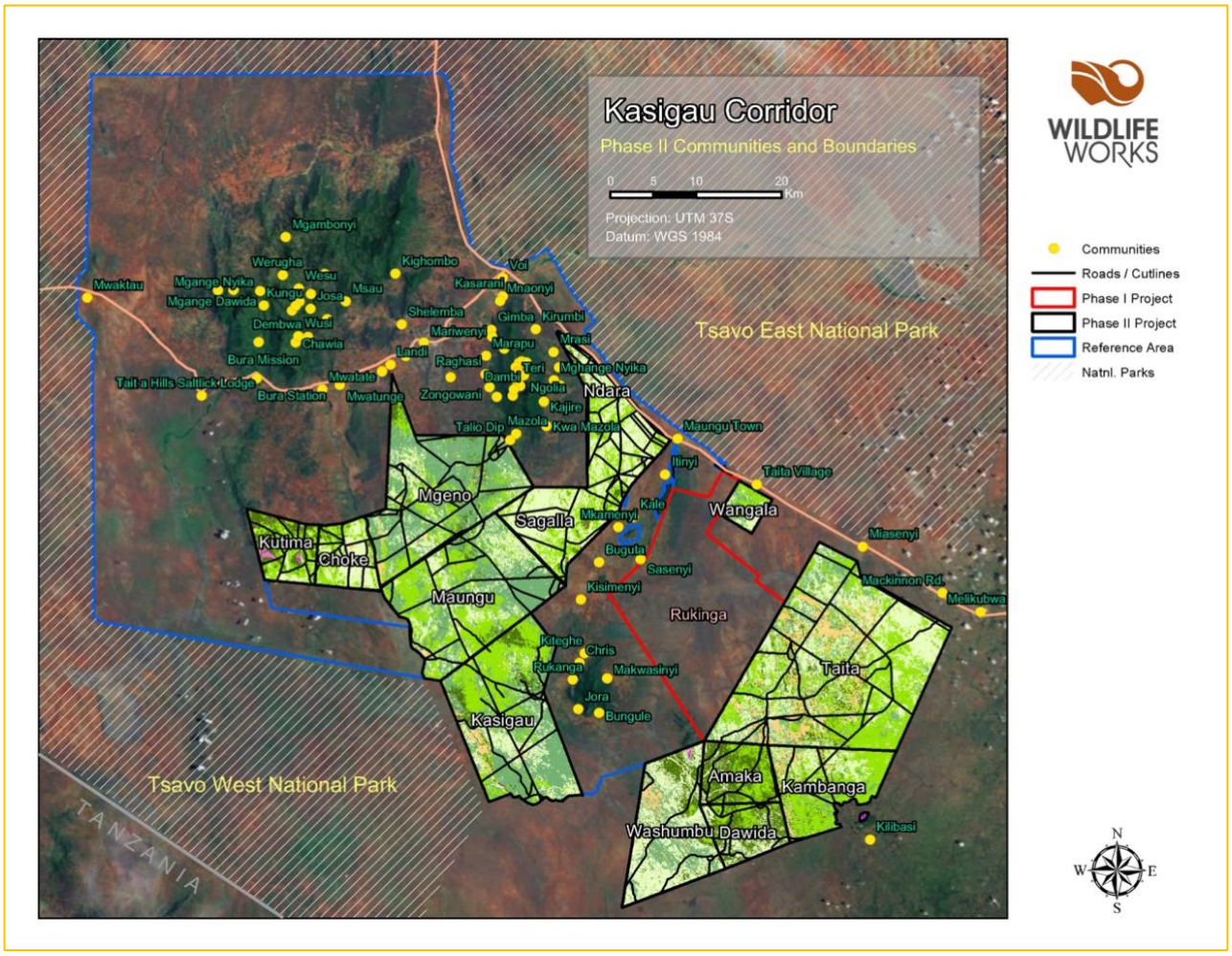


Figure 3: The Project Zone - Communities within the scope of influence of the Kasigau Corridor REDD Project Phase I – Rukinga Sanctuary Project Area.

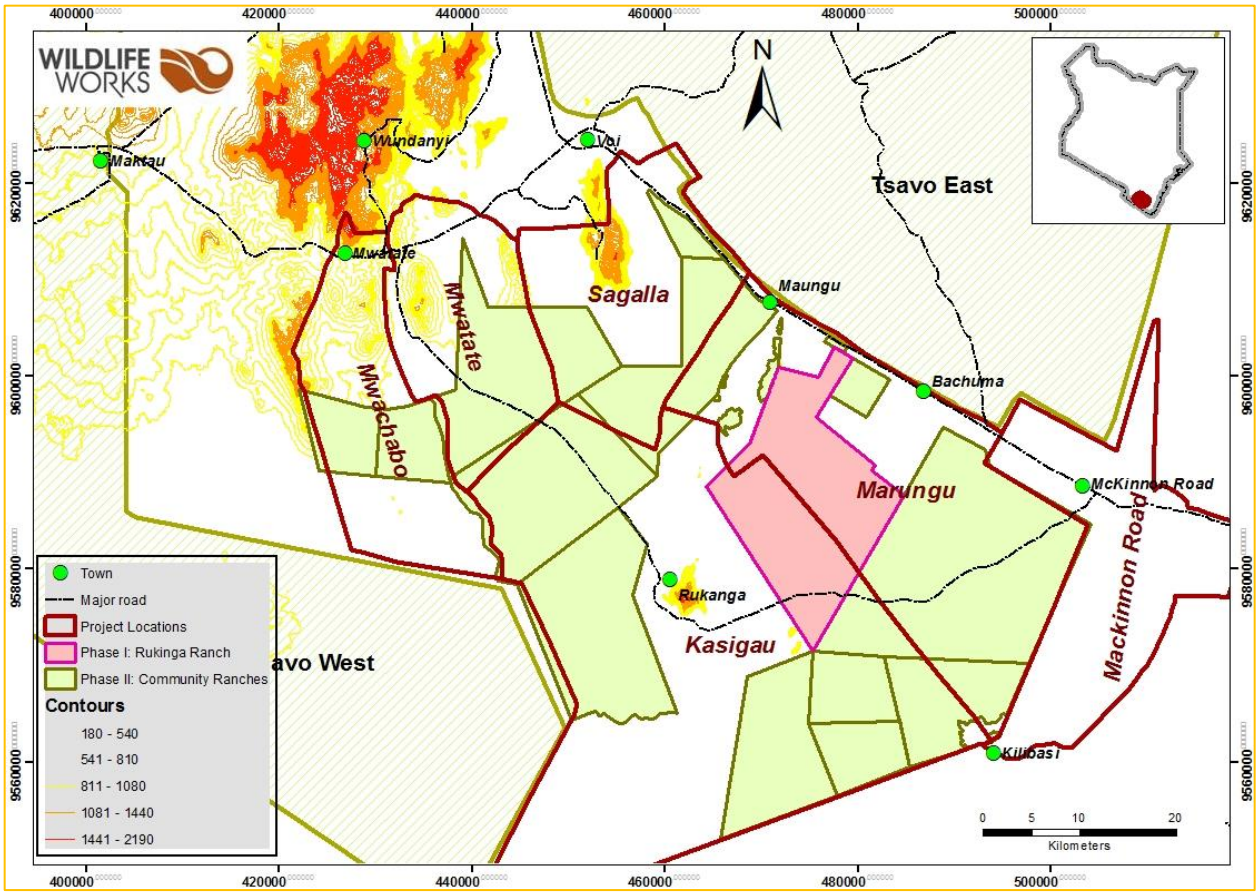


Figure 4: The six Locations in the Project Zone with which the project works with.

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 registered with, nor is it seeking registration with, any other GHG program. This is of course with the exception of possible nesting into a national or jurisdictional REDD+ Program. 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	CCB Verification M_5
24 August 2018	VCS Verification M_5
Officially opened in 2019 – Present	Ecotourism Projects: Kivuko Eco Camp in Taita
12 June 2020	CCB Verification M_6
12 June 2020	VCS Verification M_6

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_7, 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_Phasel - 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 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

[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

other global threat categories (e.g., Lion, Cheetah, African Elephant, and the Secretary Bird). 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, elephant poaching within KCRPI and around the Tsavo Conservation Area has been declining since 2015 and continued its downward trend for this reporting period (m_7). Wildlife Works has instituted several permanent initiatives to address the poaching problem:
    - Larger and better equipped ranger force: the KCRP ranger force has been increased to over 15 (about 10% women). In addition, we have maintained a large watchmen pool (currently 3) to free up rangers for wildlife security matters. Rangers maintain approximately 2 daily foot and car patrols from 1 outpost 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
    - Ranger Posts: All ranger posts are 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.
    - 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) moving bases as need be, mainly dealing with commercial elephant poaching issues.
    - Collaboration with other organizations: Lastly, whenever appropriate, Wildlife Works continues to engage like-minded organizations or individuals in undertaking critical research (e.g., Save The Elephants), bolstering conservation and fighting the poaching menace, including use of tracker dogs and additional air patrols. To this end, Wildlife Works has retained the second gyrocopter such that both can 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.

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 m_7 reporting period, a total of 225 seedlings were planted around the mountain in neighboring schools and farms in an effort to reforest the landscape and reduce pressure on montane forests. Sites planted included: Moi Boys High School, Jora Primary School, Rukanga Primary School, Kiteghe Primary School, Kasigau Girls Secondary School and Kasigau Church. 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. 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 is the "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.

[17] See <http://www.birdlife.org/extinction/pdfs/Taita_spp_Guardian_Action_Update.pdf>

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 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 June 1st to June 30th, 2021. 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. The methods used for the submission of the comments were Suggestion Boxes (8), and Community Meetings (2). More than half were requests, suggestions or opinions (55%), 35% being complaints or questions and a few (1.5%) seeking more information or clarification, mostly about Project implementation; the rest (8.5%) were compliments to the project. Most of the complaints or questions were about distribution of the community profit-share from the carbon revenues including bursary schemes, as well as process-related questions such as bursary application process, project selection and implementation, and human-wildlife conflicts. Wildlife Works' community outreach and security departments spent time explaining the structure of the WWCT and the negotiated distribution scheme during Chiefs' barazas. When necessary, issues were escalated to the relevant authority, such as KWS (for human-wildlife conflict) and the LCC's Bursary Committee for bursary-related issues. While these were discussed and any necessary changes made to the processes, it was noted that the rules were set and representatives were selected by the communities themselves and sometimes, Wildlife Works can only create awareness, advise and suggest ways of resolving these issues; ultimately, benefit sharing remains under the control of the project communities so they should remain actively engaged, especially in the election process.

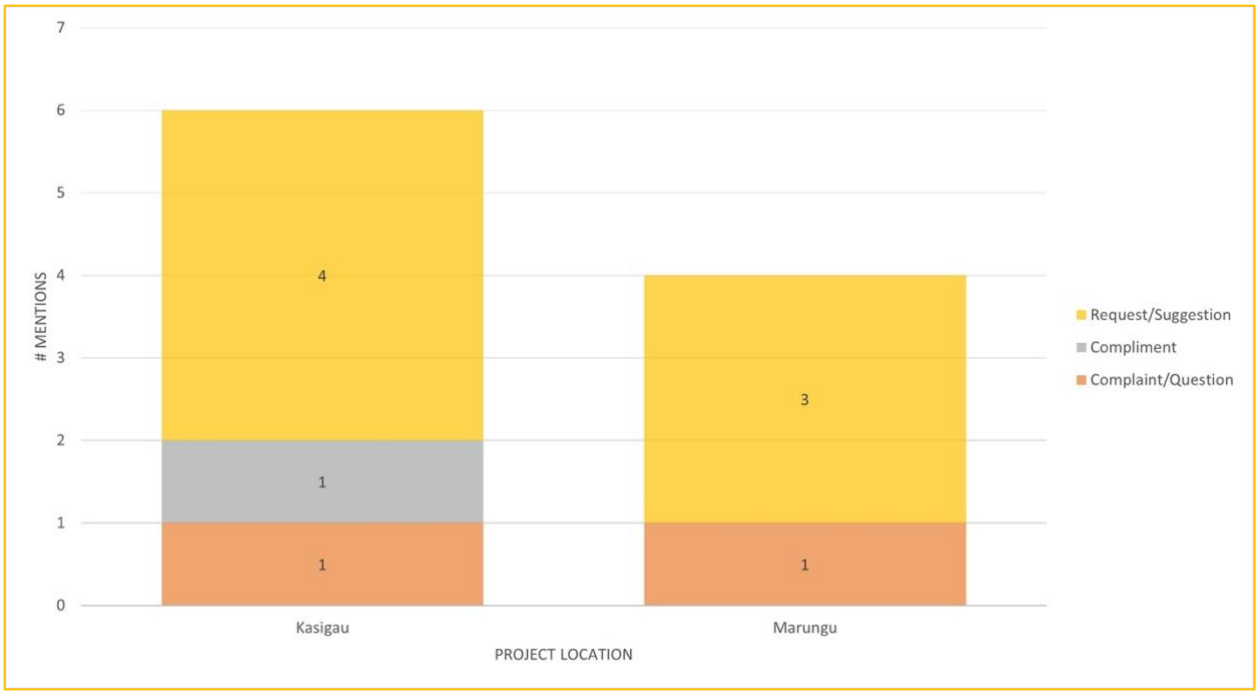


Figure 5: Categories of feedback collected through the different avenues across the six locations within the REDD+ Project zone during the 2020 (m_7) monitoring period

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

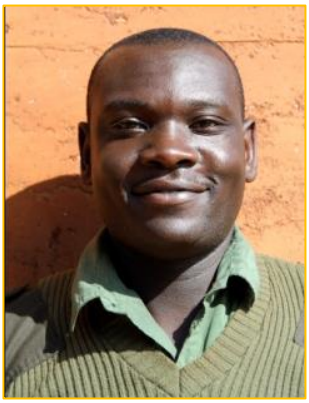


As Director of Biodiversity and Social Monitoring, Mwangi's main role is to formulate biodiversity and social monitoring plans, and lead research teams undertaking surveys and studies geared towards evaluating the impact of Wildlife Works' REDD+ programs in Africa. He has a Ph.D from the University of 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.

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 53 employees at the end of this monitoring period, of whom 29% were female, 99% are Kenyan and over 85% are local (i.e., from the Project Zone or Taita Taveta County). During this monitoring period, a total of 3 staff members were contracted with the project. All contracted staff members were hired directly from the local project area. No additional permanent staff members were hired during this monitoring period due to restrictions from the COVID-19 pandemic.

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 organisational 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 14 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.

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 and receive any new comments, requests, suggestions or grievances.

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 2020.
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 measurement methods and procedures applied:	N/A
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:	32,929

Justification of choice of data or description of measurement methods and procedures applied:	Used to define the area within which plots are established to measure any potential leakage from the Project Area.
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:	$\boldsymbol{t}$
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:	$\boldsymbol{w}$
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:	$\boldsymbol{x_i}$
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:	$\boldsymbol{x_{i,j\,k}}$
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_PhaseI- 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:	

3.1.2 Data and Parameters Monitored

Data Unit / Parameter:	ε
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 who 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 who 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 who 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 'Rukinga Carbon Model and NERs_M=7_v3.4.xlsm' 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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 v3.2_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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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* 'Rukinga Carbon Model and NERs_M=7_v3.4.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_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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 v2.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:	1,643,507.18
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:	173,999.57
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:	657,402.87
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:	$C_{BGNT}^{[m]}$
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:	69,599.83
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 [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:	51,964.64
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:	$C_{LDW}^{[m]}$
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:	12,192,477.26
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:	Equation [44]
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:	14,788,951.36
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Review of monitoring records
Purpose of data:	Calculation of baseline emissions
Calculation method:	Equation [62]
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:	320,213
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:	Value calculated using the procedures described in Section 13 of the VCS methodology VM0009 v1.1.
Description of measurement methods and procedures to be applied:	N/A
Frequency of monitoring/recording:	May be updated at every monitoring period.

Value applied:	88.76
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:	

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:	278,584

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 'Rukinga Carbon Model and NERs_M=7_v3.4.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:	$\hat{\sigma}_{SE,AGNT}$
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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 v2.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:	567,274.20
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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 'Rukinga Carbon Model and NERs_M=7_v3.4.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 v2.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 v2.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:	0.5064
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:	0.853
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 'Rukinga Carbon Model and NERs_M=7_v3.4.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:	$N_{P,k}$
Data unit:	Count
Description:	Total number of possible plots in stratum k.
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:	**Stratum Name** / **Total Number of Possible Plots** **ag active** 35,139.25 **dryland forest strata 1+2** 50,678.43 **dryland forest strata 3** 30,339.31 **dryland forest strata 4** 14,090.08 **dryland forest strata 5** 41,382.91 **dryland forest strata 6** 27,510.95 **grassland** 8,149.36 **montane forest** 700.30
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. ArcGIS software is used for area measurement of the Project Area and strata.
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 who possess GIS and remote sensing expertise.
Purpose of data:	Calculated with the Equation $N_{P,k} = \frac{a_k}{a_{plot}}$
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. ArcGIS 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 'Rukinga Carbon Model and NERs_M=7_v3.4.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_M7_v1.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_M7_v1.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:	9.5
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:	$U_{TOTAL}^{[m]}$
Data unit:	tCO_2e
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:	7.5
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 v2.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:	$x^{[m]}$
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. To accurately 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 6 below.

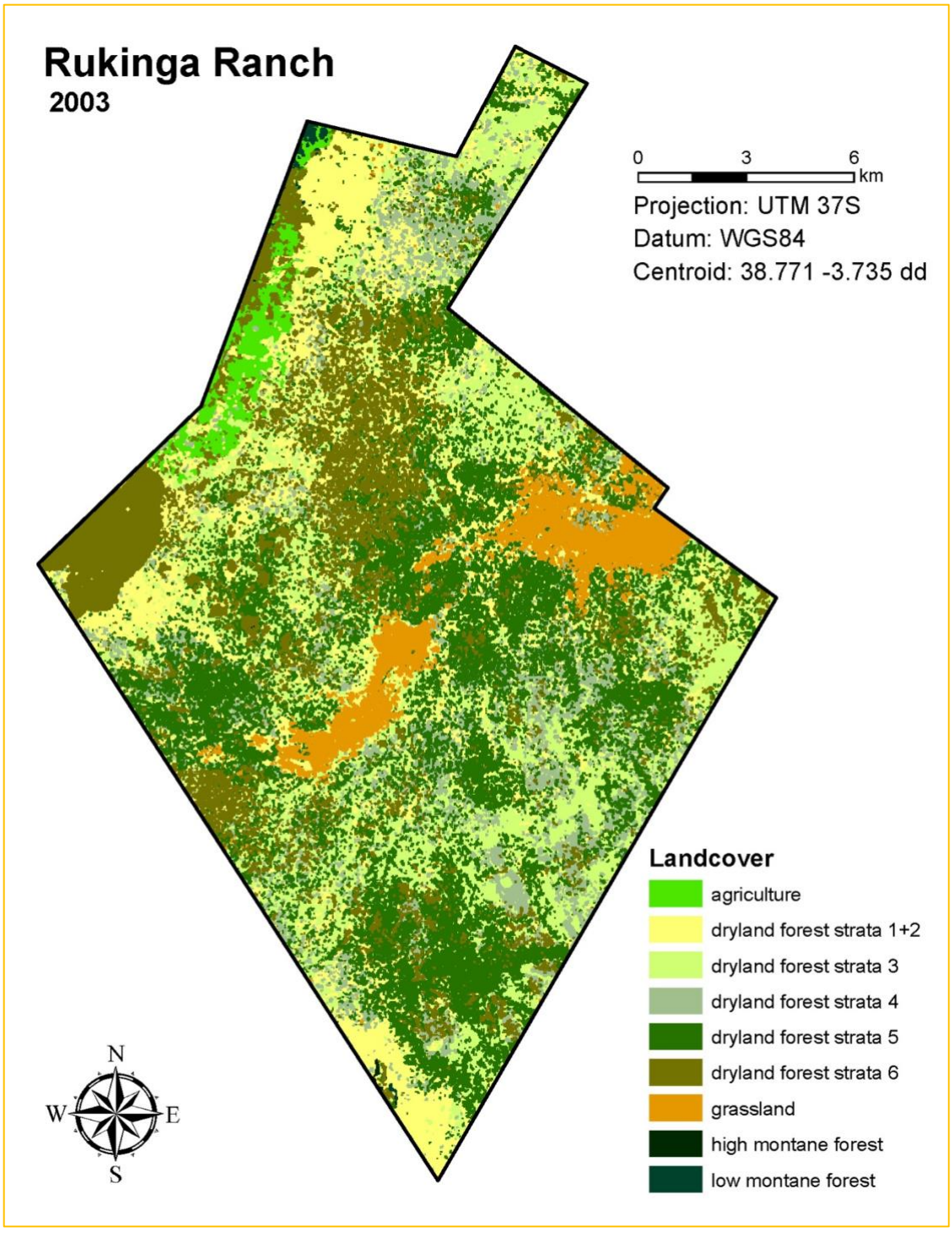


Figure 6: The Kasigau Corridor REDD+ Project Phase I – Rukinga Sanctuary landcover strata.

Biomass plot sampling was conducted throughout the monitoring period under the supervision of Wildlife Works' VP Carbon Development Jeremy Freund and Director of Regional Operations Jamie Hendriksen. 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.

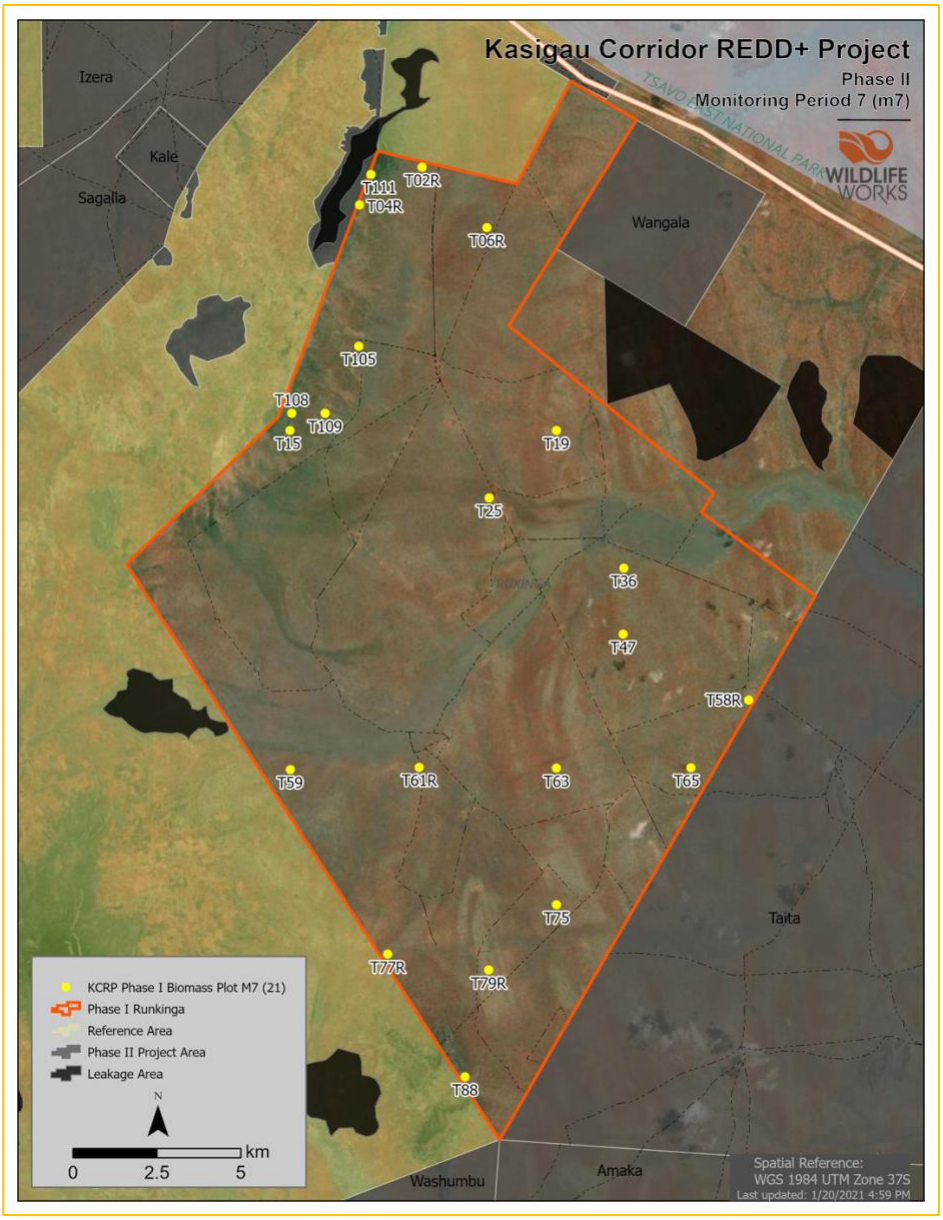


Figure 7: Biomass plots for M_7– 20% of the 429 permanent plots are measured for each year in the monitoring period.

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_7), 21 plots were measured across the Project Area (Figure 7).

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' Operations Manager, 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.

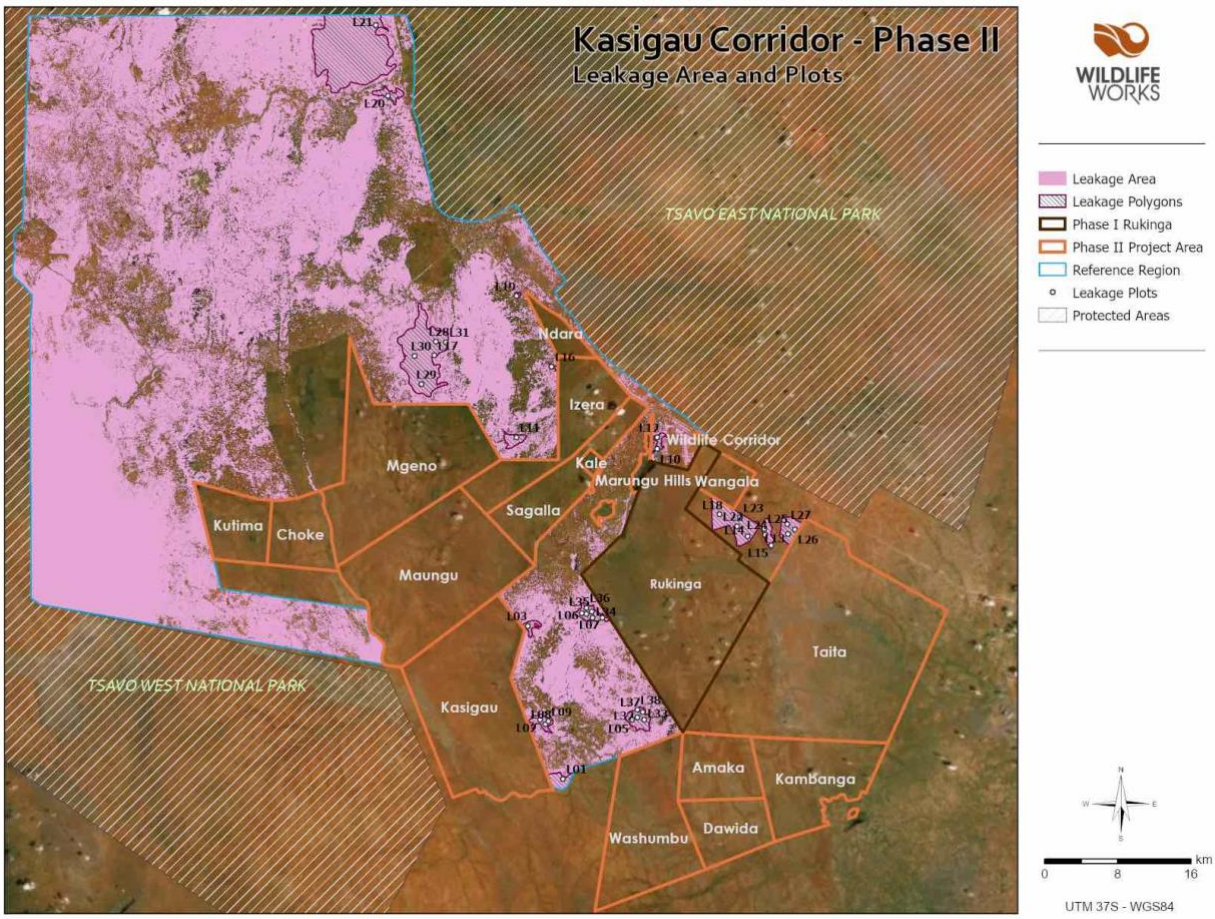


Figure 8: Leakage plot locations for KCRPI.

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 developed by Jeremy Freund, VP of Carbon Development. 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 VP of Carbon Development, 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 s 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 instructed 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 Landsat, MODIS, FEWS NET, 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 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 pilot sample of approximately 5 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_7) are calculated as follows:

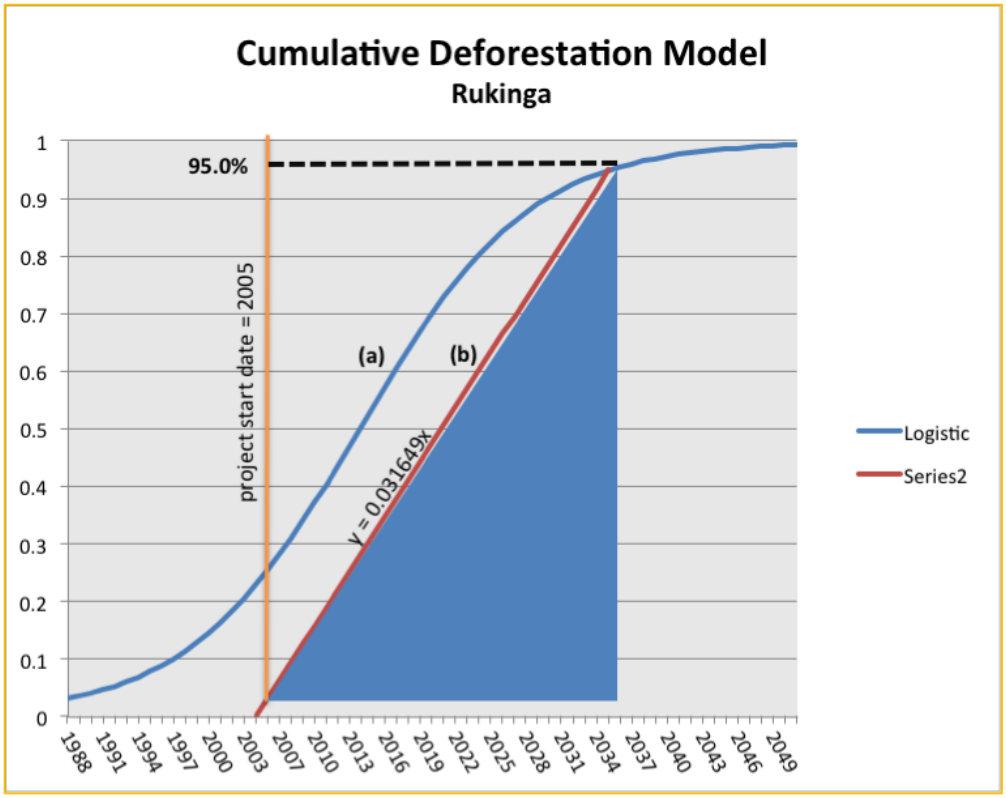


Figure 9: The cumulative deforestation model for Kasigau Corridor REDD+ Project Phase I Project Area.

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)	Total to date
Baseline deforestation %	11.1%	22.15%	25.32%	31.65%	41.14%	47.47%	50.64%	50.64%
Gross ERs (t CO_2e)	1,450,329	250,465	244,944	500,831	774,295	492,198	320,212	4,033,276
Buffer tonnes to VCS (t CO_2e)	290,066	37,570	36,742	75,125	100,658	63,986	41,628	461,519
Total ERs (t CO_2e)	1,160,263	212,895	208,202	425,706	744,707	428,212	278,584	3,571,754

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 10. 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 'Rukinga Carbon Model and NERs_M=7_v3.4.xlsm' to view the forest inventory data used for the following equations:

Current baseline emissions in above ground large trees $C_{BE,AGLT}^{[m]}$ 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:

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

Where;

$C_{BE,AGLT}^{[m]}$ = baseline emissions in above ground large 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] 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;

$C_{BE,AGLT}^{[m7]}$ = 851,523.70

$F_{DF}\left(t_2^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.50638501

$F_{DF}\left(t^{[m6]}, \hat{\eta}^{[m6]}\right)$ = 0.47473595

$C_{AGLT}^{[m7]}$ = 1,681,573.68

$C_{AGLT}^{[m6]}$ = 1,592,375.17

Current baseline emissions in above ground non trees $C_{BE,AGNT}^{[m]}$ 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;

$C_{BE,AGNT}^{[m7]}$ = 88,110.77

$F_{DF}\left(t_2^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.50638501

$F_{DF}\left(t^{[m6]}, \hat{\eta}^{[m6]}\right)$ = 0.47473595

$C_{AGNT}^{[m7]}$ = 173,999.57

$C_{AGNT}^{[m6]}$ = 169,807.71

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;

$C_{BE,BGLT}^{[m7]}$ = 339,936.78

p_{BGLT} = 1

$F_{DF}\left(t_2^{[m7]},\hat{\eta}^{[m7]}\right)$ = 0.50638501

$F_{DF}\left(t^{[m6]},\hat{\eta}^{[m6]}\right)$ = 0.47473595

$C_{BGLT}^{[m7]}$ = 671,301.02

$C_{BGLT}^{[m6]}$ = 635,370.40

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;

$C_{BE,BGNT}^{[m]}$ = 35,244.31

$F_{DF}\left(t_2^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.50638501

$F_{DF}\left(t^{[m6]}, \hat{\eta}^{[m6]}\right)$ = 0.47473595

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

$C_{BGNT}^{[6]}$ = 67,923.08

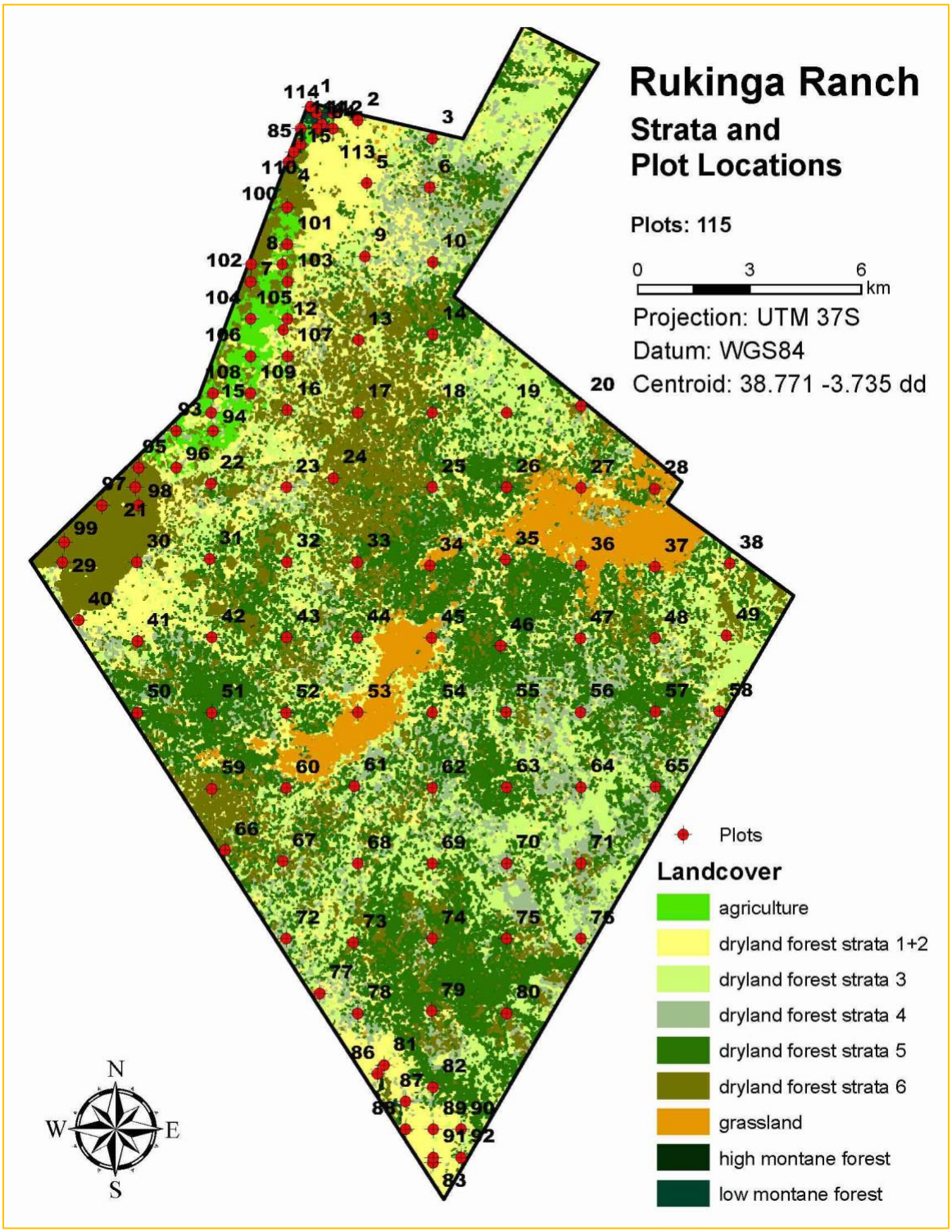


Figure 10: All Biomass sample plot locations in Kasigau Corridor REDD+ Project Phase I Project Area

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_7 within the KCRPI Project Area

Stratum	Area (ha)	Mean carbon stock (t CO_2e / ha)
ag active	706.52	125.81
dryland forest strata 1+2	6,858.93	58.96
dryland forest strata 3	5,622.92	93.87
dryland forest strata 4	2,766.58	100.35
dryland forest strata 5	8,125.52	99.96
dryland forest strata 6	4,324.29	104.92
grassland	1,600.12	16.07
montane forest	55.22	110.11
out	108.56	0.00
Total	**30,168.66**	88.76

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_7 monitoring period, in accordance with the monitoring plan. Please see Figure 11 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;

$C_{BE,SOIL}^{[m7]}$ = 175,847.53

$S\left(t_2^{[m-1]} - t_2^{[m-i-1]}, t_2^{[m]} - t_2^{[m-i]}, \hat{\lambda}, \hat{\ell}_{max}\right)$ = 123,248.019

t_i = 15

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

$\hat{\lambda}$ = 0.55

$F_{DF}\left(t_2^{[m7]}, \hat{\eta}^{[m7]}\right)$ = 0.50638501

$C_{SOIL}^{[m7-i]}$ = 12,192,477.26

$\mathcal{M}$ = 7

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

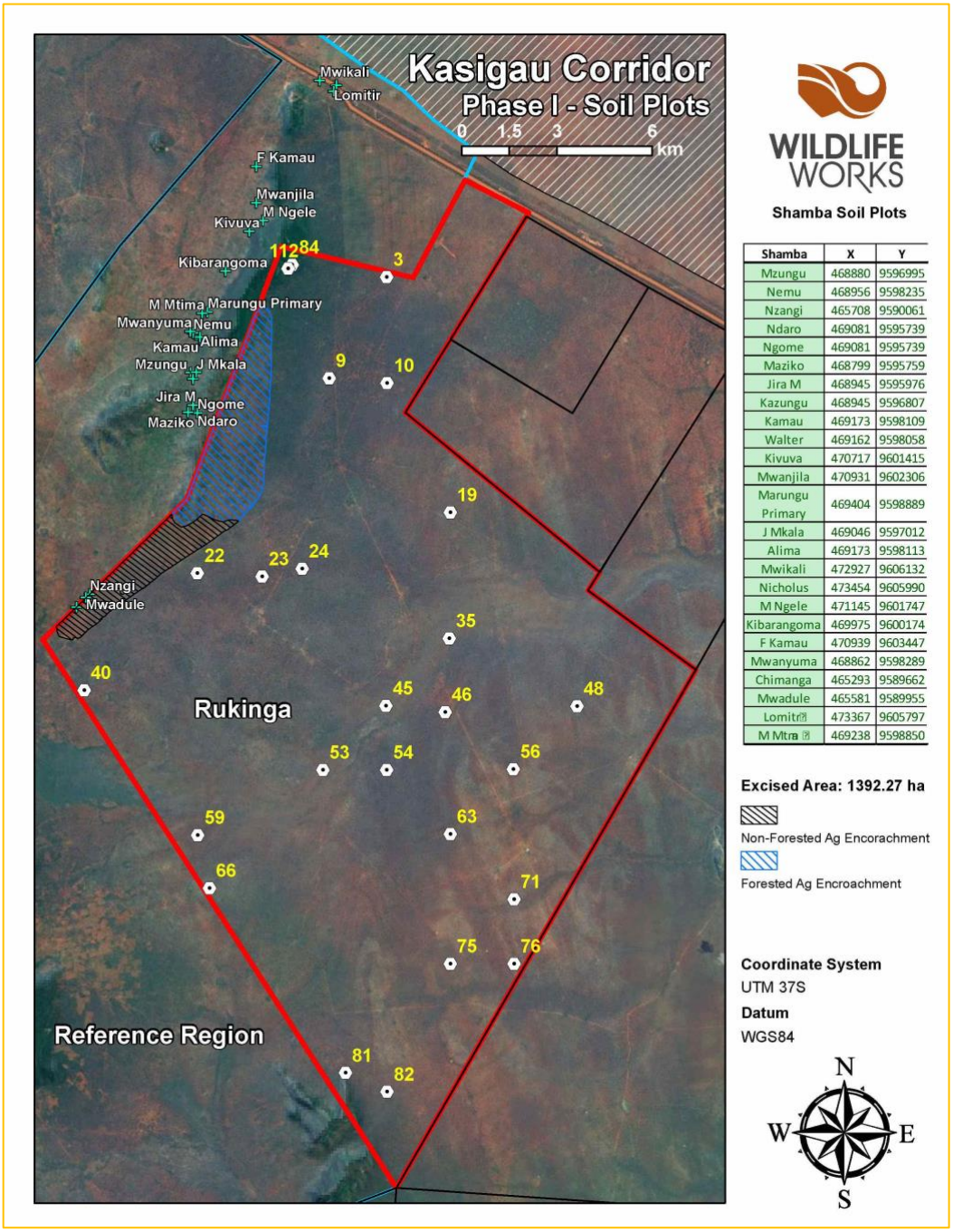
Where;

S = 123,248.019

t_i = 15

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 Mtma	469238	9598850

Figure 11: 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_7 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	407.37	18.9
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:

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

Where;

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

C=the set of all selected carbon pools

Where;

$C_{BE}^{[m]}$= 320,213

Where;

$$C_{BE}^{[m]} = cumulative\ GER^{[m7]} - cumulative\ GER^{[m6]}$$

Where;

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

$cumulative\ GER^{[m6]}$= 3,713,062.79

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_7 (t CO_2e)	Total Baseline Emissions over the Project lifetime (t CO_2e)
Aboveground and Belowground forest biomass (trees, shrubs, grasses)	1,314,816	2,465,279
Soils	2,718,460	5,180,301
Total	4,033,276	7,645,580
Average Annual Baseline Emissions for the Project Lifetime	**232,384**	

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;
- There 2 significant fire events in this monitoring period (M_7). When a significant fire event occurs, Wildlife Works is required to produce maps of the boundaries for the fire prior to the subsequent monitoring period, as stipulated in VM0009 v1.1. Please see section 3.2.2.1 for a description of these events and quantification of the emissions.
- 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_7).

3.2.2.1 Determination of emissions from fire events

During the summer of 2020 there were extremely dry conditions throughout southeast Kenya, leading to extensive and destructive wildfires. There was one wildfire inside of the Project Area during this period that had disturbed an area of 2,068.29 ha (>250 ha), which is considered a significant area (Figure 12). As a result of meeting this significance level, we then employed the comparison criteria, which is then used as the ultimate arbiter of significance.

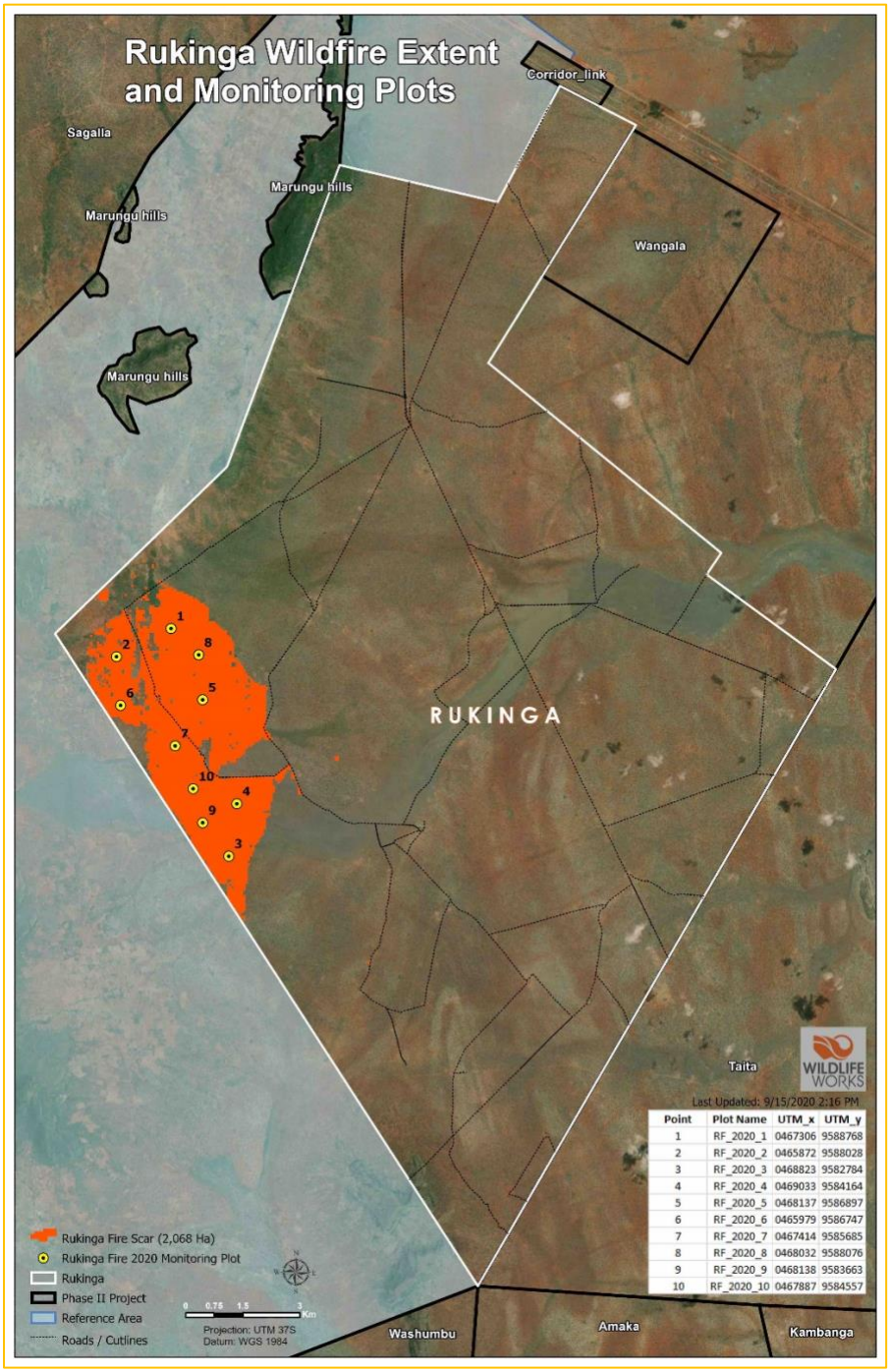


Figure 12: The extent of the wildfire inside of the KCRPI Project Area, and the location of forest sampling plots.

The general location of the burned areas were first identified by our field teams. As it is common for fire to burn quickly through the understory in this region, to denote areas of severe burn, the Landsat Normalized Burn Ratio index (https://www.usgs.gov/core-science-systems/nli/landsat/landsat-normalized-

burn-ratio) was applied to the region. Using natural classification breaks we delineated all index pixels greater than 0.17 as severe burned areas. The ensuing polygons were exported as shapefiles and used to identify the affected area. In order to determine whether there was a significant loss of carbon from this fire 10 new forest sampling plots were placed in the area, as shown in Figure 12. The measured carbon stock the fire area was then compared to the average carbon stock for the Project Area, weighted by the proportion of forest strata within the burned area. If the average carbon stock for the fire area is significantly lower than the weighted average for the project in which it is located, then it is determined that a significant emission even occurred and the emission must be quantified and deducted from the baseline emission reductions. The fire area will then be made into a new forest stratum in the project and the forest sampling plots located within the fire area will then be measured at each subsequent verification until it is determined that the carbon stock has returned to the pre-fire levels. If the carbon stock from in the fire area is not found to be significantly lower than the weighted average for the project in which it is located, then it will be determined that no significant emission occurred, and then no further action will be taken and the forest sample plots will be discarded.

Please see Table 7 for the results of the analysis of the fire area, including the measured carbon stock remaining after the fire, the Project Area carbon stock weighted average, and the total emission of CO2e that resulted from the fire. In this table, the difference between the pre- and post-fire carbon stocks is presented along with the 95% confidence interval for the Project Area weighted average carbon stock. It is seen that the difference between the pre-and post-fire carbon stocks is within the 95% confidence interval of the Project Area average weighted carbon stock; therefore, the observed carbon stock in the fire area is not significantly lower than that of the Project Area weighted average. Thus, it was determined that the fire event that occurred during the m7 monitoring period did not result in a significant emission of CO2e.

Table 7: The results of the comparison criteria

Ranch	Fire Area (ha)	Weighted Average Project Carbon Stock (t CO_2e / ha)	Fire Area Carbon Stock (t CO_2e / ha)	Carbon Stock Difference (t CO2e / ha)	95% Confidence Interval	Emission (t CO2e)
Rukinga	2,065.21	87.83	82.46	5.37	8.62	11,094.28

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:

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

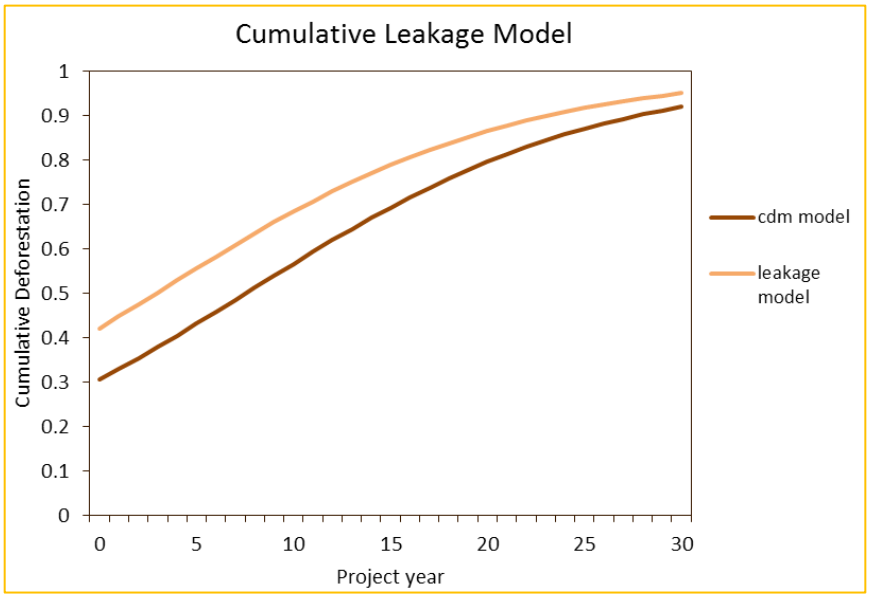


Figure 13: The cumulative deforestation model and leakage model for KCRPI.

For this 7th monitoring period, $\hat{\delta}_t$ is measured as the estimate of cumulative deforestation and degradation in the leakage plots:

$$\hat{\delta}_7 = 0.516$$

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

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

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

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

$$\hat{r}_{LE}^{[m7]} = 0\%$$

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;

$\hat{r}_{LE}^{[m7]}$ = 0

$\bar{o}^{[m7]}$=0.5157

$\bar{o}^{[7-1]}$ = 0.5157

x = 0.5157

$F_{LE}\left(t_2^{[m7]}, \hat{\eta}^{[m7]}, \hat{\delta}_{LE}\right)$ = 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]:

$$C_{LE}^{[m3]} = \hat{r}_{LE}^{[m7]} C_{BE}^{[m7]} = 0 \cdot 320{,}212 = 0$$

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_7 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_7) 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_7 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_7 monitoring period, KCRPI was not required to make a deduction for uncertainty. Please see Table 9 for results of this process and refer to both the file 'Rukinga Carbon Model and NERs_M=7_v3.4.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;

$U^{[m7]}$ = 9.5%

U_{DF}^{m7} = 5.9%

$C_{TOTAL}^{[m7]}$ = 14,788,951.36

$U_{TOTAL}^{[m7]}$ = 7.5%

$C_{SOIL}^{[m7]}$ = 12,192,477.26

U_{SCL}^{m7} = 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;

$C_U^{[m7]}$ = 0

$U^{[m7]}$ = 9.5%

$C_{BE}^{[m7]}$ = 320,213

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 8: KCRPI Buffer Account Allocation

Component	2020 Value (t CO2e)	Total Value (t CO2e)
Gross GHG emission reductions or removals (t CO_2e), M_7	320,212	320,212
Emissions from Leakage (t CO_2e), M_7	0	0
Project Emission (t CO2e), M7	0	0
ERs to VCS pooled buffer account (t CO_2e, (13%), M_7	41,628	41,628
VCS pooled buffer account return (t CO_2e), M_7	0	0
Total ER Issuance (t CO_2e), M_7	278,584	278,584

3.2.4.4 Quantifying Net Emission Reductions (CL1.1)

Based on the above factors, Table 9 shows the final quantification of KCRPI emission reductions.

Table 9: The baseline deforestation percentage, Baseline Emissions, Total Emission Reductions and VCS Buffer Pool contribution for the M_7 monitoring period for the Kasigau Corridor REDD+ Project Phase I

Component	Value (tCO_2e, unless otherwise indicated)
Baseline deforestation percentage (%), M_7	50.64
Project Emission, M_7	0
Project Reversal, M_7	0
Uncertainty Deduction, M_7	0
Emissions from Leakage, M_7	0
Baseline emissions, M_7	320,212
ERs to Buffer Pool, (13%), M_7	41,628
Buffer Pool Return, (15%), M7	0
Total emission reductions (ERs), M_7	**278,584**
Standard error of the total carbon stock, M_7	**567,274**
Total **Error (%), M_7**	**7.52**

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;

$C^{[m]}$ = 278,584

$C_{BE}^{[m7]}$ = 320,213

$C_{U}^{[m7]}$ = 0

$C_{PE}^{[m7]}$ = 0

$C_{LE}^{[m7]}$ = 0

buffer=41,628

Table 10 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 10: 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)
2020	**320,212**	0	0	**278,584**
Total	**320,212**	**0**	**0**	**278,584**

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 11: 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 and 2019) 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 14 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 14), 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.

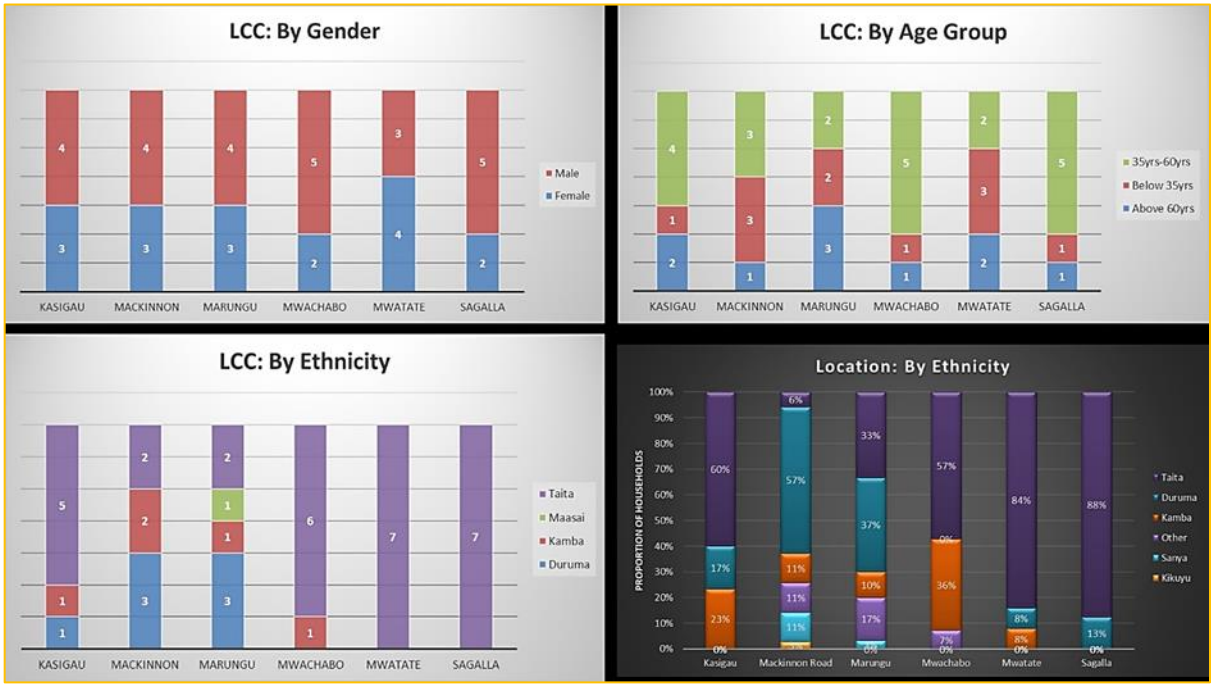


Figure 14. Composition of the previous Locational Carbon Committees (LCCs) in the six project Locations; also shown is the ethnic composition of the ethnic communities in the six Locations based on our household-level dataset.

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.

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 12).

Table 12: 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 15: 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 13 below shows details and results for M_7 for the indicators identified during the community SIA. As indicated in the section 4.1.1.1 and Figure 14, 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 13: M_7 Indicator results from the KCRPI community monitoring plan.

Focal Issue	Direct Result	#	Indicator description	Type	Lead	Results	Notes
Human-wildlife conflicts	Adequate vegetation and water	1	# water holes scooped within the Project Zone for wildlife and/or cattle	Output	Ops	1	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	0	
		3	# persons accessing new water sources	Outcome	WWCT	256	2 water-related projects in 2020 including storage tanks and harvesting
	Reduced encroachment and poaching	4	# rangers employed	Output	HR	17	Maintained an average of 91 rangers and 24 security guards during 2020
		5	# training courses held	Output	HR	1	General training for 54 staff on diverse

			for skills development				issues including HR policy, Financial literacy and COVID-19 awareness and guidelines
		6	# outposts established and operational	Output	Security	1	All ranger base posts are operational and received continuous improvement including water tanks and other amenities
		7	# patrols and/or distance travelled	Outcome	Security	216 walk and drive patrols from six base stations, covering 20827 km , 59 aerial patrol days/tracks covering 13799 km	In addition to regular foot and driving patrols, we maintained and increased the aerial surveillance using two resident gyrocopters
		8	# poachers and illegal charcoal producers arrested	Outcome	Security	7	Including wildlife poachers, transporters and

							pole/firewood harvesters
		9	# snares recovered	Outcome	Security	12	Predominantly medium but a few large snares
		10	# carcasses/injured animals recorded	Impact	Security	8	Mostly giraffe, elephant, zebra and dik dik
		11	# hectares deforested, excised or converted into farmland	Impact	RS/GIS	0	.
	Better wildlife containment	12	# and type of deterrents deployed	Output	Ops	1 metal-strip fence	This was previously deployed and was maintained (Sasenyi) during 2020
		13	# human-wildlife conflict encounters	Impact	Sec/BSMT	4	Based on ranger patrol data for 2020, mostly elephant-related crop damage
Education	Increased enrolment	14	# awareness meetings/events/activities on REDD+ and education matters in schools	Output	Community Liaison	6	In 2020, meetings were seriously impacted by the COVID-19 protocols and restrictions. Schools were out for

							most of the year
		15	# students supported by the WW bursary scheme	Output	WWCT	602 students	Partial scholarships were awarded to 601 students in 2020
		16	Amount of money spent on WW bursary scheme	Output	WWCT	KE 3,387,886	Approximately USD 30,757
		17	% students not in school due to lack of fees	Impact	BSMT	<1% primary level; 2% secondary; 1% tertiary	While fees were mostly footed by the households themselves, 28% said they had received support from Wildlife Works. In comparison, 17% of 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 of performance for partially

							supported students has started for students supported while on their final year of high school
	Better education infrastructure	19	# classrooms constructed or other school renovations	Output	Ops/WCT	2 schools	Community projects were severely affected by COVID-19 disruptions in 2020. However, after Q3, disbursement meetings for the community allocation were possible, enabling activities to start
		20	# and type of education infrastructure installed	Output	Ops/WCT	11 Schools	Including 1 that received furniture (desks and chairs), and 9 that received examination revision material
		21	# pupils using the	Outcome	Community Liaison	533	Including students and teachers

			infrastructure built				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	≈4,455	Mean monthly #: 2,896 indigenous and 1,545 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	≈645	About 2,250 seedlings planted annually in community sites, with approximately 30% survival in 1st year and 15% by 3rd year.
		24	% households obtaining fuelwood and other needs from the Project ranches	Impact	BSMT	≈3%	From the 2020 Household 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/BSMT	31	In 2020, there were 3 incidents of charcoal bags and 27 of charcoal kilns recorded
		26	# log heaps recorded	Outcome	Sec/BSMT	30	In 2020, there were 30 log heap incidents recorded
		27	# and diversity of wildlife in the Project ranches year-round	Impact	BSMT	Most HCVs	Apart from the African wild dog, all high conservation value species were recorded within the Project Area during the reporting period, including evidence of breeding from sightings of elephant calves, Grevy's zebra foals, cheetah and lion cubs

Governance	Good leadership	28	# and location of Notice Boards and Suggestion Boxes used for KCRPI purposes	Output	WWCT	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	44	2020 meetings were seriously impacted by the COVID-19 protocols and restrictions. with meetings taking place in Q1 and Q4. These included community (barazas) and various project committees' meetings
		30	# complaints or questions on project implementation and LCC's functioning filed and acted upon	Outcome	WWCT	10	Most were provided as feedback or suggestions during community meetings. All were responded to or resolved mainly through

							provision of additional information, clarifications and escalating to the relevant community body (LCC or CBO) for further action
		31	% community understanding link between environmental protection, REDD & livelihoods	Output	BSMT	32%	Most 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/WCT	0	
		33	Proportion of households with on-farm production for home use or sale	Impact	BSMT	0	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	Green house	1	Field (on-site) training visits to the Greenhouse were severely disrupted by COVID-19 restrictions in Kenya. In 2020, they involved a total of 21 community members from schools and various community groups
		35	# new/improved practices on farms	Output	Ops/BSMT	0	Testing various climate-smart agriculture and fence deterrent techniques on a pilot site at Sasenyi community neighbouring Rukinga Ranch

		36	# community (agri-business) greenhouses established	Outcome	Green house	1	Throughout the year, the four Women Groups (Sechu, Kulikila, Losario and Bungule) were provided with 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	53	There were 53 employees at the end of this monitoring period, of whom about 3 were contracted staff members, 29% were female, and 99% are Kenyan, with about 85% being local (i.e., from the

							Project Zone and or Taita Taveta County)
		38	# training courses/work shops held for skill/personal development	Output	HR	1	Trainings were greatly disrupted by COVID-19 restrictions in 2020. The sessions involved 54 staff members trained mostly on financial literacy and COVID-19 awareness
		39	total amount and sources of income earned by household	Impact	BSMT	<1,500 9%	These amounts reflect good/normal years based on proportion of the 175 respondents who answered this question during the 2020 Household Survey in the Project Zone, showing a growing percentage earning above

							10,000 compared to the long-term average.
		40	total amount and sources of income earned by household	Impact	BSMT	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 proportion of the 175 respondents who answered this question during the 2020 Household Survey in the Project Zone, showing a growing percentage earning above 10,000 compared to the long-term average.

4.3.2.1 Project Activity M_7 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_7 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: 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.
- 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 has 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 49-53 at KCRPI on average. At the end of 2020 (the M_7 reporting period), there were 53 employees in total, 2 in senior management positions (Figure 15), and 3 contracted staff members who were hired directly from the local communities. Of the 53, 29% are female and about 85% are from the local area (i.e., from either the Project Zone or the larger Taita Taveta

County). In 2020, 53 staff members attended various training courses, mainly on financial literacy and awareness on COVID-19 including Ministry of Health and WHO regulations and protocols.

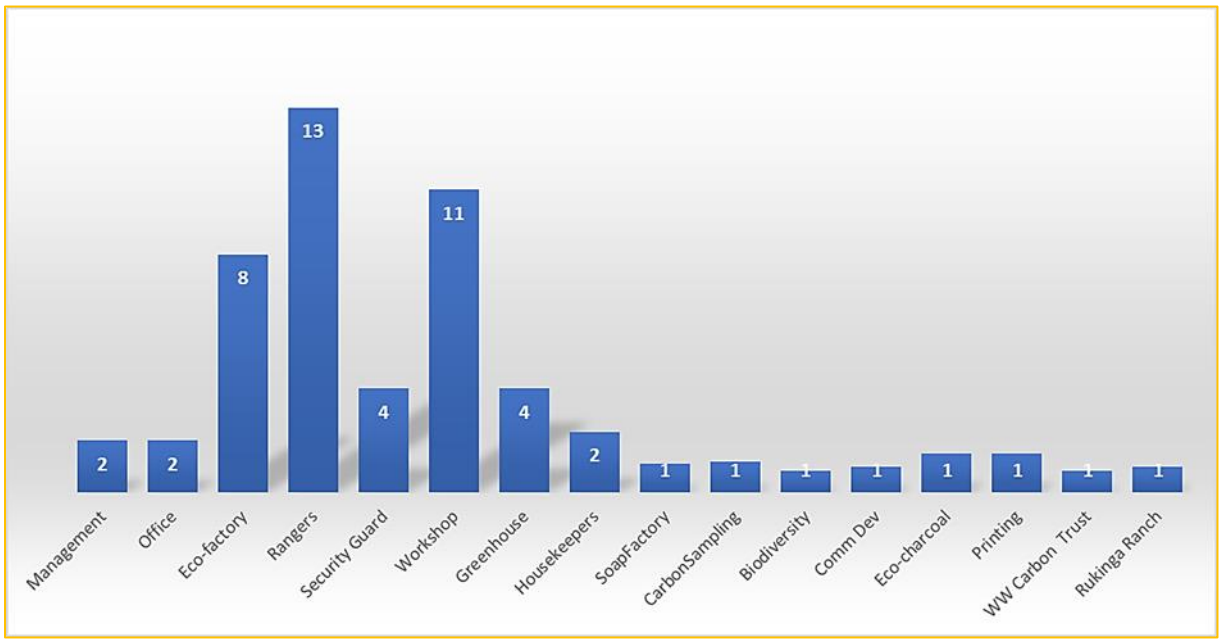


Figure 16: Wildlife Works' KCRPI employee statistics and trends at the end of the M_7 reporting period (2020) broken down by department

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 (2020) included the usual ones like school construction or renovation projects, bursary schemes, agri-business and water projects, as well as specific ones for helping control the spread of COVID-19. Aside from educational bursaries (see next section), a total of 49 Projects were commissioned during the reporting period, some which are ongoing but most having being completed during M_7 and handed over

or awaiting handing over (Table 14,

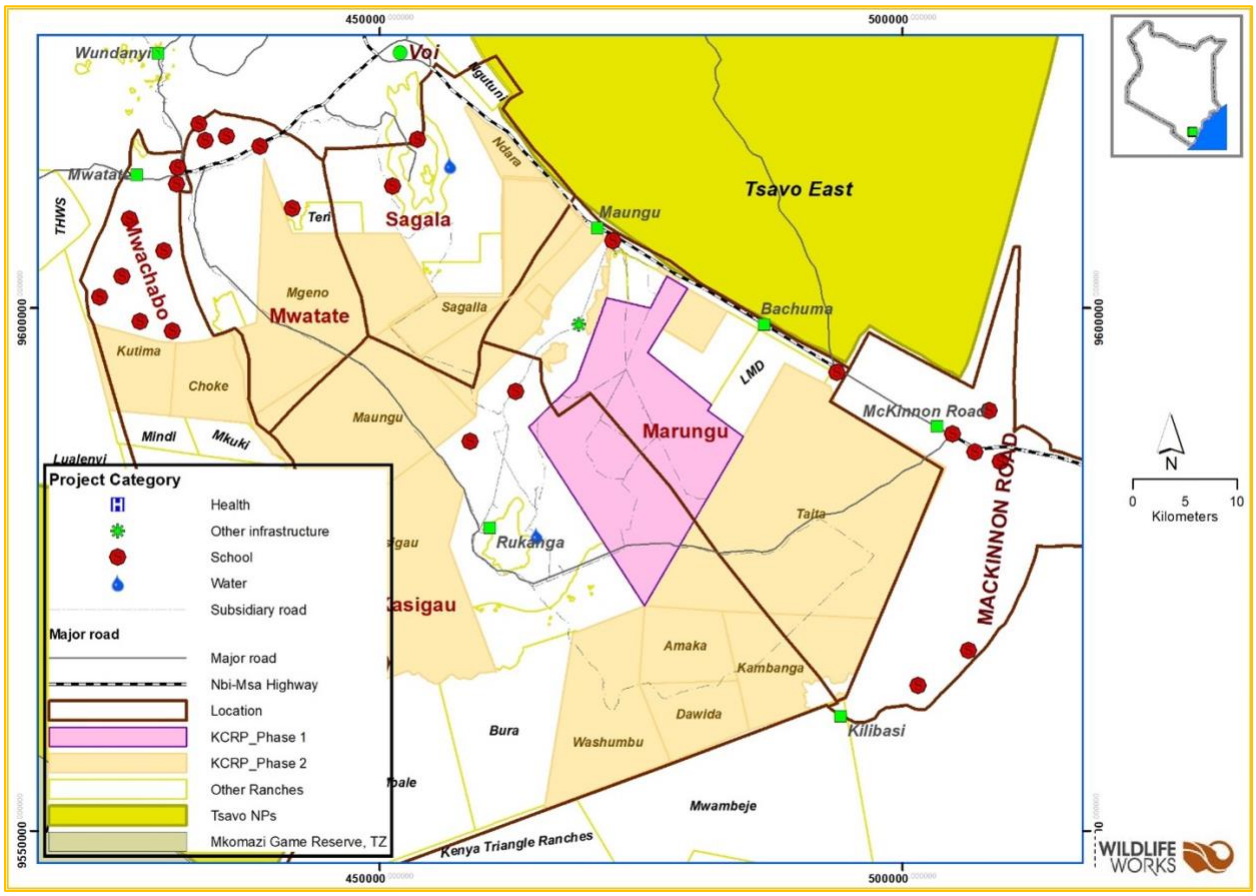


Figure 17). School projects have predominantly involved construction and repair of classrooms as well as furniture and equipment provision, whereas water projects entail improvements to collection and harvesting, including pipeline construction; other COVID-19 related activities were distribution of hand washing buckets, water tanks and liquid detergent and distribution of exams revision papers to final year students when learning was disrupted. The total cost for these projects was KES 5,691,946 (≈$USD 57,000).

Table 14: Description of the KCRPI projects initiated during the monitoring period (2020) by the LCCs through the Wildlife Works Carbon Trust and project partners

Location	Category	Sub-category	Start	End	Status	Cost	#Beneficiaries
Marungu	Health	Health & Sanitation	02-Apr-20		Completed	230,960	265
Kasigau	Health	Health & Sanitation	17-Apr-20		Completed	114,000	140

Location	Category	Sub-category	Start	End	Status	Cost	#Beneficiaries
Kasigau	School	Education	27-May-20	29-May-20	Completed	27,150	543
Marungu	School	Education	28-May-20	03-Jun-20	Completed	19,950	399
Marungu	Other infrastructure	Equipment	22-Nov-20	14-Dec-20	Completed	401,100	500
Marungu	School	Education	30-Oct-20			1,846,578	
Marungu	School	Renovation	26-Oct-20			4,041,118	

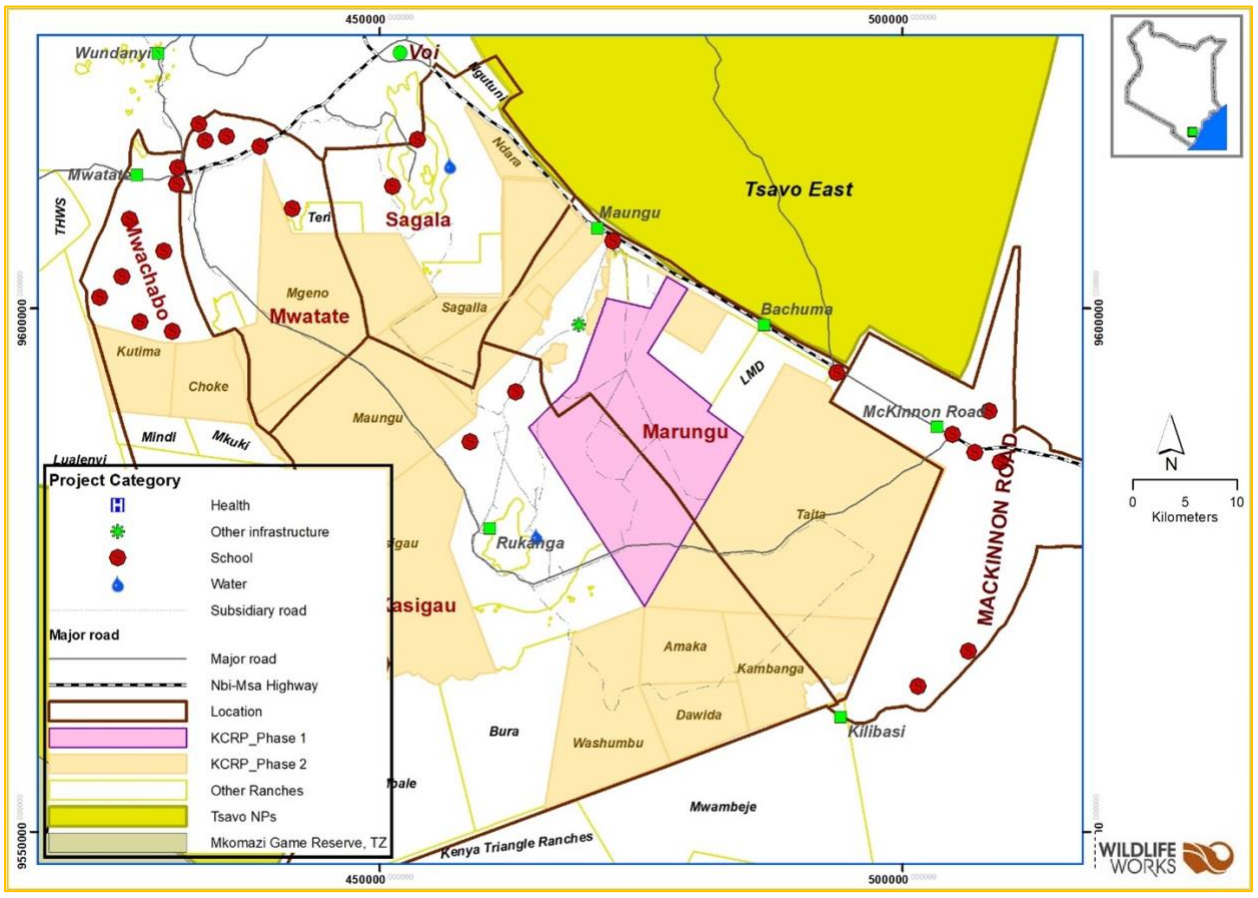


Figure 17: Distribution of the projects initiated through the WWCT during the reporting period 2020 for the KCRPI Project Zone.

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-favor of partial scholarships.

In the 2020 academic year, a total of 602 students received partial sponsorship through the Wildlife Works' bursary scheme, (Figure 18), of which about 51% were girls. The total cost of sponsoring these students during the M_7 reporting period was KES 3,387,886 (≈USD 30,743); (Figure 19).

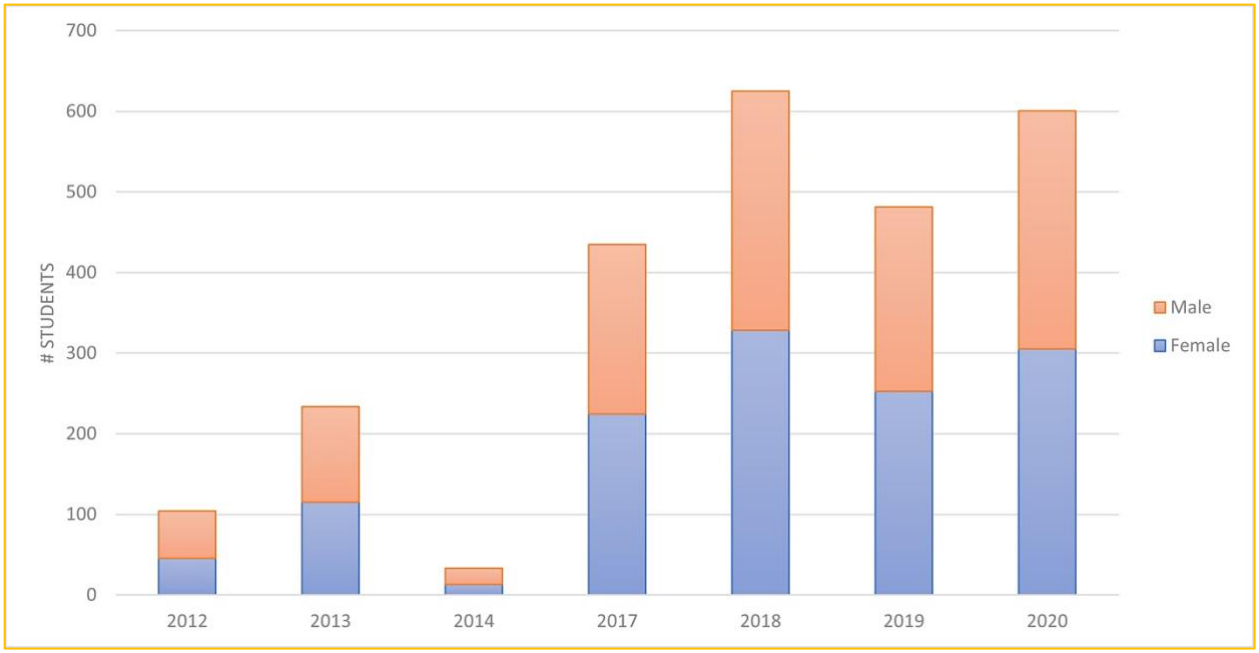


Figure 18: Total number of partially sponsored students (male and female) for the six Locations of KCRPI combined from 2012 to the current reporting period 2020.

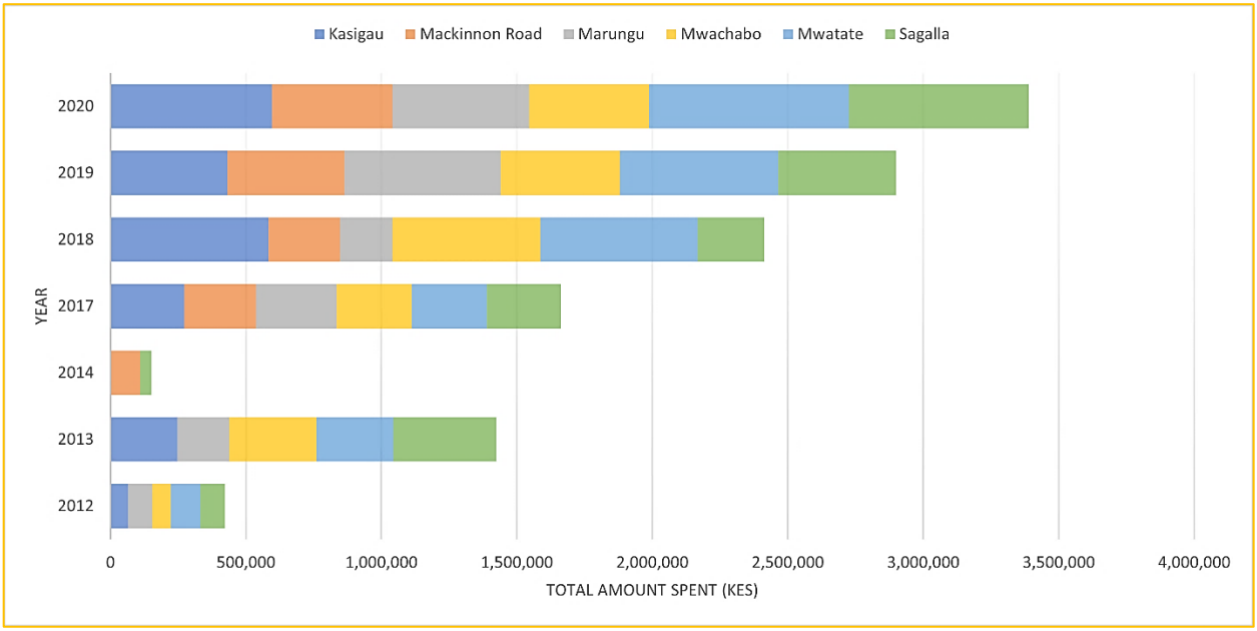


Figure 19: Total amount spent annually on partially sponsored students across KCRPI for each location including the current reporting period (2020) and back to 2012.

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: 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. During the current reporting period, a total of KES 1,039,385 (≈$USD 10,400) was spent on the CBOs across the six locations (Figure 20). 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.

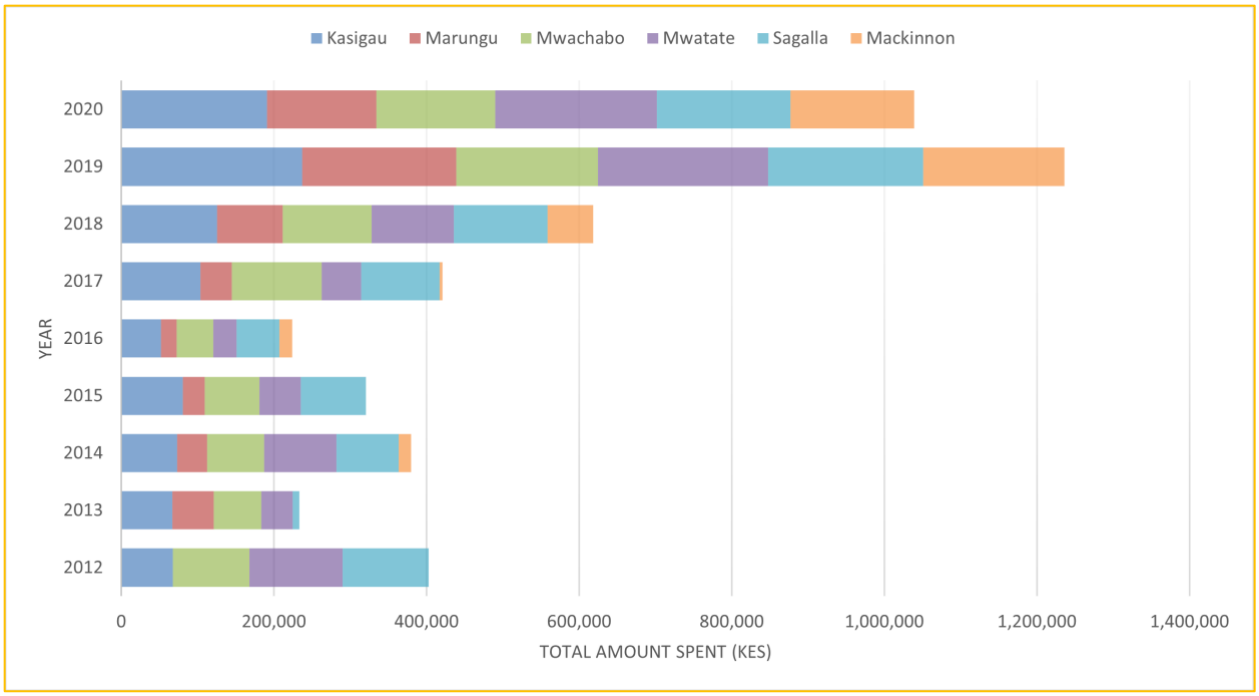


Figure 20: Total amount spent by the KCRPI on CBOs development and operations (recurrent expenditure) between 2012 and the current monitoring period, 2020.

Stakeholder Engagement and Community Meetings

During 2020, meetings were seriously impacted by the COVID-19 protocols and restrictions. Schools were out for most of the year, but community meetings were allowed after Q3 with various restrictions to adhere to the Ministry of Health protocols. During the reporting period, 44 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 (Fig. 17). A cumulative total of almost 1,242 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 theatre (films, short plays and skits), games and game drives. 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.

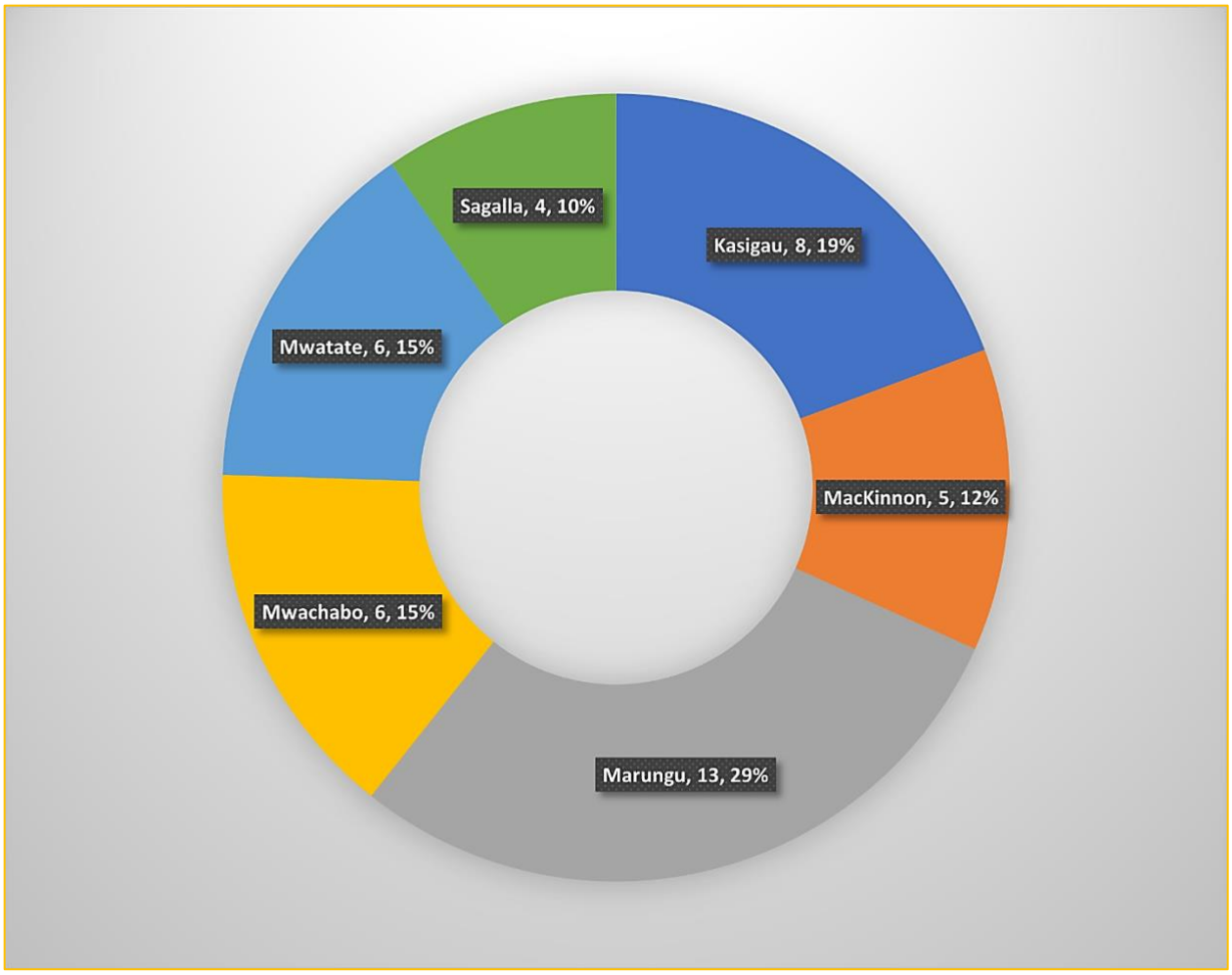


Figure 21: Distribution community meetings held during the reporting period, 2020, disaggregated by Location

During the reporting period, a total of 6 awareness meetings were also held in local schools, involving a cumulative total of about 851 students. Of these meetings, about a third (65%) were in primary-level schools, the rest being in secondary schools. Most were interacting with Environmental Clubs (3) or entire classes/school (2). Most of the engagement involved interactive discussions (question-and-answer), while the rest were demonstrations and education tours and game drives. Content-wise, most involved planning and discussions about activities that the clubs could undertake towards conservation, whilst others were general climate change and REDD+ discussions; the balance were a mix of tree-planting demonstrations, motivational talks including career choices and health-related matters.

Finally, Landowners' Meetings were equally affected by COVID-19 related restrictions on travels and congregations during the reporting period, where only 2 meetings were held in-person in 2020 involvinng the Rukinga Ranch shareholders. These meetings largely addressed the international carbon markets' outlook and sales projections in conjunction with the financial position of the company, the upcoming KCRPI verification, issues around the National REDD+ process, policy and nesting and how it may impact KCRPI, 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 remained steady during the 2020 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 22). The greenhouse team responsible for implementing and managing both components has grown to 24 staff members at the end of the 2020 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, although these have been hampered by lockdowns and associated COVID-19 disruptions. Lastly, throughout the year, the four Women Groups with community greenhouses (Sechu, Kulikila, Losario and Bungule) were provided with follow-up support from the Wildlife Works' Greenhouse and Community Outreach Departments, mainly on planting and care of vegetables and seedlings, but also on group organization, dynamics and financial management.



Figure 22: Aerial photo of the Greenhouse area showing the two agriculture greenhouses and production demonstration area on right, the tree nursery greenhouses in the middle section and out-planted jojoba experiment area at the middle-to-top of the image.



Figure 23: The recent picture of Lusario community greenhouse as an illustration of the basic set up and production process of the community greenhouses that are mirrored on the demonstration site at Wildlife Works (Figure 18 above)

- *Indigenous seedling purchase*: Wildlife Works runs a Greenhouse tree planting program 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. Both our seedling purchase and out

planting were disrupted in 2020 by a prolonged dry spell in addition to COVID-19 restrictions on movement, with most activities only happening in Q1 (before pandemic) and Q4 (after some rains). During this monitoring period, a total of 5,122 seedlings were bought from 13 individuals and groups within the community for a total of KES 71,210 (≈$USD 626).

- *Indigenous trees in nursery*: Of the indigenous trees bought from the community and nurtured at the Wildlife Works' greenhouse, the five most common species are *Vachellia robusta, Gardenia volkensii, Vachellia nilotica, Terminalia prunoides* and *Sclerocarya birrea* (Figure 24). On average, there were around 2,905 indigenous trees in the Greenhouse nursery every month, though this varied based on out-planting seasons and purchasing times (Figure 25).

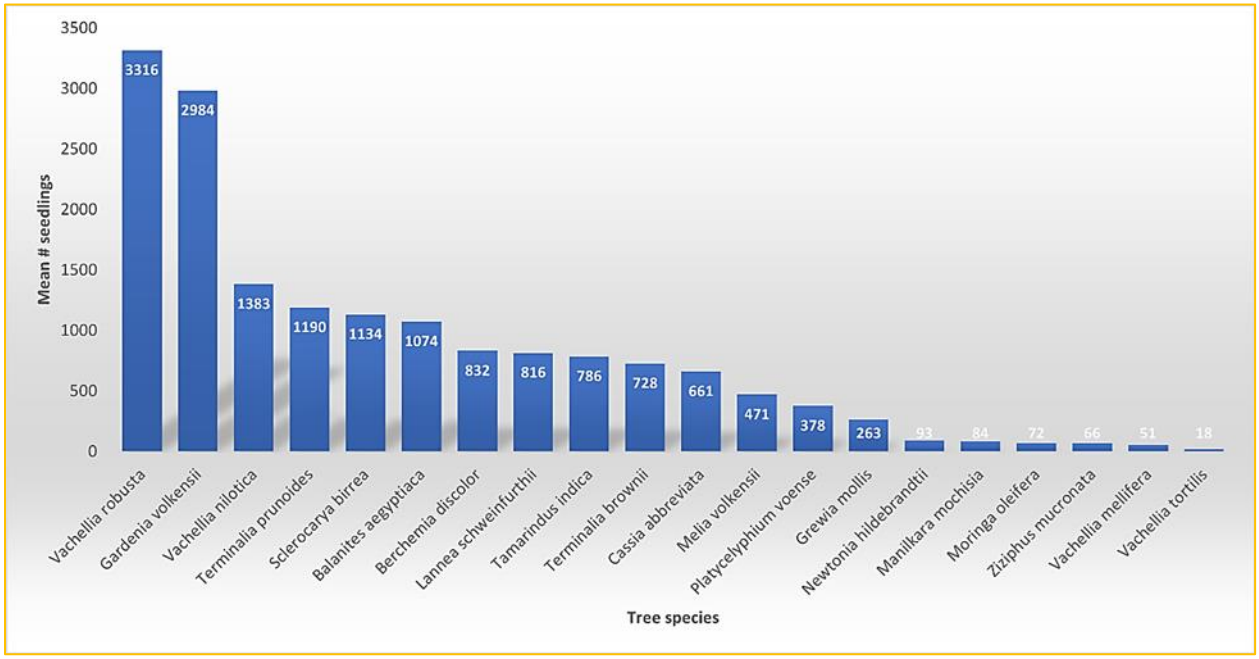


Figure 24: Mean monthly tally of top-20 commonest indigenous tree seedlings at the Wildlife Works' tree nursery during the 2020 reporting period

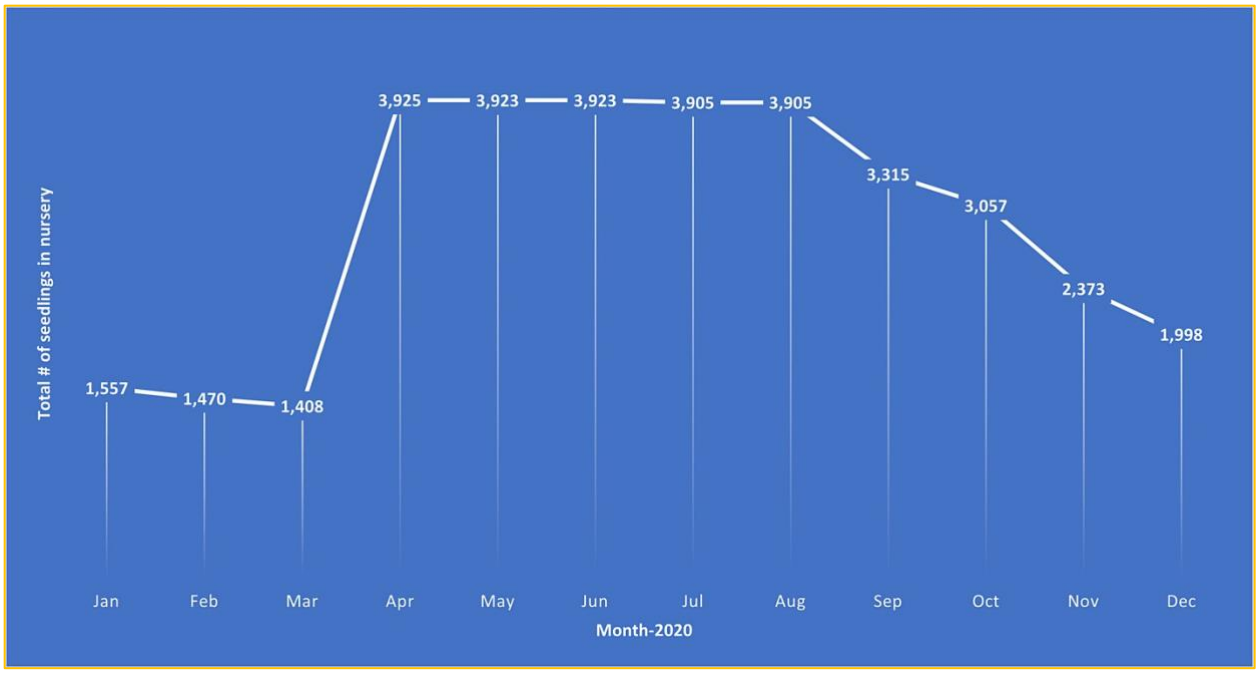


Figure 25: Total number of indigenous tree seedlings at the Wildlife Works' tree nursery each month during the reporting period, 2020

- *Fruit trees in nursery*: Of the fruit trees grafted and nurtured at the Wildlife Works' greenhouse, the Mango and Avocado root stocks, followed by Apple Mango, Valencia Late and Minneola citrus were the most common plants (Figure 26). On average, there were around 1,550 fruit tree seedlings in the nursery at any one time, though this varies based on sales and season (Figure 27).

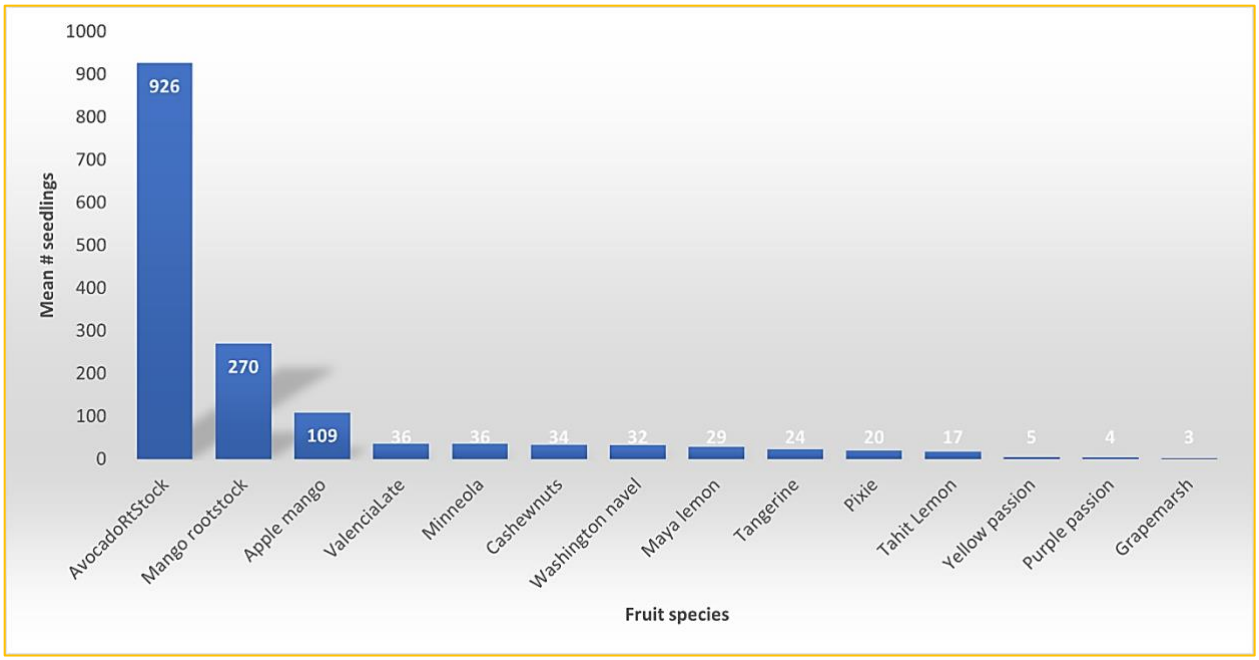


Figure 26: Mean monthly tally of fruit tree seedlings at the Wildlife Works' tree nursery during the 2020 (M_7) reporting period.

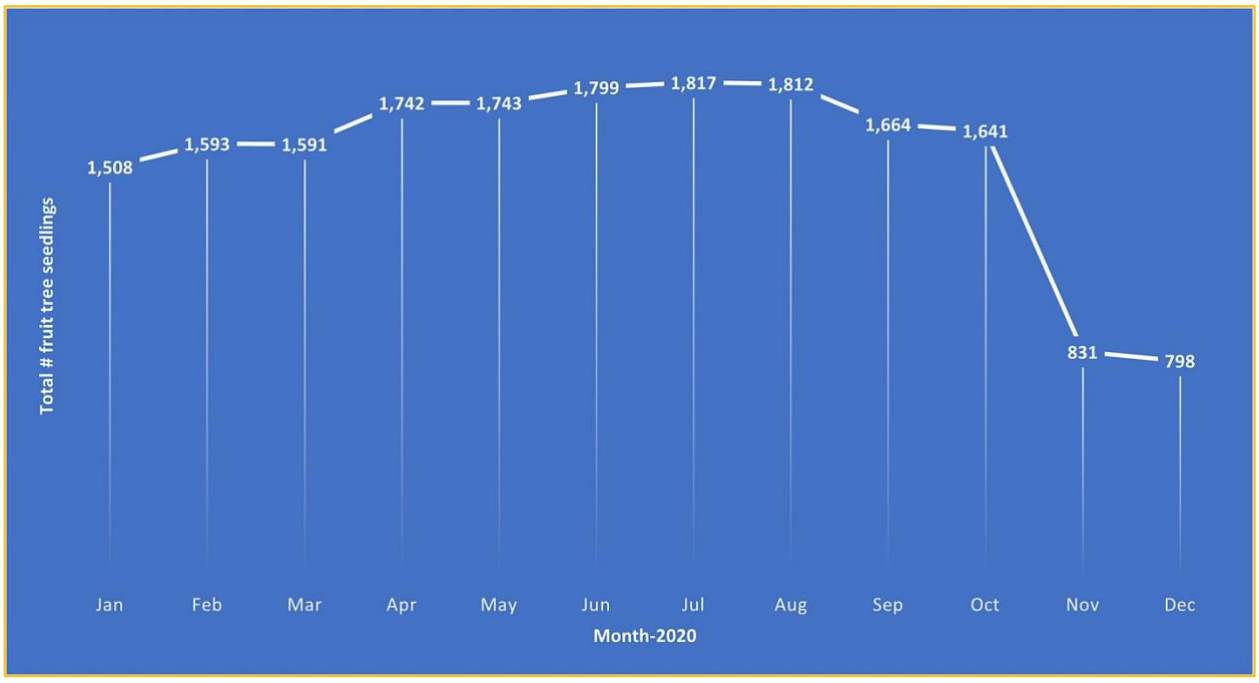


Figure 27: Total number of fruit tree seedlings at the Wildlife Works' tree nursery each month in the reporting period, 2020.

- *Out-planting and monitoring*: during the reporting period, a total of 2,207 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*: No visits were organized to the Greenhouse since COVID-19 travel and congregation protocols were enforced in Kenya between April and October 2020. However, visits resumed in Q4-2020. During the reporting period, eight visits were made to Wildlife Works' Greenhouse comprising 21 individuals for outreach, training or information purposes. The visitors mainly comprised youth and community groups (Table 15). 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 15: Number and identity of visitors to Wildlife Works' Greenhouses during the reporting period, 2020

Date	Group/Institution name	Category	# Visitors
24-Jan-20	St.Peters' primary school	Students	15
24-Jan-20	Dighende Khambiri	Women group	17

- *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 22). 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 308 seedlings were planted around the mountain in neighboring schools, institutions and private farms to reforest the landscape and also to reduce pressure on the trees on the mountain. Besides individual farms, other sites planted included: Moi Boys High School, Jora Primary School, Ngambenyi Primary School, Rukanga Primary School, Kiteghe Primary School, Buguta Primary School, Kasigau Girls Secondary School, Kasigau Church and Buguta Catholic Church.

- *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 2020, the mechanized briquette press was sourced for producing smaller pillow-shaped briquettes (Figure 28), in addition to an improved kiln, grinder and mixer, which will enable scaling up production to semi-commercial status.



Figure 28: Clockwise L-R: The mechanized briquette press, manual press, eco-charcoal briquettes, improved kiln, grinder and mixer acquired during the M_7 monitoring period

- *Ecotourism Projects*: Wildlife Works continues to support management of Kivuli Camp, and development of Satao Camp at Kivuko on Taita Ranch. Although severely affected by travel restrictions due to the COVID-19 outbreak in 2020, 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 is supporting Rukinga Wildlife Sanctuary's application to formally receive conservancy status.
- *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-2020, though disrupted by school closure due to

the Coronavirus pandemic, health education through our girl-child program that targets girls from vulnerable families held 3 sexual health and sanitation training sessions for 153 girls on sexual health, sanitation and drug abuse in various schools within KCRPI. Additionally, 375 re-usable sanitary pads and girls' underwear were distributed to the session attendees.

- *Community Wildlife Scouts*: Wildlife Works maintains a community-based wildlife monitoring scheme, currently expanded to 3 areas within KCRPI: Makwasinyi; Sasenyi; and Kale/Buguta/Mkamenyi/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.
- *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 2020, 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 organization, Hadithi, now provides marketing and sales support to 7 craft groups, comprising over 226 members, mostly women. During the COVID-19 caused business disruption, Hadithi also sought alternate relief funding of about USD10,000 to support these groups before normal business resumes. 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, 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 million 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 2020. Besides sales, Hadithi has expanded to providing training. In 2020, basket weaving trainings were provided to seven 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 four 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). Lastly, Wildlife Works continues to maintain and run 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; about ¼ (25%) of all incidents recorded during the reporting period were originally detected from an aerial patrol.
- *REDD+ Carbon Inventory Monitoring*: As per VM0009 and the VCS Project Description (PD), 20% of the 115 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 the fifth monitoring period (m_5). 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 May 2019 where results from the 2018 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 2021, where data from the 2020 Household Survey will 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_7 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.

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.

[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.

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 employed 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

Indicators are extracted from the Biodiversity Impact Assessment indicators and monitoring plan (see Section 4.3.2, Table 13) 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 13) 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.

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 13 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

[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

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 2020 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_7 reporting period, three transect sampling sessions were conducted S26 in March, S27 in July and S28 in October (Figure 29). 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 29). During this 2020 monitoring period, the most common species encountered were Kirk's Dikdik and the unstriped squirrel (Figure 30).

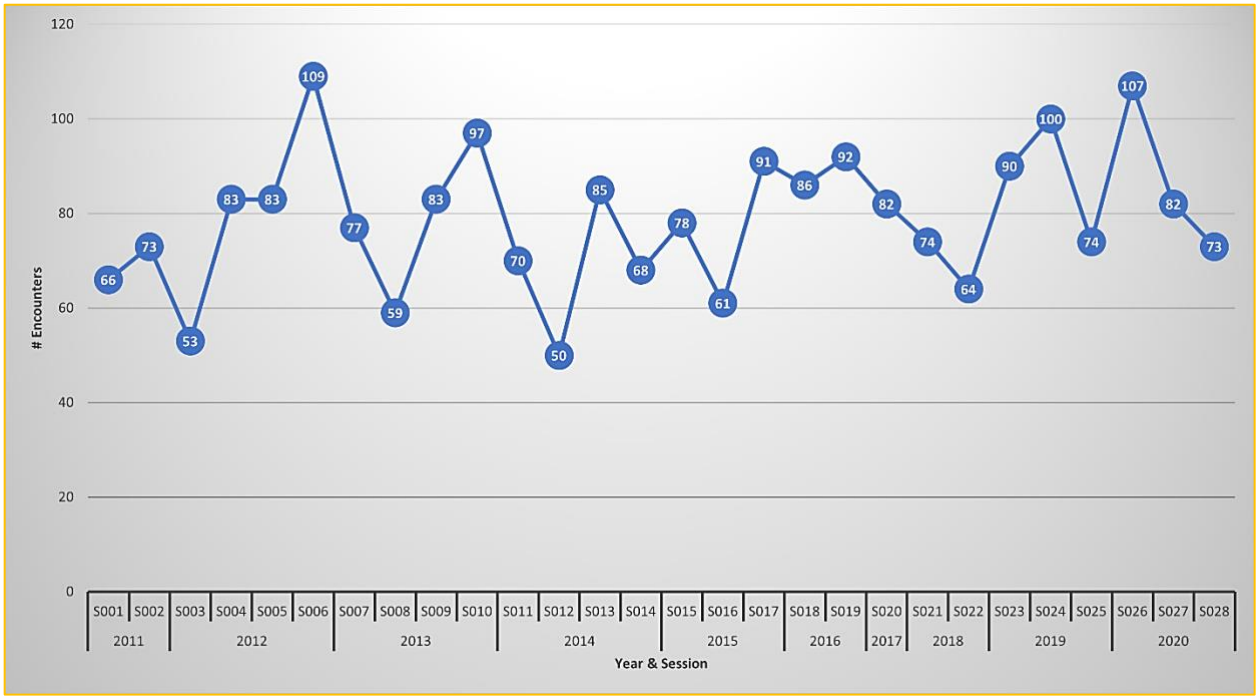


Figure 29: Total number of wildlife encounters recorded on the 28-permanent road transects across KCRPI since the project start date.

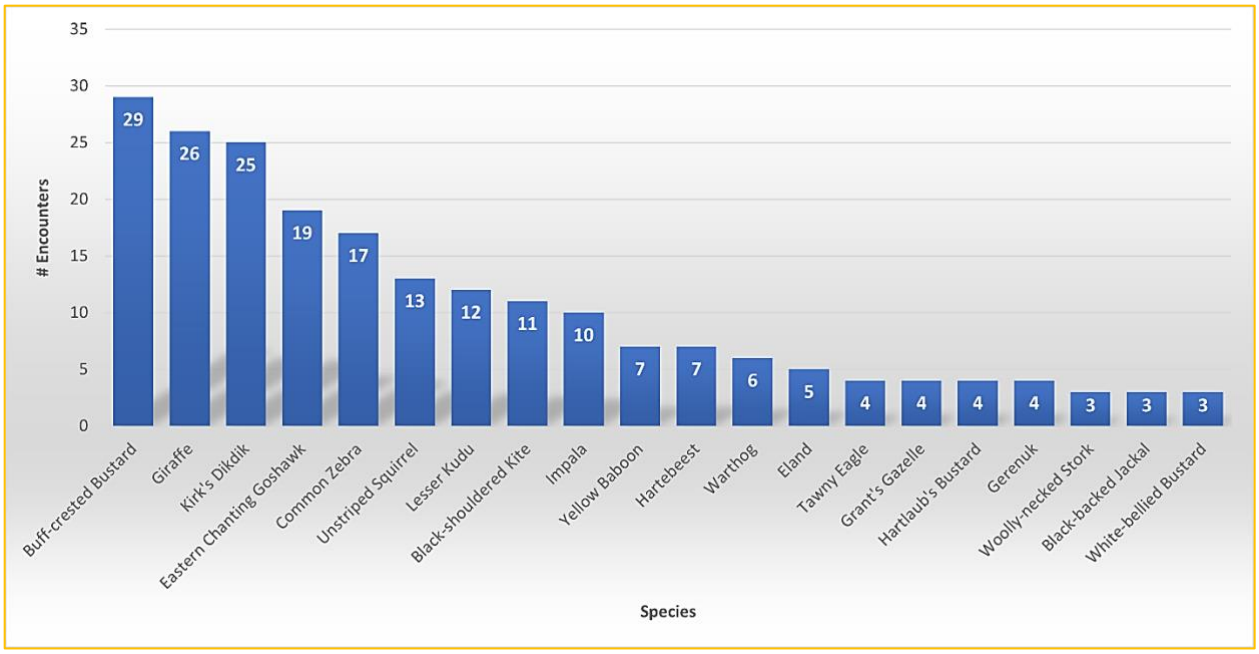


Figure 30: Total number of encounters of the top-20 wildlife species recorded on the 25-permanent road transects across KCRPI during the 2020 monitoring period

- *Camera traps*: between August 2011 and December 2020, a total of 9,626 independent photographs of 54 different species were taken from 24 random positions by six cameras within the KCRPI Project Area. In the 2020 reporting period, there were 1,083 Independent Photo Events (IPEs) in total, comprising 34 different species. The top-four most photographed species were Lesser Kudu (*Tragelaphus imberbis)*, Elephant (*Loxodonta Africana)*, Giraffe (*Giraffa Camelopardalis)*, and Common Zebra (*Equus burchellii)* (Figure 31). High conservation value species captured at least once on camera included Elephant (176 IPEs), Cheetah (6), Secretarybird (4), Grevy's Zebra (2) and Lion (2).

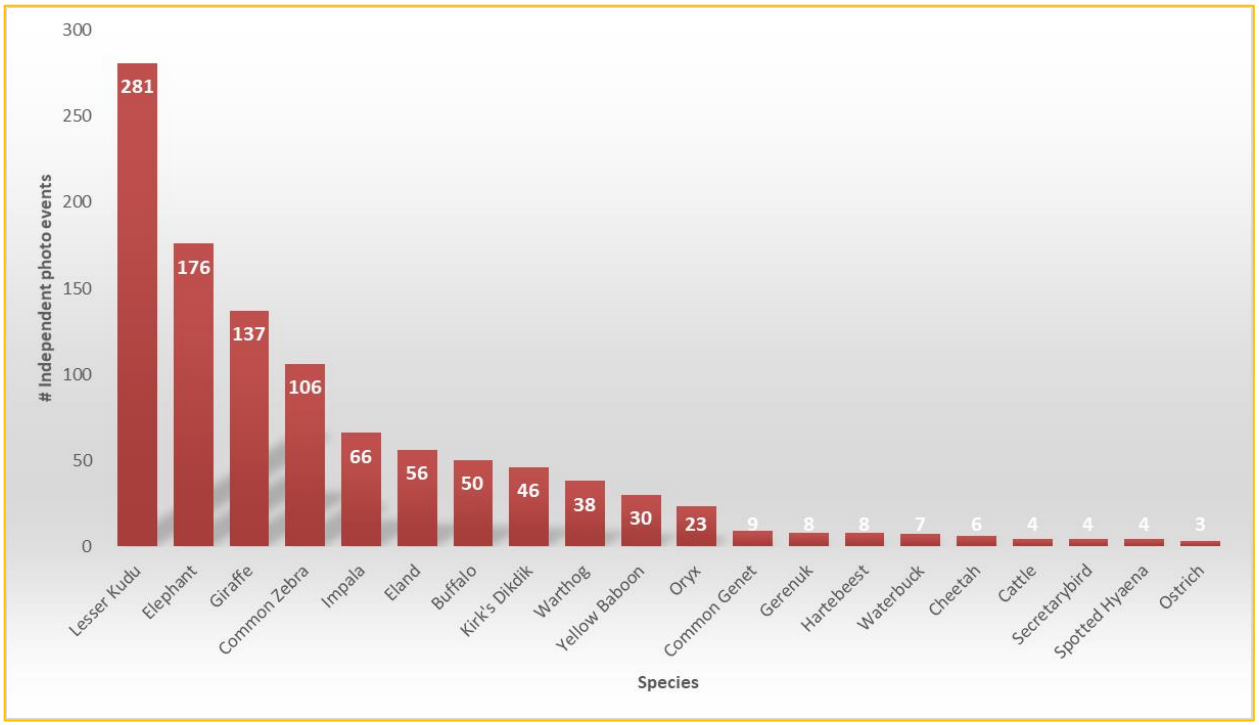


Figure 31: Top-20 commonest species recorded on the 24-permanent camera trap locations across Rukinga Ranch in 2020.

Ranger patrol dataset

- *Effort*: Despite COVID-19 restrictions and disruptions in 2020, the six Wildlife Works' ranger outpost teams continued to undertake both foot and vehicle patrols across the KCRPI Project Area. The rangers undertook a total of 215 patrols during the reporting period, covering about 20,765 km in total (Figure 32). These patrols crisscrossed the entire Project Area (Figure 33). Besides the six outposts, our Head of Security operates a mobile patrol team that supports the outposts with information, logistics and / or back-up rangers when needed. Overall, despite the COVID-19 restrictions and disruptions, 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).

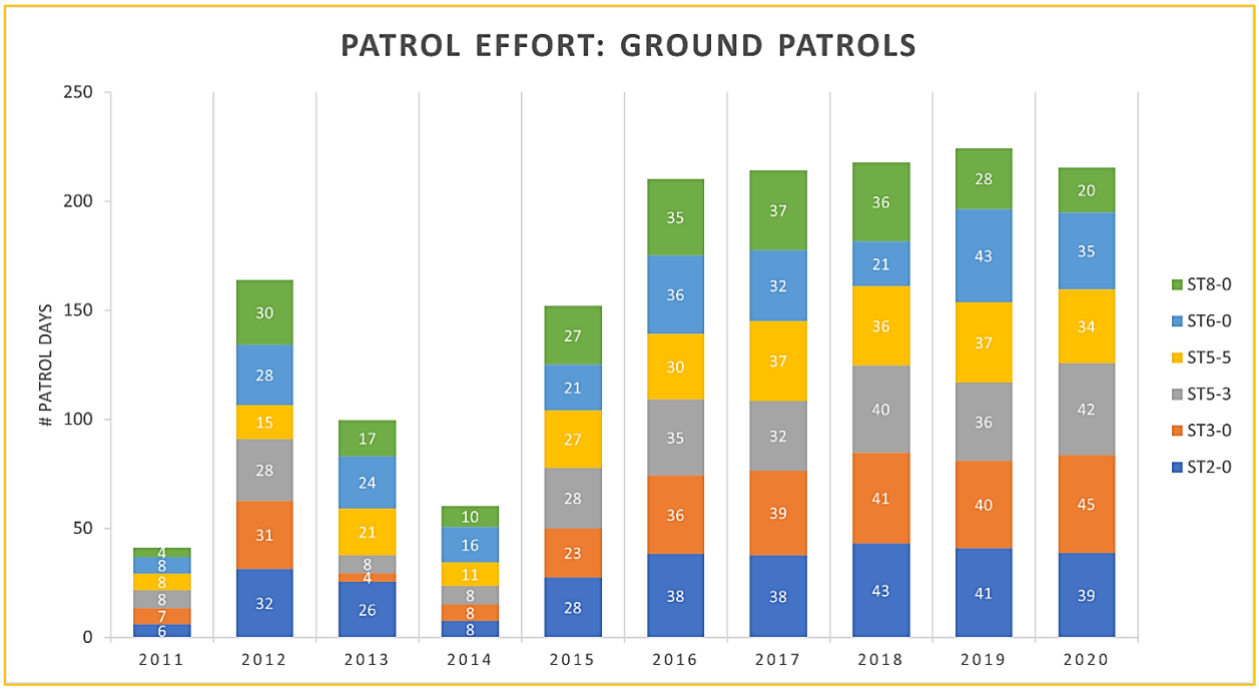


Figure 32: Number of patrols recorded for each of the six ranger outposts across KCRPI from 2011 to 2020

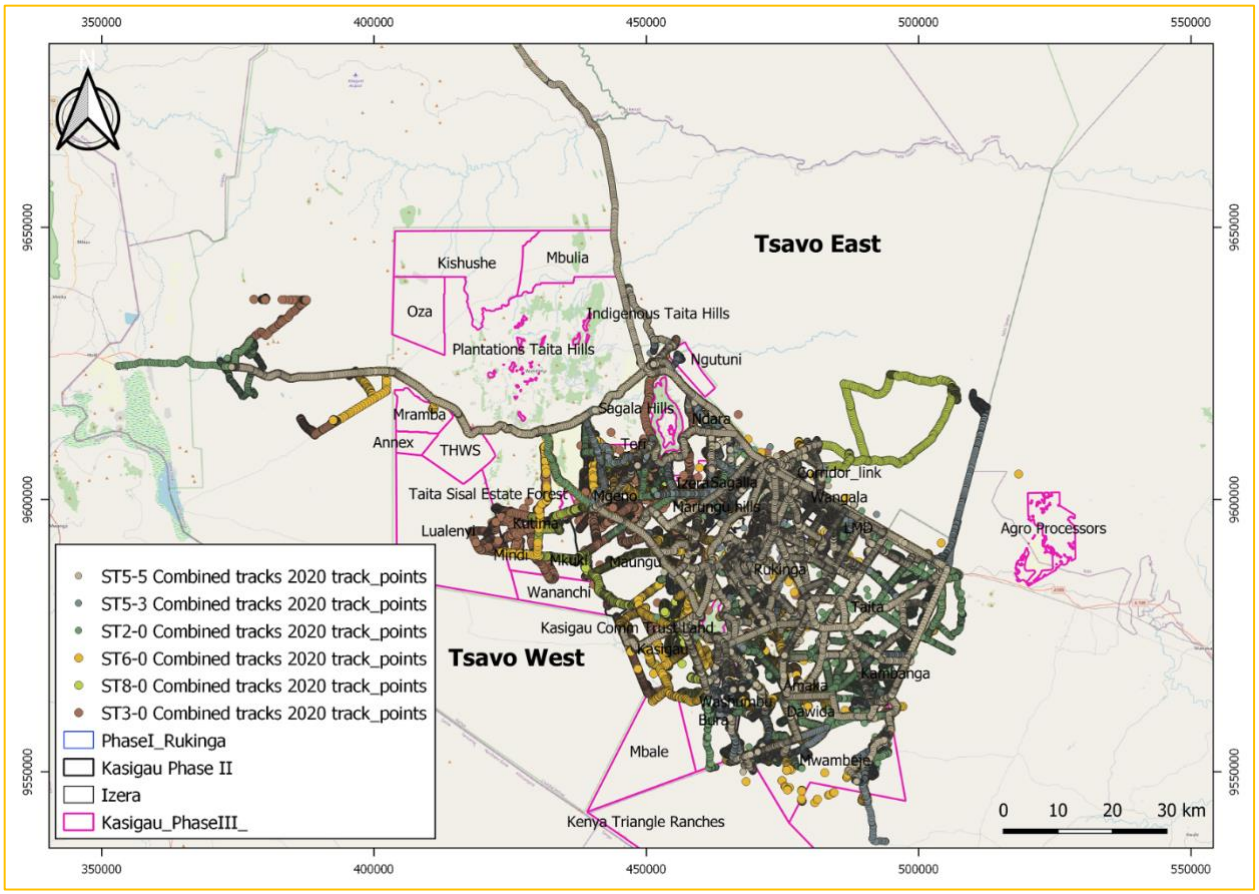


Figure 33: Coverage by ground (foot and vehicle) patrols conducted across KCRPI during the reporting period, Jan-Dec 2020.

- Species: During the period of January to September 2020, the ranger ground patrol teams recorded a total of 2,514 encounters with wildlife. These comprised a total of 34 different species. Lesser Kudu, Giraffe, Impala, Elephant and Common Zebra were the top-five most encountered species (Figure 34). Other species of conservation concern observed regularly included Lion, Secretary bird, Grevy's Zebra, and Cheetah.
- 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 35).

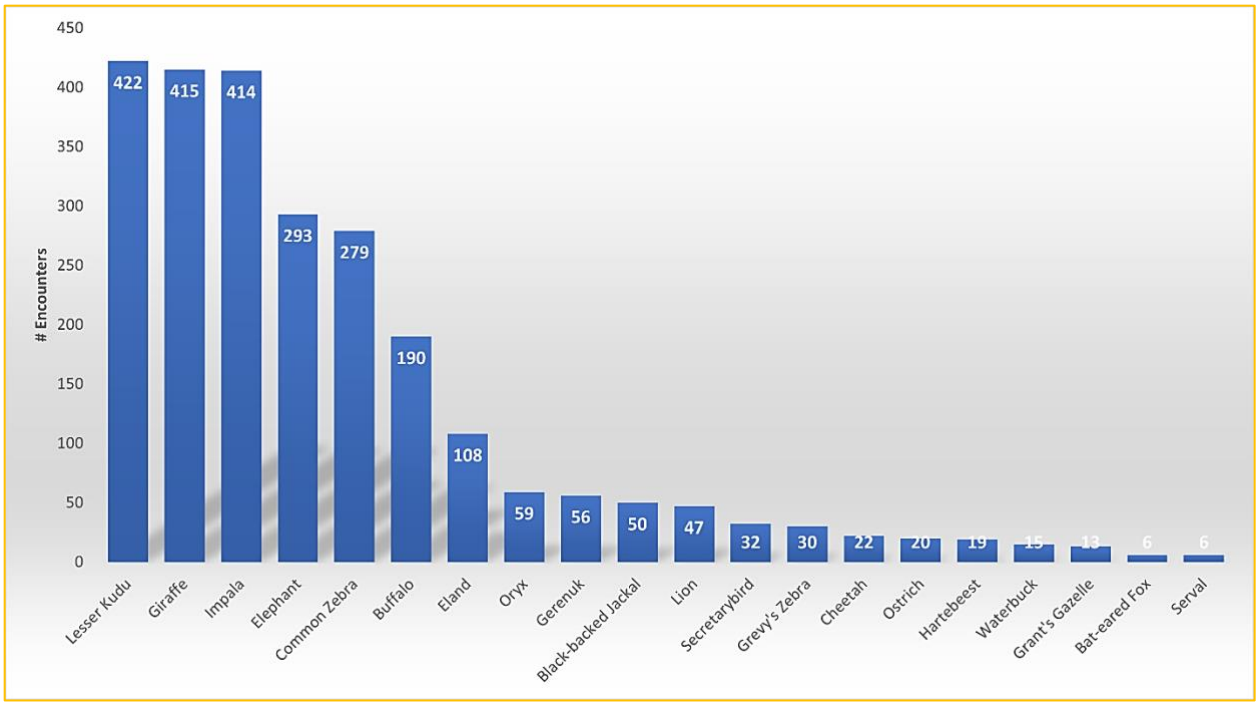


Figure 34: Top-20 commonest species encountered during ranger ground patrols across KCRPI during the 2020 reporting period.

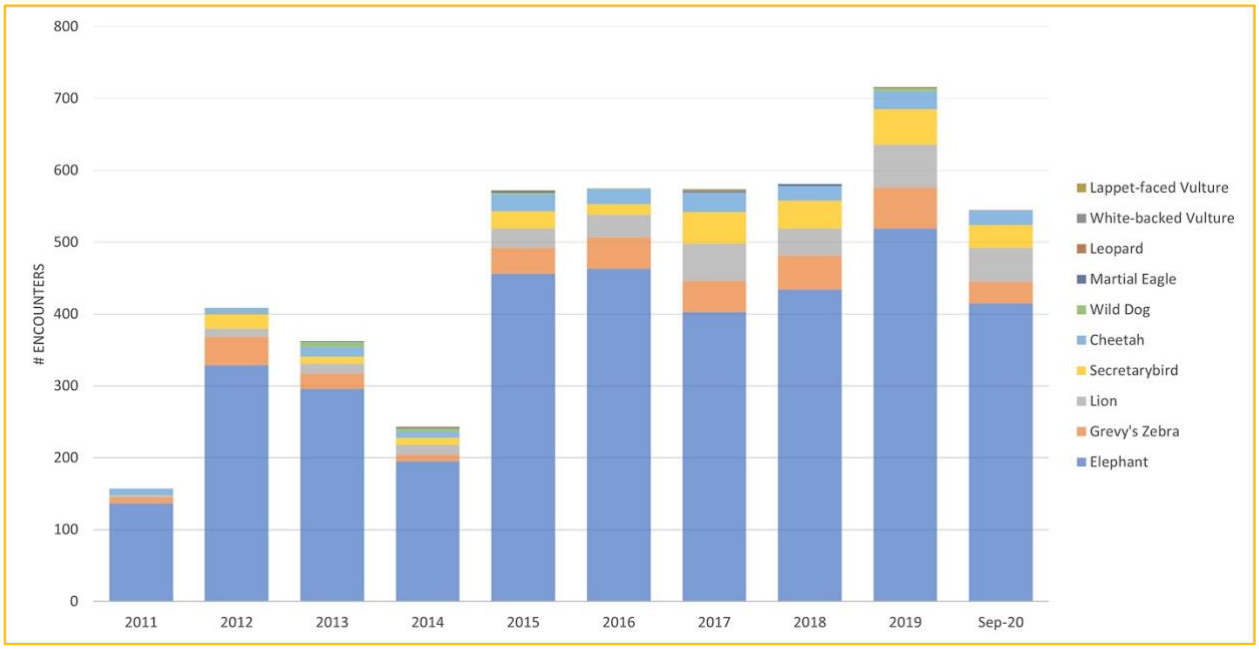


Figure 35: Total number of encounters of the key HCV species recorded by the six ranger outposts across KCRPI from 2011 to the 2020 reporting period.

- Incidents: The Wildlife Works' security team recorded a total of 145 incidents within KCRPI during the reporting period, with 36% being originally detected from an aerial patrol (Figure 36). Though the figure below suggests an increasing trend in number of incidents, an effectiveness analysis is currently underway to try and tease out the cause of the trend, considering the consistent use of aerial patrols since 2017 which enhanced effectiveness of locating incidents, especially log heaps and charcoal kilns (dark green and dark blue numbered blocks, Figure 36). Additionally, the 2020 monitoring period revealed a drastic increase in human signs (dark maroon block) and fires (light green), the former linked to the detectability of log heaps and kilns, while the latter being due to an escalation of fire incidents in the project area from a prolonged drought in 2019-2020.

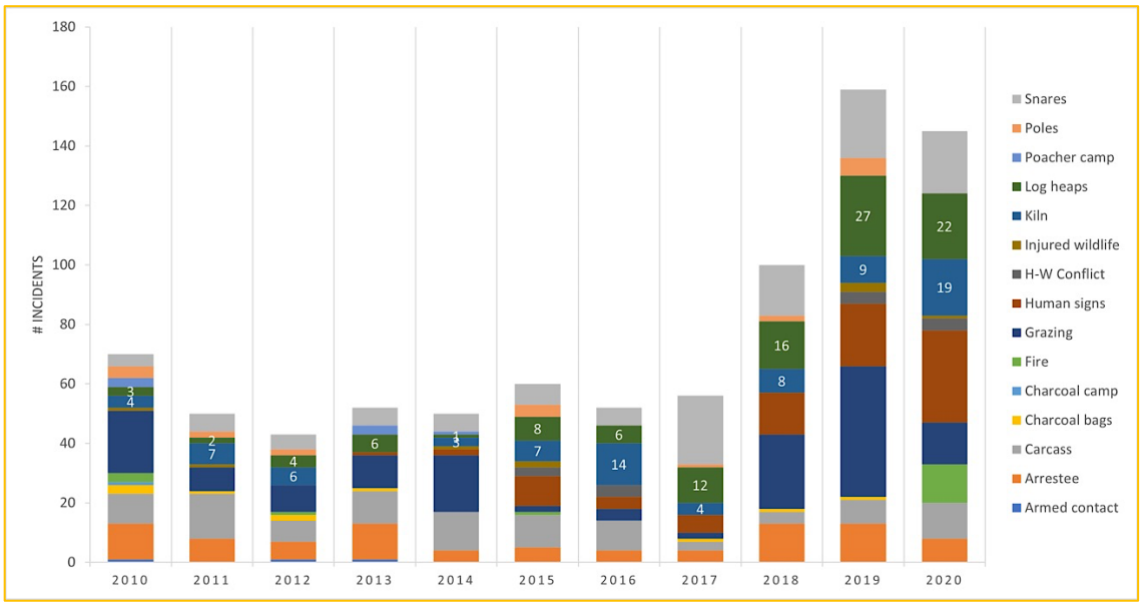


Figure 36: Total number of different incidents recorded by the six ranger outposts across KCRPI from 2010 to the current reporting period, 2020.

Aerial patrol dataset

There were sustained aerial patrols conducted during the M_7 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 and were not significantly impacted by the restrictions from COVID-19 protocols, aside from pilots having to fly alone without their usual colleagues to help with spotting and note taking, In 2020, there were 59 aerial patrol days/tracks from the two gyrocopters, covering a total of 13,758 km (see monthly trends in Figure 37) and traversing the majority of the Project Area (see Figure 39). Aerial patrol effort has steadily grown since 2015 to-date, especially with the addition of the second

gyrocopter (

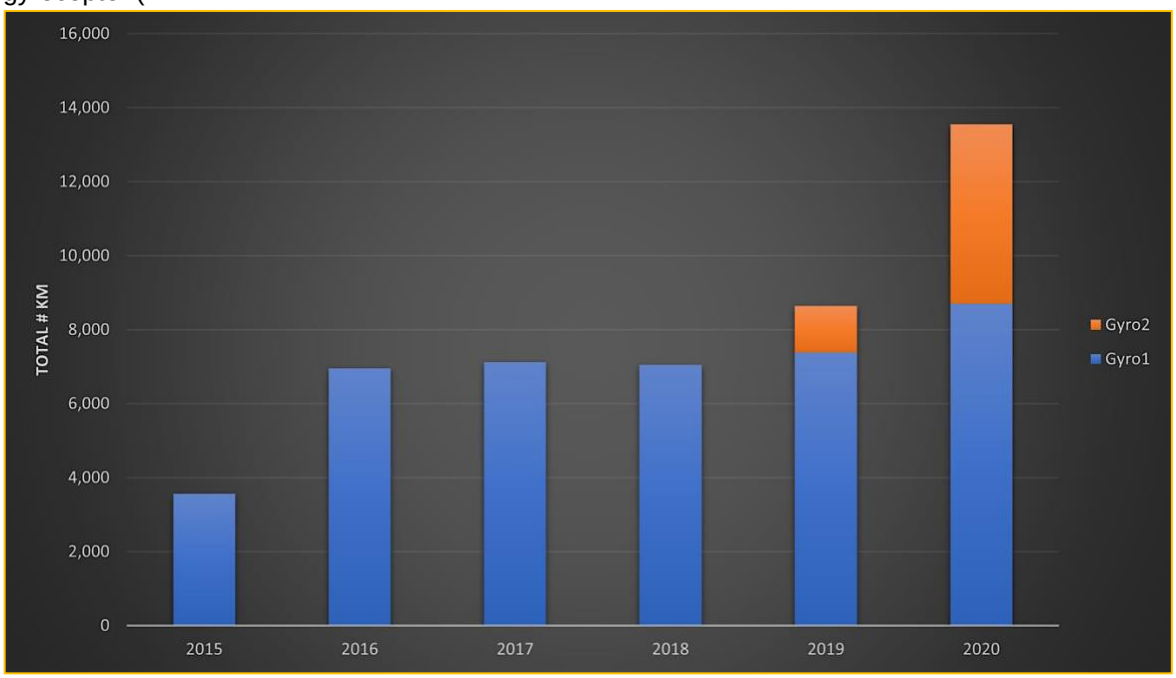


Figure 38).

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 2020 reporting period, comprising 21 species. The commonest species recorded was elephant (69%) followed by Grevy's zebra (10%).

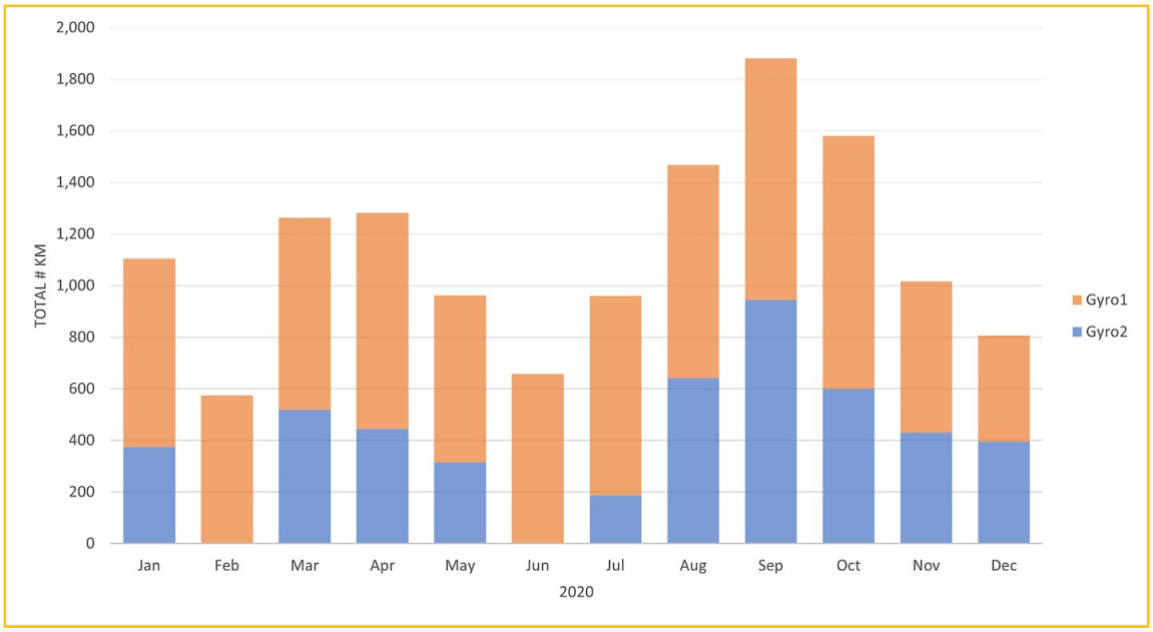


Figure 37: Monthly distances covered by the two resident gyrocopters traversing the KCRPI during the 2020 reporting period.

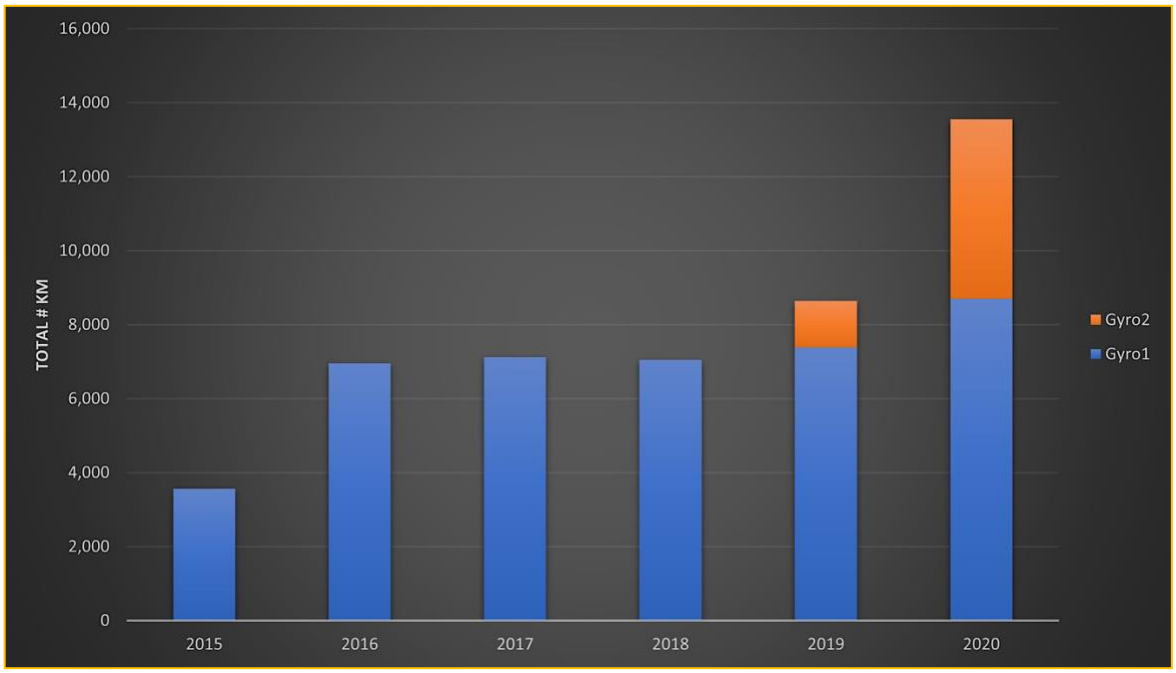


Figure 38: Annual distances covered by the resident gyrocopters across the KCRPI from 2015 to the 2020 reporting period

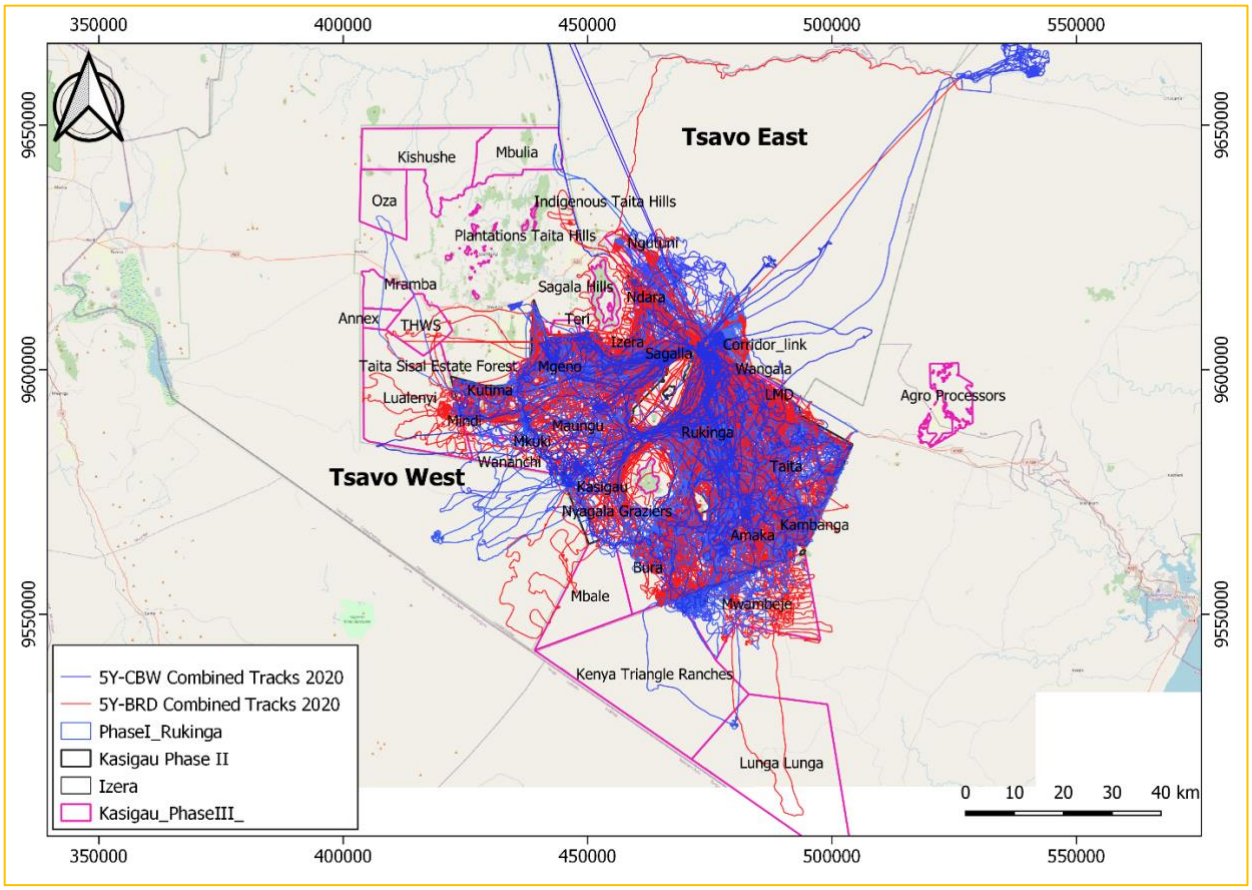


Figure 39: Coverage by aerial patrols conducted across KCRPI by the two resident gyrocopters during the reporting period, 2020.

- Daily logs: During 2020, 561 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 (58%); other commonly spotted species of conservation interest (HCVs) were Lion (12%), Grevy's zebra (5%) and Secretary Bird (5%). See distributions of key HCVs (Elephants and Grevy's Zebra) based on this Daily Logs dataset that mostly comprises of aerial survey data (Figure 40 & Figure 41) and carnivores (lion, cheetah and secretary bird) (Figure 42).

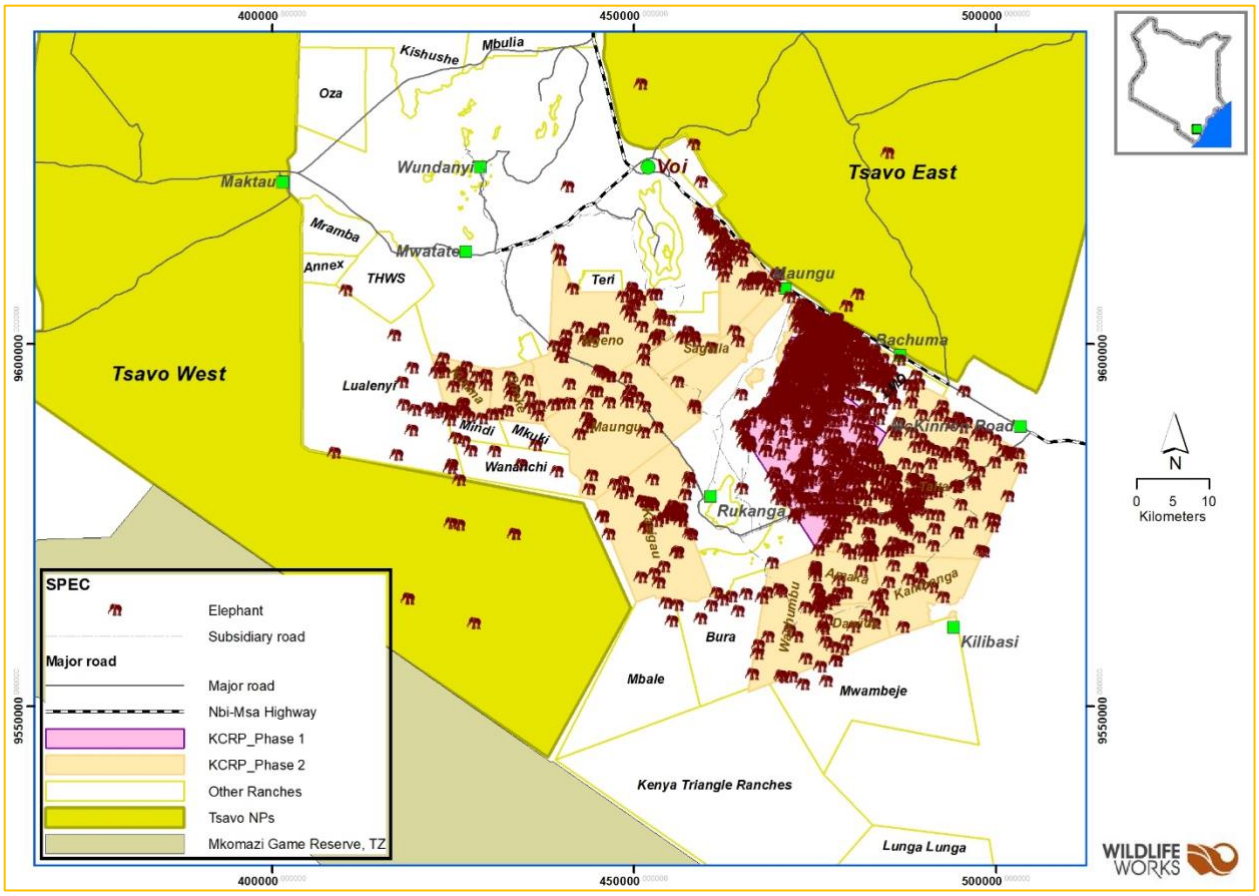


Figure 40: Distribution of elephant sightings across KCRPI based on daily logs and aerial patrols during the reporting period 2020

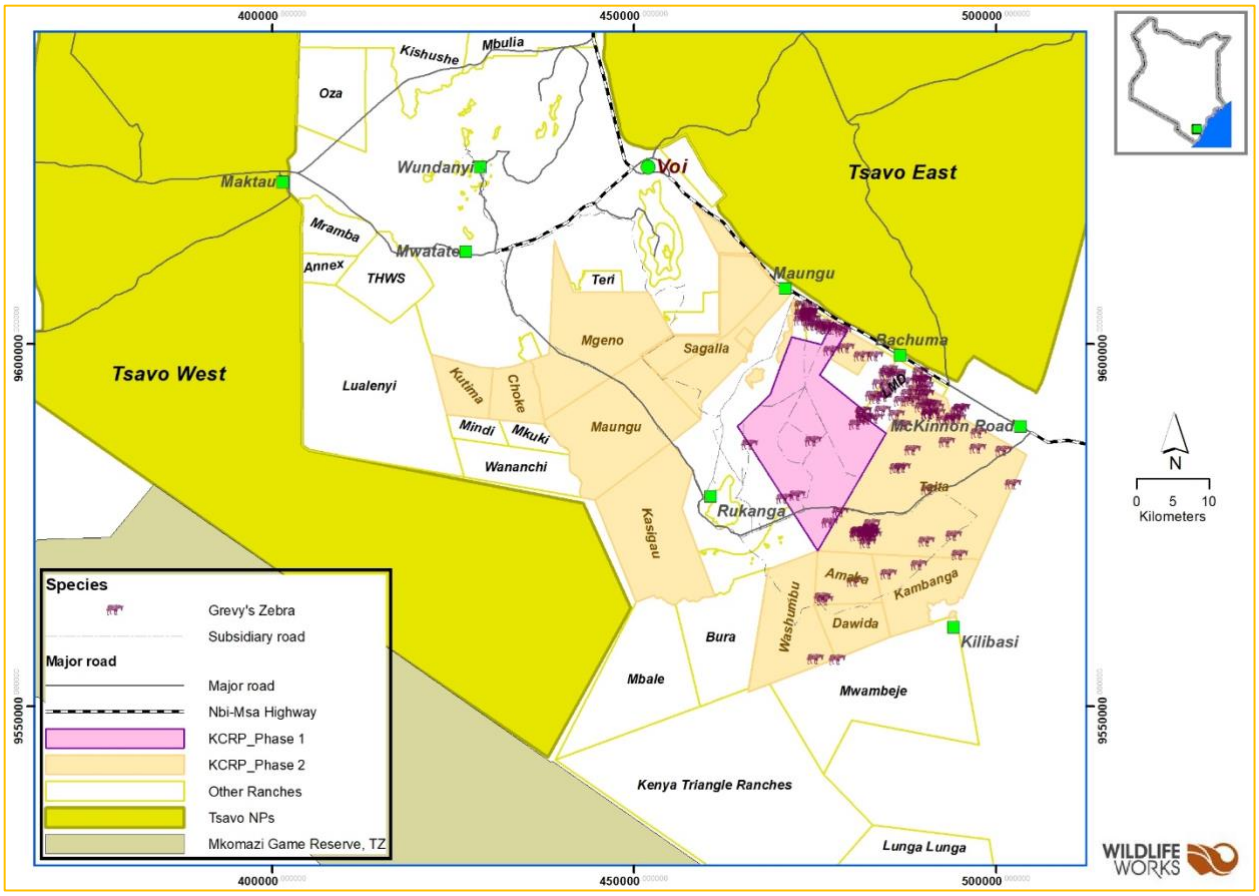


Figure 41: Distribution of Grevy's zebra sightings across KCRPI during the reporting period 2020 based on daily logs and aerial patrols.

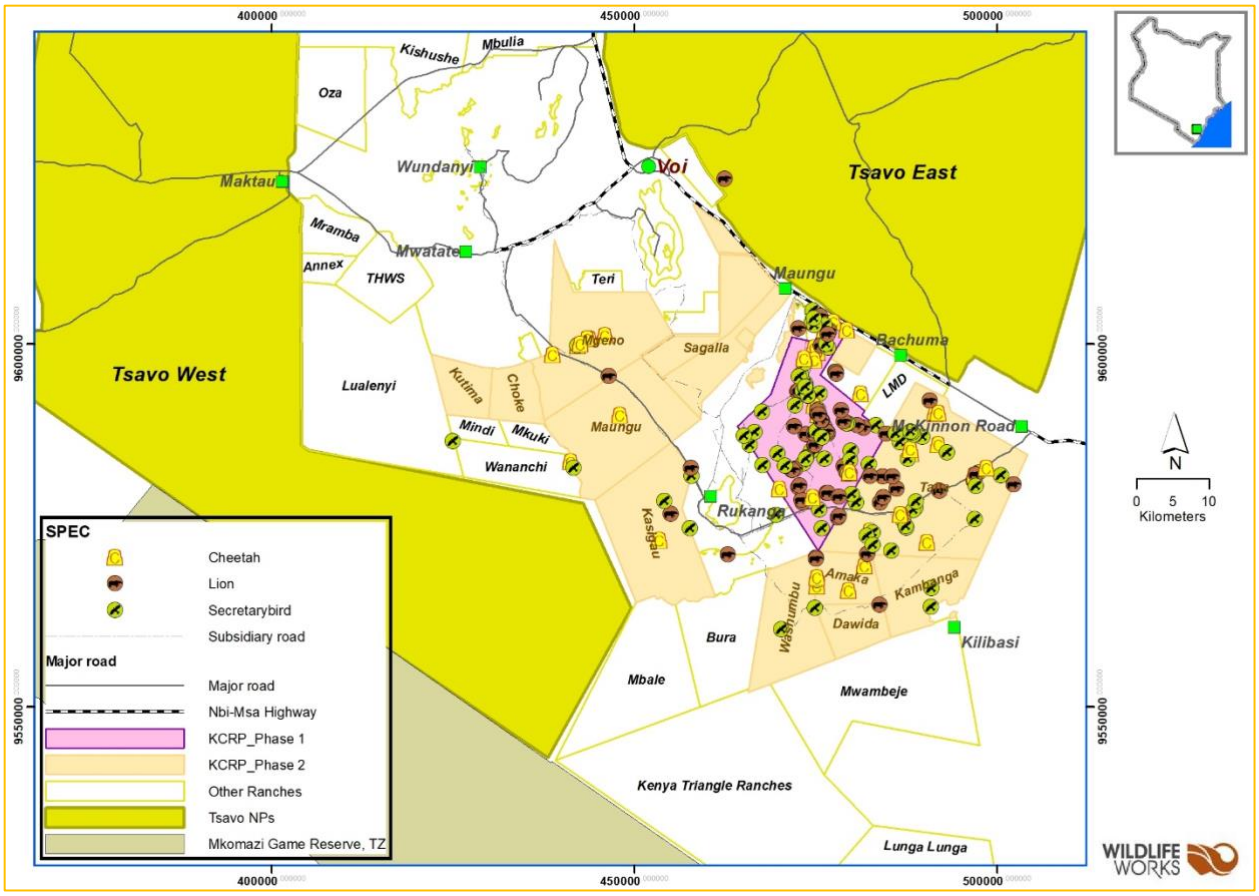


Figure 42: Presence and distribution of three HCV carnivores (lion, cheetah and secretary bird) during the reporting period 2020 based on anecdotal sightings and aerial patrols across KCRPI.

- Community monitors: During the reporting period-2020, a total of 287 human-wildlife conflict or encounters with HCVs were reported by our 3 community monitors across the Project Zone. Most incidents were in Kale (51%), followed by Buguta, (28%), and Makwasinyi (21%); Species-wise, Elephants and Spotted Hyena dominated, comprising about 54% and 36% of all the reported incidents, respectively. Other important species were Impala (6%) and Eland (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_7 reporting period, the biennial Household Survey was undertaken. The most recent SIA Community Workshop was held in May 2019 where the results from the 2018 Household Survey, 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_7 reporting period, including:

- 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
- Von Hagen RL, Norris P, Schulte BA. 2020. Quantifying capsaicinoids from chili pepper and motor oil mixtures used in elephant deterrent fences. Chromatographia 83: 1153-1157. https://doi.org/10.1007/s10337-020-03934-8
- Von Hagen, R.L., Norris, P., Githiru, M., Kasaine, S., Amakobe, B., Lepczyk, C., Schulte, B. A. Conversations on conservation: The human dimensions of elephant conservation in the Kasigau Wildlife Corridor of Kenya. British Ecological Society online Festival of Ecology. December 2020
- Schulte BA, Githiru M, Mutwiwa U, Von Hagen L, Kasaine S, Amakobe B. 2020. Elephant deterrent effectiveness in light of ecological and agricultural variation. International Elephant Foundation Final Report 2020

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 sub-sections (under Section 5.3.2, and Fig. 33), most of the key High Conservation Value species that are listed under some category of threat globally in the latest IUCN Red List were repeatedly recorded across KCRPI during M7 – African elephant (415 encounters), Grevy's zebra (30), Lion (47), Leopard (1), Cheetah (20), Secretarybird (32), and Martial Eagle (1). For several, there was evidence of breeding (i.e. elephant calves, Grevy's Zebra foals, lion and cheetah cubs).

KCRP-Phase I has a resident population of Grevy's zebra (*Equus grevyi*), which is on the IUCN Red List – Endangered. Based on a recent study[23], more than half of the population of about 35-60 individuals of this species were found within Taita and neighboring ranches like Wangala or the Phase II project zone (Figure 42) 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[24], this range constitutes between 1-2% of the global population.

[23] 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

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

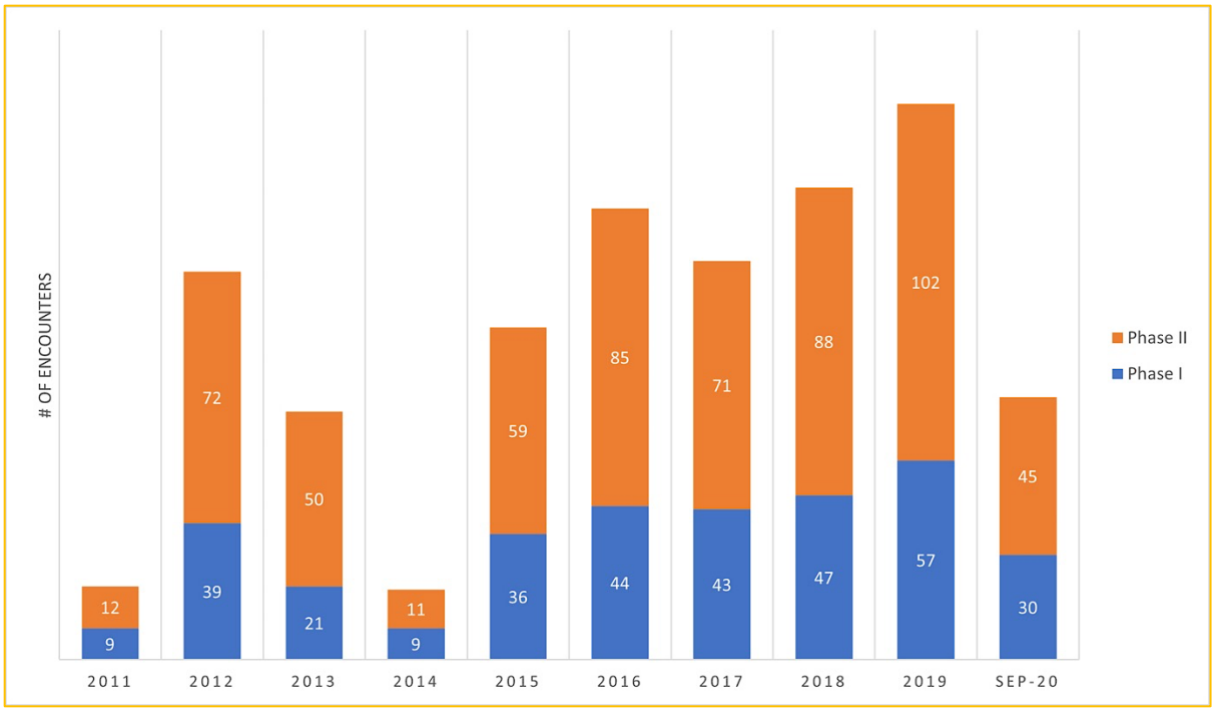


Figure 43. The number of reported encounters of Grevy's zebra (*Equus grevyi*) in the KCRPI and KCRPII project Areas for each year.

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.