REBUILDING PASTORALIST LIVELIHOODS

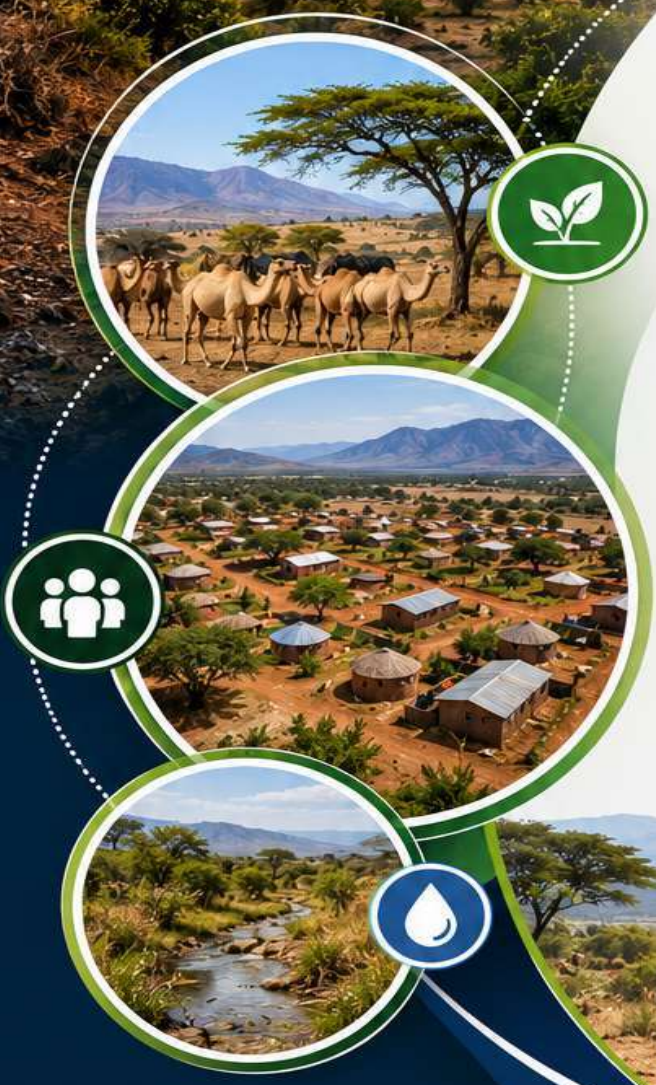
SUSTAINING LAND, LIVELIHOODS AND NATURE FOR GENERATIONS

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

FOR THE PROPOSED

EXCISION OF KARARE SETTLED AREAS

FROM MARSABIT NATIONAL GAME RESERVE



ENVIRONMENTAL STEWARDSHIP | SOCIAL INCLUSIVITY | WILDLIFE CONSERVATION | STAKEHOLDER PARTICIPATION | SUSTAINABLE DEVELOPMENT



PREPARED BY:

9wells CONSULT

The Nine Wells Consult

Hydrating Knowledge. Empowering Futures.

PROJECT LOCATION
Karare Settled Areas
Marsabit County, Kenya

REPORT DATE
JUNE 2025

A COMMITMENT TO
People. Land. Wildlife. Future.

INFORMED DECISIONS • RESILIENT COMMUNITIES • THRIVING ECOSYSTEMS

FACT SHEET

ITEM	DETAILS
PROJECT NAME	THE PROPOSED EXCISION OF KARARE SETTLED AREAS FROM MARSABIT NATIONAL GAME RESERVE
ASSIGNMENT NAME	ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROPOSED EXCISION OF KARARE SETTLED AREAS FROM MARSABIT NATIONAL GAME RESERVE
LOCATION	Karare II, Kamboe, Parkishon and Kambinye Settlements, Marsabit County, Kenya
GPS COORDINATES	Approximate Coordinates: 2.3286° N, 37.9899° E
PROJECT DESCRIPTION	The project involves the proposed legal excision of established settled areas from the Marsabit National Reserve to facilitate land tenure regularization, settlement planning, infrastructure development, and sustainable socio-economic development.
PROJECT PROPONENT	Rebuilding Pastoralist Livelihoods Organization (REPAL)
APPROXIMATE PROJECT COST	To be determined during subsequent planning and implementation stages
ADDRESS OF THE PROPONENT	Rebuilding Pastoralist Livelihoods Organization (REPAL), Marsabit County, Kenya. Tel: +254 704 000 204

SUBMISSION OF DOCUMENTATION

ENVIRONMENTAL CONSULTANT

I, Mr. Sammy Juma, on behalf of The Nine Wells Consult, hereby submit this Environmental and Social Impact Assessment (ESIA) for The Proposed Excision of Karare Settled Areas from Marsabit National Game Reserve in Marsabit County, Kenya, on behalf of the project proponent, Rebuilding Pastoralist Livelihoods Organization (REPAL).

To the best of my knowledge, all information contained in this report represents an accurate and truthful presentation of the findings, observations, assessments, stakeholder consultations, and analyses relating to the proposed project.

Signed in NAIROBI *on this .....*12TH *.....day of* August, 2026

Signature: 

Designation: Lead Environmental Consultant. NEMA Reg. No. 9620

PROJECT PROPONENT

I, Mr. Eddy Lemoile, on behalf of the Rebuilding Pastoralist Livelihoods Organization(REPAL), hereby submit this Environmental and Social Impact Assessment (ESIA) for The Proposed Excision of Karare Settled Areas from Marsabit National Game Reserve in Marsabit County, Kenya.

To the best of my knowledge, all information contained in this report represents an accurate and truthful presentation of the findings, observations, assessments, stakeholder consultations, and analyses relating to the proposed project.

Signed in NAIROBI *on this* .....12TH .....*day of* August, 2026

Signature: .....

Designation: Executive Director .....

THE ESIA TEAM

No.	Name	Position/Expertise	Qualifications	Signature
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5	Mr. Sammy Juma	Team Coordinator / Environmental and Water Resources Specialist	• PhD in Ecology – Ongoing • MSc Water Science and Engineering • BSc Environmental and Biosystems Engineering	
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ACKNOWLEDGEMENTS

The successful completion of this Environmental and Social Impact Assessment (ESIA) for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve was made possible through the support, cooperation, and contributions of various institutions, stakeholders, and community members.

The ESIA team sincerely acknowledges the Rebuilding Pastoralist Livelihoods Organization (REPAL) for entrusting The Nine Wells Consult with the responsibility of undertaking this important assignment and for the continuous support, coordination, and facilitation provided throughout the study process.

Special appreciation is extended to the National Environment Management Authority (NEMA), Marsabit County offices, Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), the Ministry of Lands and Physical Planning, local administration, and other government institutions for their valuable guidance, technical input, and cooperation during the ESIA process.

The team further acknowledges the contributions of local leaders, chiefs, elders, women groups, youth groups, pastoralists, community-based organizations, and residents of Karare II, Kamboe, Parkishon, and Kambinye settlements who actively participated in stakeholder consultations, public meetings, and field assessments. Their views, experiences, recommendations, and local knowledge provided critical insights that greatly informed the assessment process.

The ESIA team also appreciates all technical experts, field assistants, GIS specialists, enumerators, and support personnel who contributed to data collection, analysis, mapping, stakeholder engagement, report preparation, and logistical coordination during implementation of the assignment.

Finally, we acknowledge all individuals and institutions who contributed in one way or another toward the successful completion of this ESIA study and preparation of this report.

EXECUTIVE SUMMARY

INTRODUCTION

This Environmental and Social Impact Assessment (ESIA) report has been prepared for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve in Marsabit County, Kenya. The assessment was commissioned by the Rebuilding Pastoralist Livelihoods Organization (REPAL) and undertaken by The Nine Wells Consult in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), and the Environmental (Impact Assessment and Audit) Regulations, 2003.

The proposed excision seeks to address long-standing settlement and land tenure challenges arising from the existence of permanent human settlements within land that remains legally gazetted as part of the Marsabit National Reserve. Over the years, the settlements have developed into established socio-economic centres supporting residential communities, schools, healthcare facilities, administrative offices, livestock production systems, commercial activities, and other public infrastructure. The ESIA was undertaken to evaluate the potential environmental and social impacts associated with the proposed excision process and to recommend appropriate mitigation measures and environmental safeguards necessary for ensuring environmentally sustainable and socially inclusive implementation of the project.

PROJECT DESCRIPTION

The proposed project involves the legal excision of settled areas within Karare II, Kamboe, Parkishon, and Kambinye settlements from the Marsabit National Reserve in Marsabit County. The excision process is intended to formalize existing settlements and facilitate improved land administration, settlement planning, infrastructure development, and socio-economic service delivery within the project area.

The project area is characterized by arid and semi-arid ecological conditions dominated by pastoral livelihood systems, communal grazing landscapes, seasonal drainage systems, shrub vegetation, and wildlife movement corridors within portions of the landscape. The settlements are already occupied by established communities and associated socio-economic infrastructure.

OBJECTIVES OF THE ESIA

The main objective of the ESIA was to assess the potential environmental and social impacts associated with the proposed excision process and provide appropriate mitigation measures for minimizing adverse impacts while enhancing positive project outcomes.

Specific objectives of the ESIA included establishing the environmental and socio-economic baseline conditions within the project area, identifying and evaluating potential environmental and social impacts associated with the proposed excision, undertaking stakeholder consultations and public participation, assessing ecological sensitivity and wildlife corridor conditions, evaluating cumulative and residual impacts, and developing an Environmental and Social Management Plan (ESMP) for implementation and monitoring of mitigation measures.

ESIA METHODOLOGY

The ESIA was undertaken through a combination of field investigations, ecological assessments, GIS and spatial analysis, stakeholder consultations, institutional engagements, socio-economic surveys, literature review, and environmental impact analysis. Baseline assessments focused on the physical environment, ecological conditions, biodiversity, wildlife corridors, land use systems, socio-economic conditions, grazing systems, climate vulnerability, and settlement patterns within the project area.

Stakeholder engagement formed a critical component of the assessment and included consultations with local communities, chiefs and elders, women groups, youth groups, pastoralists, government agencies, and conservation institutions. Public meetings and consultation forums were undertaken within Karare II, Kamboe, Parkishon, and Kambinye settlements in accordance with NEMA requirements.

BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

The project area lies within the arid and semi-arid ecological zone of Marsabit County characterized by low and variable rainfall, high temperatures, seasonal drainage systems, shrub vegetation, and fragile ecological conditions. Livelihood systems within the area are predominantly pastoral, with communities relying largely on livestock production and natural resource utilization.

Ecological assessments established that portions of the project area remain environmentally sensitive due to the presence of wildlife movement corridors, ecological connectivity zones, grazing dispersal areas, and seasonal drainage systems. The assessment further established that although substantial portions of the proposed excision areas are already modified by human settlement and socio-economic activities, ecological functionality remains important within portions of the landscape.

Socio-economic assessments established that the settlements experience challenges relating to insecure land tenure, inadequate infrastructure, limited public service delivery, water scarcity, human-wildlife conflicts, and limited investment opportunities associated with the current reserve status of the land.

STAKEHOLDER CONSULTATIONS AND PUBLIC PARTICIPATION

Extensive stakeholder consultations and public participation activities were undertaken throughout the ESIA process in accordance with NEMA requirements. Stakeholder engagement included institutional consultations, public meetings, community sensitization forums, focus group discussions, and field consultations with local communities and relevant government institutions.

The consultations revealed overwhelming community support for the proposed excision process. Community members expressed strong expectations that the project would facilitate improved land ownership security, infrastructure development, public service delivery, livelihood opportunities, and socio-economic development within the settlements.

Stakeholders however emphasized the importance of protecting wildlife corridors, maintaining ecological connectivity, promoting sustainable grazing systems, and strengthening environmental conservation measures during future settlement planning and development activities.

ANALYSIS OF PROJECT ALTERNATIVES

The ESIA evaluated various project alternatives including the No Project Alternative, Partial Excision Alternative, Wildlife Corridor Retention Alternative, Controlled Settlement Zoning Alternative, Buffer Zone Alternative, and Co-Management Alternative.

The assessment established that the preferred alternative involves implementation of the proposed excision together with controlled settlement zoning, wildlife corridor protection, ecological buffer management, sustainable grazing systems, and climate-sensitive land use planning measures.

IMPACT ASSESSMENT

The assessment established that the proposed excision is expected to generate substantial positive socio-economic impacts including improved land tenure security, enhanced settlement planning, improved access to public services, increased investment opportunities, improved governance systems, and strengthened socio-economic resilience within the settlements.

Potential adverse impacts identified during the ESIA include ecological disturbance, obstruction of wildlife corridors, human-wildlife conflict risks, settlement expansion pressure, grazing system degradation, vegetation loss, climate-related environmental stress, and cumulative environmental impacts within portions of the landscape. The assessment however established that most adverse impacts are moderate and manageable provided that the proposed mitigation measures and Environmental and Social Management Plan (ESMP) are effectively implemented.

MITIGATION MEASURES AND ENVIRONMENTAL MANAGEMENT

The ESIA developed comprehensive mitigation measures aimed at minimizing environmental and social impacts associated with the proposed excision process. The proposed mitigation measures focus on wildlife corridor protection, controlled settlement zoning, ecological restoration, sustainable grazing management, climate adaptation, water resource conservation, environmental awareness, and stakeholder participation.

The Environmental and Social Management Plan (ESMP) outlines mitigation measures, monitoring indicators, institutional responsibilities, implementation schedules, and environmental monitoring requirements necessary for sustainable project implementation. The ESMP further emphasizes the importance of continuous environmental monitoring, inter-agency coordination, stakeholder engagement, and adaptive environmental management throughout future implementation phases.

WILDLIFE CORRIDOR PROTECTION AND HUMAN-WILDLIFE CONFLICT MANAGEMENT

The ESIA identified wildlife movement corridors and ecological connectivity zones traversing portions of the project area. Protection of these ecological systems was identified as a critical requirement for ensuring long-term environmental sustainability within the wider Marsabit ecosystem.

The assessment recommends formal mapping and protection of wildlife corridors, controlled settlement zoning, restriction of settlement expansion into ecological interface zones, sustainable grazing management, and strengthening collaboration between local communities and Kenya Wildlife Service (KWS). The ESIA further recommends implementation of community awareness programmes and continuous ecological monitoring to support sustainable coexistence between settlement development and wildlife conservation objectives within the project area.

CLIMATE CHANGE AND ENVIRONMENTAL RESILIENCE

The project area is highly vulnerable to climate variability, prolonged droughts, land degradation, and water scarcity. The ESIA therefore integrated climate adaptation and resilience measures into the proposed mitigation framework.

Recommended climate adaptation measures include climate-sensitive land use planning, vegetation restoration, tree planting initiatives, water harvesting systems, sustainable grazing management, climate-resilient infrastructure planning, and promotion of clean energy systems within the settlements. These measures are intended to strengthen long-term environmental resilience and reduce climate vulnerability within the wider Marsabit landscape.

CONCLUSION

The ESIA concludes that the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve is environmentally and socially acceptable provided that the proposed mitigation measures and Environmental and Social Management Plan (ESMP) are effectively implemented.

The assessment established that the anticipated socio-economic benefits associated with improved settlement security, infrastructure development, public service delivery, livelihood improvement, and sustainable development opportunities substantially outweigh the anticipated adverse environmental impacts, most of which are manageable through implementation of the proposed environmental safeguards.

The ESIA therefore recommends that the proposed excision be allowed to proceed subject to implementation of wildlife corridor protection measures, controlled settlement zoning, sustainable grazing management systems, climate adaptation initiatives, environmental monitoring programmes, and continuous stakeholder engagement and institutional coordination throughout future implementation phases.

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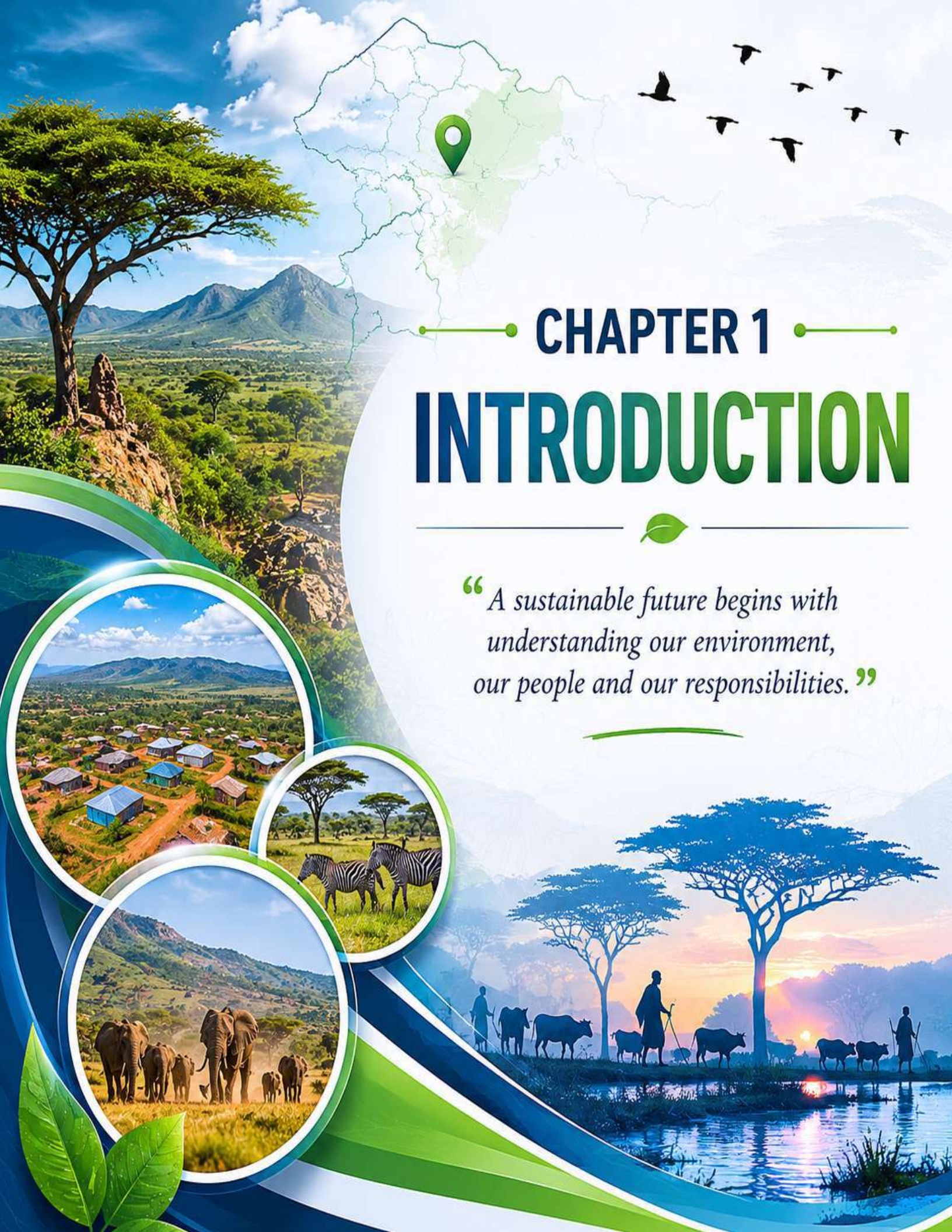
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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Meaning
AfDB	African Development Bank
ASALs	Arid and Semi-Arid Lands
CIDP	County Integrated Development Plan
EMCA	Environmental Management and Coordination Act
EMS	Environmental Management System
ESA	Environmentally Sensitive Area
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GIS	Geographic Information System
GHG	Greenhouse Gas
GoK	Government of Kenya
GPS	Global Positioning System
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KFS	Kenya Forest Service
KNBS	Kenya National Bureau of Statistics
KWS	Kenya Wildlife Service
MCA	Member of County Assembly
MoLPP	Ministry of Lands and Physical Planning
NBSAP	National Biodiversity Strategy and Action Plan
NCCAP	National Climate Change Action Plan
NEMA	National Environment Management Authority
NEAP	National Environment Action Plan
NGO	Non-Governmental Organization
PAPs	Project Affected Persons
PRA	Participatory Rural Appraisal
REPAL	Rebuilding Pastoralist Livelihoods Organization

SEA	Strategic Environmental Assessment
TOR	Terms of Reference
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WRA	Water Resources Authority
WRI	World Resources Institute
KES	Kenya Shillings
ESMS	Environmental and Social Management System
PPE	Personal Protective Equipment
GPS	Global Positioning System
CSR	Corporate Social Responsibility
CBO	Community-Based Organization
SWOT	Strengths, Weaknesses, Opportunities and Threats
SDGs	Sustainable Development Goals
WB	World Bank



CHAPTER 1

INTRODUCTION

"A sustainable future begins with understanding our environment, our people and our responsibilities."

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND OF THE PROJECT

The proposed excision of Karare settled areas from the Marsabit National Game Reserve seeks to address longstanding land use, governance, and administrative challenges arising from the existence of permanent human settlements within the legally gazetted reserve boundaries. Over the years, sections of the reserve have experienced progressive settlement expansion and the establishment of socio-economic infrastructure including schools, health facilities, religious institutions, security installations, roads, administrative centres, and permanent residential homesteads. Consequently, portions of the reserve have gradually transformed into fully established settlement areas with significantly reduced ecological functionality as wildlife habitats.

The proposed excision aims to formally regularize these settlements through a legal de-gazettement process while promoting sustainable land use planning, enhanced tenure security, improved service delivery, orderly settlement development, and environmental sustainability. The initiative is being spearheaded by the Rebuilding Pastoralist Livelihoods Organization (REPAL) in collaboration with Nine Wells Consult Limited, relevant government institutions, local leadership structures, and affected communities.

The excision process has undergone extensive stakeholder engagement and public participation involving local communities, elders, community leaders, conservation agencies, the Kenya Wildlife Service (KWS), the National Environment Management Authority (NEMA), the Marsabit County Government, the Marsabit County Assembly, the Ministry of Environment, Climate Change and Forestry, the Ministry of Lands, Public Works, Housing and Urban Development, the National Land Commission (NLC), local administration, civil society organizations, and other interested stakeholders. The process has further received formal support from the Marsabit County Assembly following public participation forums, as well as a formal request for de-gazettement submitted by the Governor of Marsabit County to the Cabinet Secretary responsible for Environment, Climate Change and Forestry.

The current proposal involves the excision of approximately 14,402 acres (58 km^2), equivalent to approximately 5,827 hectares, from the Marsabit National Game Reserve. The proposed excision comprises four distinct settlement zones, namely Kambinye (north-western section), Parkishon

(western section adjacent to the KDF base), Karare II (south-western section), and Kamboe (southern section), located within Saku and Laisamis Sub-Counties of Marsabit County.

In accordance with Section 58 of the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, and Legal Notices No. 31 and 32 of 2019, the proposed excision constitutes a prescribed activity requiring a comprehensive Environmental and Social Impact Assessment (ESIA) prior to implementation. The ESIA Study has therefore been undertaken to assess the potential environmental, ecological, social, economic, and land use impacts associated with the proposed excision and to recommend appropriate mitigation and management measures to ensure environmentally sustainable and socially responsible implementation of the project.

Given the ecological sensitivity of the wider Marsabit ecosystem and the complex interactions between conservation objectives and human settlement dynamics, the proposed excision requires a balanced and scientifically informed assessment framework capable of addressing biodiversity conservation, wildlife movement, ecological connectivity, pastoral livelihoods, settlement sustainability, climate resilience, and long-term landscape management considerations. Particular attention has been given to elephant movement corridors and ecological connectivity zones traversing sections of Karare, Karare II, Kamboe, and Parkishon areas as identified during ground verification and georeferenced mapping exercises undertaken by the Kenya Wildlife Service (KWS).

1.2 HISTORICAL CONTEXT OF MARSABIT NATIONAL RESERVE

Marsabit Forest Reserve was initially established in 1932 through Proclamation No. 44 of 1932, under Section 3 of the Forest Ordinance. While the proclamation did not specify the total area, subsequent records indicate that as at 31st December 1989, Marsabit Forest Reserve covered approximately 152.8 km^2 (15,280.9 hectares). The Forest Reserve forms the core forested ecosystem of Marsabit Mountain and is jointly managed for conservation purposes.

In 1948, Marsabit National Reserve was established when the Kenya National Park Trustees were granted specific management rights within the area through Government Notice (Legal Notice) No. 936 of 24th September 1948, pursuant to Sections 6, 13(2), and 18 of the National Parks Ordinance, and delineated under Boundary Plan No. 216/1 (Figure 1). At the time of gazettement, the Reserve covered approximately 10,265 square miles, equivalent to 26,597 km^2, making it one of the largest protected areas in northern Kenya.

To operationalize management of the Reserve, the Marsabit National Reserve Regulations, 1958 were promulgated through Legal Notice No. 170 of 1st April 1958 by the Trustees of the Royal National Parks of Kenya (TRNPK), with approval from the Minister responsible for forests, game, and fisheries.

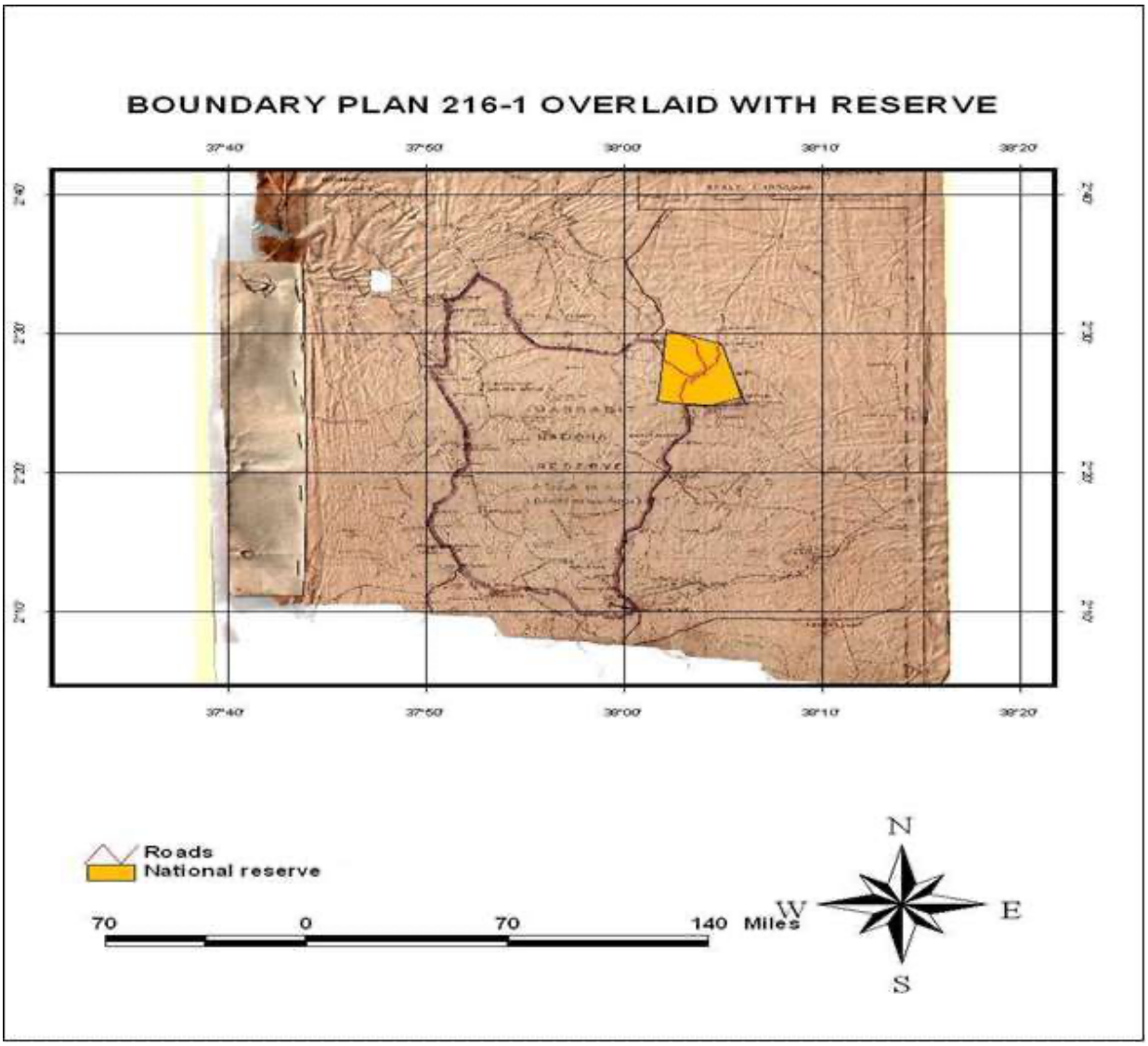


Figure 1-1: Boundary Plan 216-1 Overlaid with Reserve.



Figure 1-2: Marsabit Mountain National Park, 1966 Boundary plan 204/26

In 1966, Marsabit Mountain National Park was gazetted under Boundary Plan No. 204/26 (Figure 2), covering approximately 35,660 acres (14,413 hectares or 144 km^2). The Park was established to provide enhanced protection to the forested mountain ecosystem, which functions as a critical water catchment and biodiversity refuge within the wider Marsabit ecosystem.

The Reserve and Park together play a key role in biodiversity conservation, water catchment protection, and the maintenance of ecological processes within northern Kenya.

Following successive excisions (described in Section 1.2), the official boundary of Marsabit National Reserve was later formalised through Legal Notice No. 3962 of 21st October 1983, under Boundary Plan No. 216/48 (Figure 3), after which the Reserve measured approximately 1,122 km^2. This gazettement provided the prevailing legal framework for land use regulation and wildlife conservation within the Reserve.

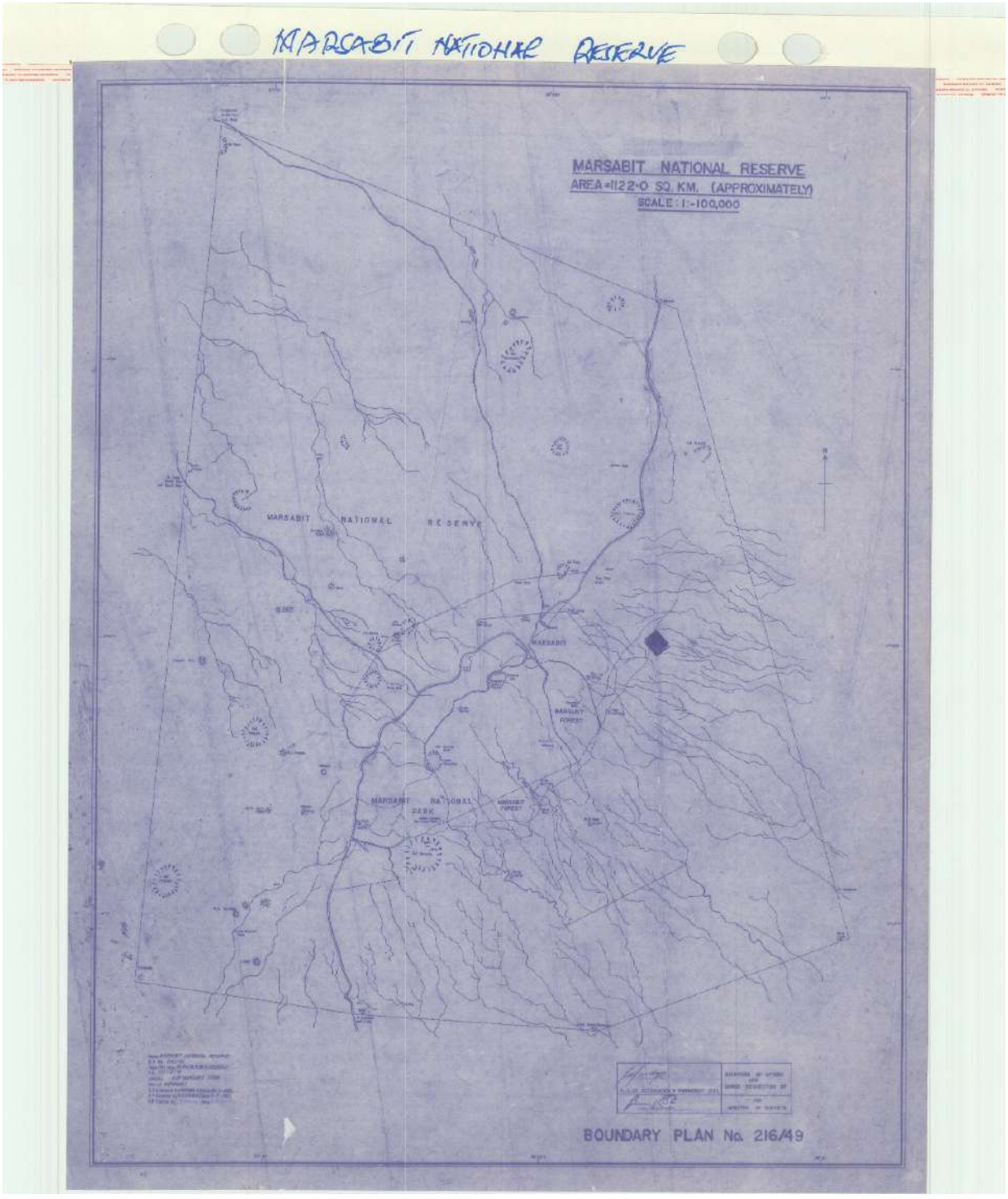


Figure 1-3: Marsabit National Reserve Boundary Plan No. 216/49, 1983

1.2.1 PREVIOUS EXCISIONS WITHIN MARSABIT NATIONAL RESERVE

Over the years, several excisions have been undertaken within Marsabit National Reserve to accommodate settlement expansion and administrative needs. These excisions include:

A. Marsabit Sector and Ewaso Nyiro Sector

In 1960, the Trustees of the Royal National Parks of Kenya (TRNPK) surrendered control over parts of the Reserve, retaining only two sections: the Marsabit Sector and the Uaso Nyiro Sector.This surrender was formalised through Legal Notice No. 16 of 1961, under Boundary Plan No. 216/13. Subsequently, in 1962, the TRNPK surrendered control of the Uaso Nyiro Sector through Legal Notice No. 366 of 1962, as reflected in Boundary Plan No. 216/49, leaving a significantly reduced Reserve area under conservation management. After this surrender, the Uaso Nyiro Sector was completely removed from the successive discussion and maps depicting the area of Marsabit National Reserve.

B. Marsabit Town and Songa Settlement

A major excision occurred in 1983, when land measuring approximately 524 km^2, including Marsabit Town and the Songa Settlement, was excised from Marsabit National Reserve through Legal Notice No. 3962 of 21st October 1983, and delineated under Boundary Plan No. 216/48 (Figure 4).

This excised area was later adjusted in 1991 through Legal Notice No. 1982 of 5th April 1991, under Boundary Plan No. 216/56, increasing the excised area to approximately 534 km^2 to incorporate additional settlement areas, including Karare.

C. Karare Sector

Further excision of the Karare Sector occurred in 1988, when approximately 9.6 km^2 was excised from Marsabit National Reserve and delineated under Boundary Plan No. 216/59 (Figure 5).

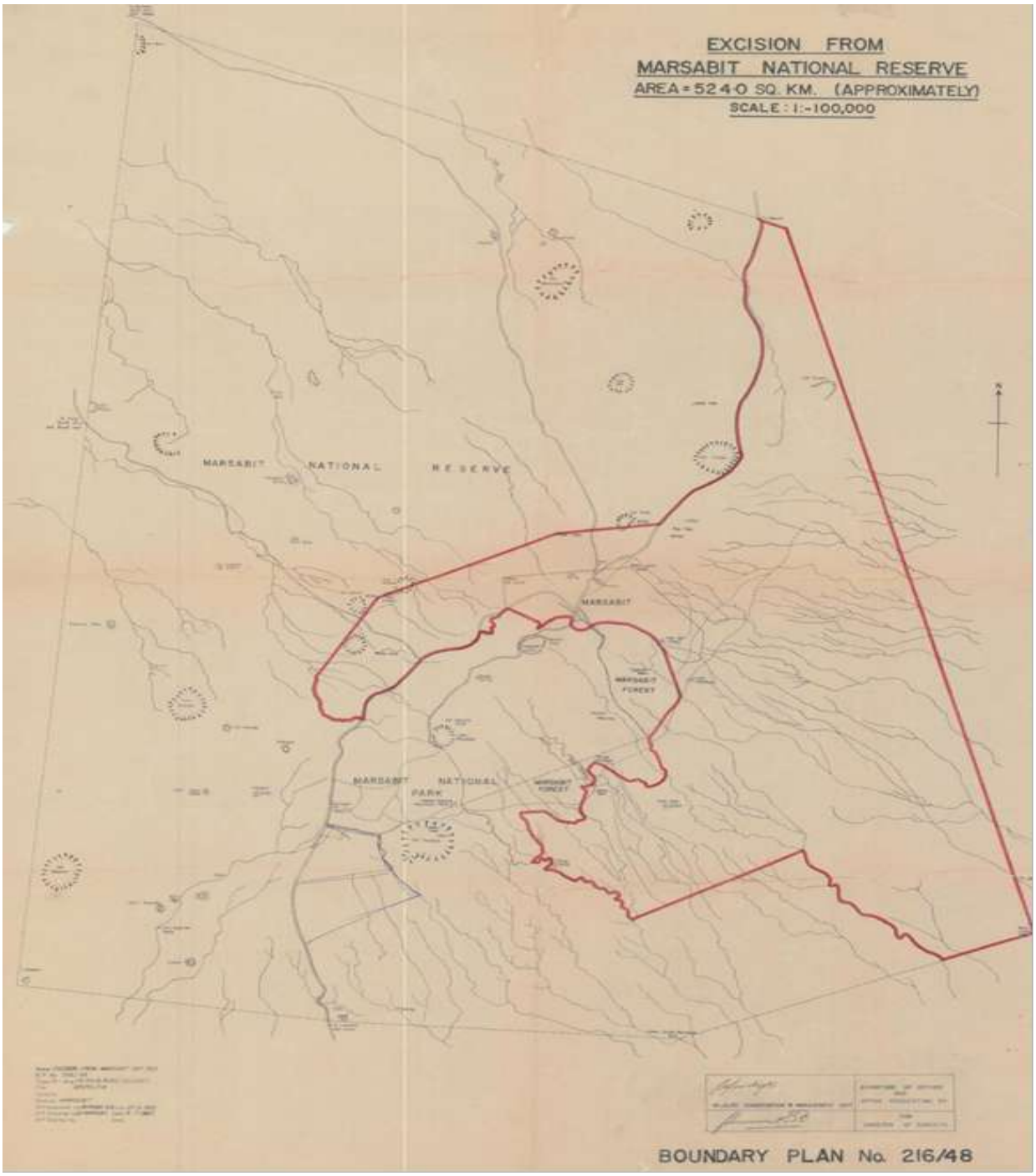


Figure 1-4: Excision of Songa and Marsabit Town Sectors from the National Reserve

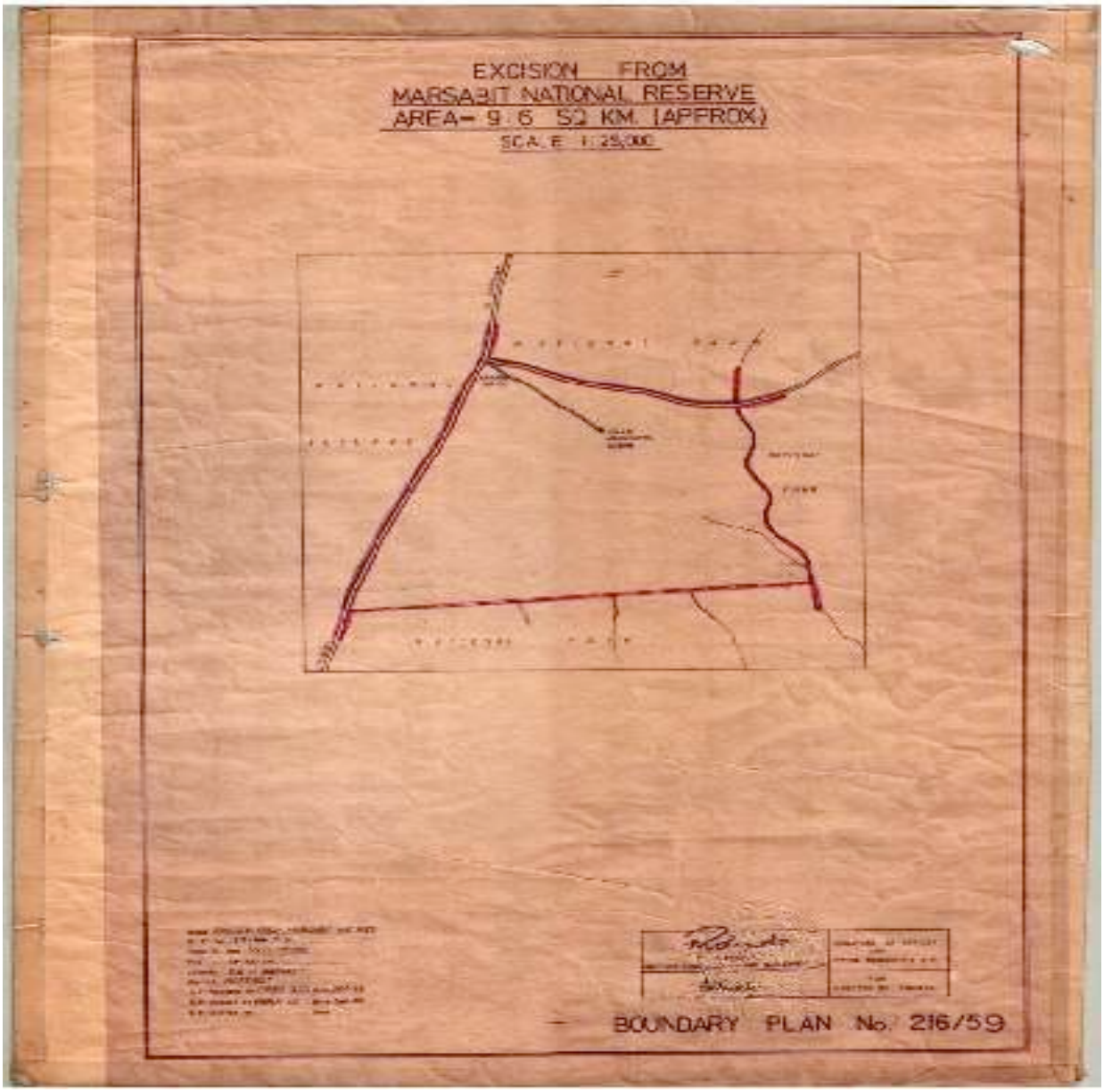


Figure 1-5: Excision of Karare1 Sector from Marsabit National Reserve, 1988

These historical excisions provide important context for the current proposal and highlight the evolving interactions between human settlement and conservation within Marsabit National Reserve.

1.3 CURRENT PROPOSED EXCISION AREAS

The current proposal involves the excision of approximately 14,402 acres (58 km^2) of settled areas located within Marsabit National Game Reserve in Marsabit County. The proposed excision areas

comprise four distinct settlement zones, namely Karare, Kambinye, Kamboe, and Parkishon, situated within Saku and Laisamis Sub-Counties of Marsabit County. The proposed excision areas have experienced long-term human occupation and infrastructure development over several decades and are presently characterized by permanent residential settlements, schools, health facilities, administrative offices, security installations, roads, water infrastructure, religious institutions, livestock holding areas, and other socio-economic infrastructure serving the local communities. The settlements are predominantly occupied by pastoralist communities whose livelihoods are largely dependent on livestock production, grazing systems, and natural resource utilization.

The County Government of Marsabit, through letter Ref. CGM/CS/CORD/02/10/25/2 dated 2nd October 2025, requested the Kenya Wildlife Service (KWS) to provide technical support in georeferencing and mapping the Karare Settled Area and its environs for the proposed excision. Subsequently, ground verification and georeferenced mapping undertaken by KWS confirmed that the proposed excision areas largely correspond with existing settlement footprints, grazing systems, infrastructure development patterns, and current land use realities within the landscape. The assessment further identified ecologically sensitive habitats, seasonal drainage systems, wildlife dispersal areas, and important elephant movement corridors traversing sections of the proposed excision areas and adjacent reserve ecosystems.

The aim of the proposed excision is to address evolving settlement and land use needs while ensuring the sustainability of wildlife corridors, dispersal areas, ecological connectivity, and critical habitats within Marsabit National Reserve. The proposed excision therefore seeks to formally align the legal land status with existing settlement realities while promoting improved land administration, tenure regularization, sustainable settlement planning, and enhanced service delivery. At the same time, the process aims to ensure that critical ecological areas, wildlife movement corridors, environmentally sensitive zones, and landscape connectivity functions are adequately considered in future land use planning, conservation management, and development control measures within the wider Marsabit ecosystem.

Given the ecological sensitivity of the Marsabit ecosystem and the complex interactions between conservation objectives and human settlement dynamics, the proposed excision requires a comprehensive assessment of environmental, ecological, social, economic, governance, and land use implications in order to inform sustainable and evidence-based decision-making throughout the excision process.

1.4 PROBLEM STATEMENT

Marsabit National Game Reserve is an ecologically important protected area that supports biodiversity conservation, wildlife movement, ecological connectivity, and critical ecosystem services within northern Kenya. However, over the years, sections of the reserve have experienced progressive human settlement expansion and infrastructure development resulting in increasing overlap between conservation functions and human land use activities.

The Karare, Kambinye, Kamboe, and Parkishon areas currently contain permanent settlements, schools, health facilities, roads, religious institutions, security installations, and other socio-economic infrastructure, despite remaining legally within the gazetted reserve boundaries. The proposed excision areas currently support an estimated population of approximately 9,520 people distributed across the four settlement zones. This has created land use conflicts, tenure insecurity, planning challenges, and administrative inconsistencies between the legal conservation status of the land and the actual settlement realities on the ground.

At the same time, the wider Marsabit ecosystem contains important wildlife movement corridors and ecologically sensitive habitats, including elephant dispersal routes traversing sections of the proposed excision areas. Uncontrolled settlement expansion and unplanned land use changes therefore pose potential risks to ecological connectivity, wildlife movement, habitat integrity, and reserve sustainability.

There is therefore a need for a comprehensive Environmental and Social Impact Assessment (ESIA) to evaluate the potential environmental, ecological, social, economic, and land use implications of the proposed excision and recommend appropriate mitigation and management measures to support sustainable decision-making.

1.5 JUSTIFICATION FOR THE PROPOSED EXCISION

The proposed excision is justified by the need to align the legal status of the land with the existing settlement realities within Karare, Kambinye, Kamboe, and Parkishon areas. These areas have experienced long-term human occupation and currently support extensive socio-economic infrastructure including schools, health centres, administrative offices, security installations, roads, religious institutions, and permanent residential settlements.

The proposed excision areas occupy approximately 14,402 acres within the southern and western sections of Marsabit National Reserve and already contain established pastoral settlements and socio-economic infrastructure serving the local communities. The proposed excision will facilitate land tenure regularization, orderly physical planning, improved service delivery, infrastructure development, and sustainable settlement management for the affected communities. It will also provide an opportunity to establish clearer and better-managed boundaries between settlement areas and ecologically sensitive conservation zones.

In addition, the proposed excision seeks to promote sustainable coexistence between conservation objectives and community livelihoods within the Marsabit ecosystem. Through a scientifically informed and controlled excision process, critical wildlife corridors, ecological connectivity areas, and environmentally sensitive habitats can be identified and integrated into future land use planning and conservation management strategies.

The proposed excision has further received support through stakeholder consultations, public participation forums, endorsement by the Marsabit County Assembly, and a formal de-gazettement request submitted by the Governor of Marsabit County to the Cabinet Secretary responsible for Environment, Climate Change and Forestry.

1.6 OBJECTIVES OF THE ESIA STUDY

The overall objective of the ESIA Study is to assess the potential environmental, ecological, social, economic, and land use impacts associated with the proposed excision of Karare settled areas from the Marsabit National Game Reserve and recommend appropriate mitigation and management measures for sustainable implementation of the project.

1.6.1 SPECIFIC OBJECTIVES

The specific objectives of the ESIA Study are to:

1) Establish the baseline environmental, ecological, socio-economic, and land use conditions within the proposed excision areas and the surrounding Marsabit ecosystem;
2) Identify, predict, and assess the potential positive and negative environmental, ecological, social, economic, and cumulative impacts associated with the proposed excision and subsequent land use changes within the Marsabit National Reserve;
3) Assess wildlife movement corridors, ecological connectivity systems, sensitive habitats, human-wildlife conflict risks, climate risks, sustainability considerations, and potential greenhouse gas implications associated with the proposed excision;
4) Evaluate feasible project alternatives, including the "No Project Alternative" and other conservation-compatible land use and settlement planning options, while facilitating stakeholder engagement and public participation in accordance with applicable environmental regulations; and
5) Develop appropriate mitigation, monitoring, institutional management, and Environmental and Social Management Plan (ESMP) measures to support environmentally sustainable and socially responsible implementation of the proposed excision process.

1.7 SCOPE OF THE ESIA STUDY

The ESIA Study covers the proposed excision of approximately 14,402 acres (58 km^2) comprising Karare, Kambinye, Kamboe, and Parkishon settlement areas located within Marsabit National Reserve in Saku and Laisamis Sub-Counties of Marsabit County. The proposed excision areas are located within the southern and western sections of the reserve and currently support an estimated population of approximately 9,520 people. The study covered both the proposed excision areas and the wider zones likely to experience direct, indirect, and cumulative impacts associated with the proposed land use changes.

The scope of the study included:

- Project description and land use analysis;
- Review of relevant legal, policy, and institutional frameworks;

- Baseline environmental assessment including climate, hydrology, biodiversity, water quality, air quality, and noise assessment;
- Wildlife corridor and ecological connectivity assessment;
- Socio-economic and cultural assessment;
- Human-wildlife conflict risk assessment;
- Cumulative impact assessment;
- Alternatives and scenario analysis;
- Climate risk and sustainability assessment;
- Stakeholder engagement and public participation; and
- Development of an Environmental and Social Management Plan (ESMP) for the proposed excision process.

1.8 ESIA STUDY METHODOLOGY

The ESIA Study was undertaken using an integrated and participatory approach involving literature review, field investigations, stakeholder consultations, spatial analysis, and specialist assessments. The study was conducted in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, and the approved NEMA Terms of Reference (ToR).

The methodology involved review of relevant secondary data and reports, baseline environmental and socio-economic surveys, public participation and stakeholder engagement, wildlife corridor and ecological assessments, GIS mapping and spatial analysis, impact identification and evaluation, and development of mitigation and management measures through the Environmental and Social Management Plan (ESMP). Detailed methodologies applied for the various thematic assessments and specialist studies are presented in Chapter 4 of this ESIA Study Report.

1.9 TERMS OF REFERENCE AND NEMA APPROVAL CONDITIONS

The Terms of Reference (ToR) for the Environmental and Social Impact Assessment (ESIA) Study were prepared in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, and other applicable environmental and land governance frameworks. The ToR outlined the scope of the

study, key thematic areas, specialist assessments, stakeholder engagement requirements, and the methodology to be applied during the ESIA process.

The ToR for the proposed excision of Karare settled areas from the Marsabit National Game Reserve were submitted to the National Environment Management Authority (NEMA) for review and approval on 22nd August 2025. Subsequently, NEMA approved the ToR under License No. NEMA/ENVIS/EIA/TOR/Approval_0232 and Application Reference No. NEMA/ENVIS/EIA/TOR/00147 dated 23rd May 2026.

The approval conditions issued by NEMA required the ESIA Study to undertake comprehensive assessments including wildlife corridor and ecological connectivity assessment, biodiversity assessment, cumulative impact assessment, human-wildlife conflict risk assessment, socio-economic land use assessment, climate risk assessment, alternatives analysis, stakeholder engagement and public participation, and development of appropriate mitigation and management measures.

The ESIA Study has therefore been undertaken in compliance with the approved ToR and NEMA approval conditions. Detailed specialist assessments and thematic analyses are presented in the relevant chapters and annexes of this ESIA Study Report.

1.10 STRUCTURE OF THE REPORT

This ESIA Study Report is organized into eleven main chapters and supporting annexes covering the various environmental, ecological, social, legal, and institutional aspects associated with the proposed excision of Karare settled areas from the Marsabit National Game Reserve.

- Chapter One presents the introduction, project background, historical context of the reserve, previous excisions, problem statement, justification of the proposed excision, objectives, scope of the study, methodology overview, and the approved Terms of Reference.
- Chapter Two provides a detailed description of the proposed project including the project location, proposed excision areas, existing land use activities, settlement characteristics, infrastructure, and project components.
- Chapter Three presents the policy, legal, and institutional framework relevant to the proposed excision and ESIA process.

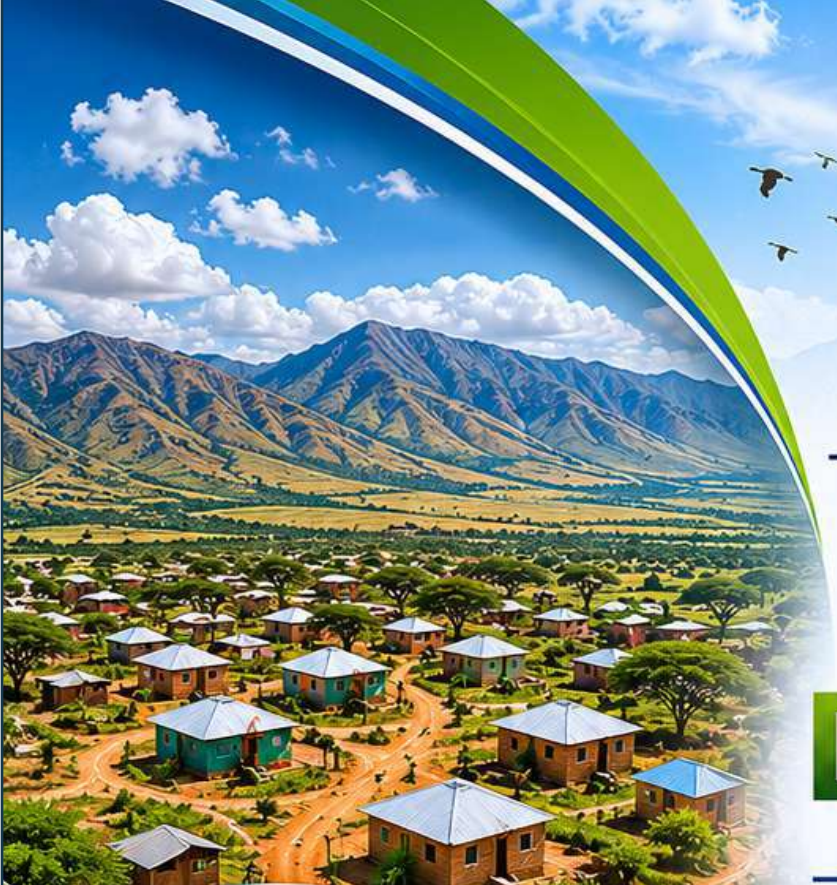
- Chapter Four outlines the ESIA study methodology, including data collection methods, field investigations, stakeholder engagement approaches, GIS analysis, and impact assessment methods applied during the study.
- Chapter Five presents the baseline environmental conditions within the project area, including climate, hydrology, biodiversity, ecological resources, wildlife habitats, and environmental sensitivities.
- Chapter Six presents the baseline socio-economic conditions including demographic characteristics, livelihoods, settlement patterns, infrastructure, land use systems, cultural heritage, and human-wildlife interactions.
- Chapter Seven presents the public participation and stakeholder engagement process undertaken during the ESIA Study.
- Chapter Eight provides an analysis of project alternatives including the "No Project Alternative" and other conservation-compatible land use options.
- Chapter Nine presents the identification and assessment of potential environmental and social impacts associated with the proposed excision.
- Chapter Ten presents the proposed mitigation measures and the Environmental and Social Management Plan (ESMP) for the project.
- Chapter Eleven presents the conclusions and recommendations of the ESIA Study.
- The report is further supported by annexes containing specialist studies, public participation records, maps, laboratory results, legal documents, and other supporting information relevant to the ESIA Study.

CHAPTER 02

PROJECT DESCRIPTION

Defining the proposed excision area, project activities, and the physical and administrative context.













PROJECT LOCATION

SETTLEMENTS & COMMUNITIES

LAND USE & LIVELIHOODS

INFRASTRUCTURE & SERVICES

PROJECT ACTIVITIES & OUTCOMES

CHAPTER 2: PROJECT DESCRIPTION

This chapter presents a description of the proposed excision project including the project location, administrative context, proposed excision areas, current land use characteristics, settlement patterns, and the key activities associated with the proposed excision process. The chapter further describes the spatial distribution of the proposed excision areas within Marsabit National Reserve and outlines the existing socio-economic and ecological conditions within the project area.

2.1 PROJECT LOCATION

The proposed excision areas are located within the southern and western sections of Marsabit National Reserve in Marsabit County, northern Kenya. The study area specifically covers the Karare Settled Area and its environs, which form part of the wider Marsabit National Reserve ecosystem and interface closely with surrounding community lands.

The proposed excision areas are situated within Saku and Laisamis Sub-Counties and comprise four distinct settlement zones namely Karare II, Kambinye, Kamboe, and Parkishon. The areas are located west and south of Marsabit Town and are characterized by gently undulating plains interspersed with low hills, seasonal drainage systems, grazing areas, and scattered settlement clusters.

The project area is accessible through a network of main roads and earth tracks, including the Marsabit–Isiolo A2 Highway, which serves as the primary access route to the proposed excision areas. The Karare area, which forms the focal point of the study, is traversed by major road infrastructure that enhances accessibility but also contributes to increasing human pressure within the conservation landscape.

Ground verification and georeferenced mapping undertaken by the Kenya Wildlife Service (KWS) confirmed that the proposed excision areas largely correspond with existing settlement footprints, grazing systems, and current land use realities within the landscape. The assessment further identified ecologically sensitive habitats, seasonal drainage systems, wildlife dispersal areas, and important elephant movement corridors traversing sections of the proposed excision areas and adjacent reserve ecosystems.

The proposed excision areas collectively cover approximately 14,402 acres (58 km^2) and currently support an estimated population of approximately 9,520 people distributed across the four settlement zones.

Figure 2-1: Proposed Excision Areas and Population Distribution

SETTLEMENT AREA	AREA (ACRES)	AREA (KM^2)	ESTIMATED POPULATION
Kambinye	4,978	20	2,062
Kamboe	3,712	15	3,205
Karare II	3,728	15	2,334
Parkishon	1,985	8	1,919
Total	**14,402**	**58**	**9,520**

2.2 ADMINISTRATIVE CONTEXT

Administratively, the proposed excision areas are located within Marsabit County in northern Kenya and fall under Saku and Laisamis Sub-Counties. The project area is primarily situated within Karare Ward and its surrounding settlement zones within the wider Marsabit ecosystem.

The proposed excision areas comprising Karare II, Kambinye, Kamboe, and Parkishon are located within the southern and western sections of Marsabit National Reserve and fall under the administrative jurisdiction of the County Government of Marsabit and the national government administrative structure within the region.

The area is served by various administrative institutions including County Government offices, local administration units, security agencies, and sectoral government departments responsible for land administration, environmental management, wildlife conservation, infrastructure development, and public service delivery. The Parkishon area additionally hosts a Kenya Defence Forces (KDF) base which constitutes an important institutional and security presence within the landscape.

Figure 2-2: Administrative Context of the Proposed Excision Areas

ADMINISTRATIVE UNIT	DESCRIPTION
Country	Kenya
Region	Northern Kenya
County	Marsabit County
Sub-Counties	Saku and Laisamis
Ward	Karare Ward
Protected Area	Marsabit National Reserve
Main Settlement Areas	Karare II, Kambinye, Kamboe, and Parkishon
Nearest Urban Centre	Marsabit Town
Key Institutional Presence	Kenya Defence Forces (KDF) Base – Parkishon

2.3 DESCRIPTION OF PROPOSED EXCISION AREAS

The proposed excision areas comprise four distinct settlement zones namely Karare II, Kambinye, Kamboe, and Parkishon located within the southern and western sections of Marsabit National Reserve. The proposed excision areas largely encompass locations already under varying levels of human settlement, grazing use, infrastructure development, and socio-economic activities reflecting long-standing pastoral occupation patterns within the wider Marsabit ecosystem.

Ground verification undertaken by the ESIA Consultant and the Kenya Wildlife Service (KWS) personnel established that the proposed excision areas generally correspond with existing settlement footprints and current land use patterns. Minor deviations from gazetted reserve boundaries were however observed in some locations, highlighting the need for formal boundary demarcation to minimize future land use conflicts and boundary disputes.

The proposed excision areas contain varying levels of settlement density, infrastructure development, ecological sensitivity, and wildlife movement interactions. Some sections directly overlap with important wildlife dispersal routes and ecological connectivity zones, particularly elephant movement corridors traversing the Karare II and adjacent settlement areas.

A. KARARE II

Karare II forms the focal point of the proposed excision and is situated within the south-western section of Marsabit National Reserve. The area is characterized by relatively high settlement density, established infrastructure, and extensive human activity compared to other sections of the proposed excision areas.

The area contains permanent residential settlements, schools, health facilities, roads, administrative offices, livestock holding areas, and other socio-economic infrastructure supporting the local pastoralist communities. The settlement pattern is concentrated along major access roads and transport corridors. The area exhibits the highest settlement concentration among the proposed excision areas and directly overlaps important wildlife movement routes and ecological connectivity zones.

Figure 2-3: Proposed Karare II Village Coordinates

COORDINATES	REMARKS

37N 376406 / UTM 0245872	Northeast border along highway
37N 374486 / UTM 0246118	Northwest border along elephant corridor
37N 373612 / UTM 0245190	Western border
37N 373049 / UTM 0238665	Southwest border
37N 374978 / UTM 0238538	Southeast border along highway



Figure 2-4: Settlements at Karare Village (Source: Google Earth image dated 1/1/2021)

B. KAMBINYE

Kambinye is located within the north-western section of the proposed excision areas adjacent to sections of the Reserve boundary and Kargi Road. The area is characterized by dispersed pastoral settlements, grazing lands, and moderate infrastructure development.



Figure 2-5: Settlements at Kambinye Village (Source: Google Earth image dated 1/1/2021)

The dominant land use within Kambinye is pastoralism and livestock grazing, with settlements concentrated mainly along access routes and transport corridors. The area forms part of the broader pastoral grazing landscape within the Marsabit ecosystem.

Figure 2-6: Proposed Kambinye Village Coordinates

COORDINATES	REMARKS
37N 364064 / UTM 0264273	Southwest border along Reserve
37N 364509 / UTM 0268485	Northwest border near Kargi Road
37N 369335 / UTM 0269014	Northeast border
37N 369102 / UTM 0264929	Southeast border along Kargi Road

The area currently supports extensive grazing activities and scattered settlement clusters with pastoralism forming the primary livelihood activity.

C. KAMBOE

Kamboe is situated within the southern section of the proposed excision areas and lies adjacent to sections of the Marsabit–Isiolo highway and Reserve boundary. The area contains established pastoral settlements, grazing areas, and socio-economic infrastructure serving the local communities.

The settlement pattern within Kamboe is influenced by proximity to major transport infrastructure and access routes. Livestock production and grazing remain the dominant livelihood activities within the area. The area reflects long-standing pastoral occupation patterns and increasing settlement development associated with improved accessibility and infrastructure connectivity.

Figure 2-7: Proposed Kamboe Village Coordinates

COORDINATES	REMARKS
37N 380153 / UTM 0232998	Southeast border along Reserve
37N 380169 / UTM 0235585	Northeast border
37N 374470 / UTM 0235935	Northwest border
37N 374422 / UTM 0233426	Southwest border
37N 376393 / UTM 0233180	Southern border along highway
37N 375815 / UTM 0235853	Northern border along highway



Figure 2-8: Settlements at Kamboe Village (Source: Google Earth image dated 1/1/2021)

D. PARKISHON

Parkishon is located within the western section of the proposed excision areas adjacent to the Kenya Defence Forces (KDF) base and sections of the Marsabit highway corridor. The area contains permanent settlement clusters, institutional infrastructure, grazing areas, and access routes linking the surrounding communities.



Figure 2-9: Settlements at Parkishon Village (Source: Google Earth image dated 1/1/2021)

The presence of the KDF base represents a significant permanent institutional footprint within the landscape and has influenced settlement development patterns and infrastructure growth within the area.

Figure 2-10: Proposed Parkishon Village Coordinates

COORDINATES	REMARKS
37N 376692 / UTM 0248938	Southeast border along highway
37N 377293 / UTM 0250484	Northeast border along highway
37N 372292 / UTM 0251336	Northwest border
37N 371996 / UTM 0249632	Southwest border

The area currently supports pastoral settlements, institutional infrastructure, and grazing activities while also interacting with adjacent wildlife habitats and conservation landscapes within the wider Marsabit ecosystem.

2.4 CURRENT LAND USE AND SETTLEMENT CHARACTERISTICS

The proposed excision areas are currently characterized by a mixture of pastoral settlements, grazing lands, transport infrastructure, public institutions, and socio-economic service facilities developed over several decades of human occupation within sections of the Marsabit National Reserve. The dominant land use within the project area is pastoralism, with local communities relying primarily on livestock production, grazing systems, and natural resource utilization for their livelihoods.

Settlement patterns within the proposed excision areas are generally concentrated along major access roads, transport corridors, water access points, and institutional centres. Permanent and semi-permanent residential settlements have gradually expanded within Karare II, Kambinye, Kamboe, and Parkishon areas, resulting in increasing development of social and economic infrastructure within the landscape.

The proposed excision areas currently contain schools, health facilities, administrative offices, security installations, roads, water infrastructure, religious institutions, livestock holding areas, and commercial activities serving the local communities. Grazing activities remain widespread across the proposed excision areas and surrounding landscapes, with livestock mobility forming an important component of the pastoral production system. The areas also contain seasonal drainage systems, natural vegetation, scattered wildlife habitats, and ecological connectivity zones interacting with the broader Marsabit ecosystem.

Ground verification and georeferenced mapping undertaken by the Kenya Wildlife Service (KWS) established that the proposed excision areas largely correspond with existing settlement footprints and long-standing grazing use patterns. However, some sections of the proposed excision areas

overlap with wildlife dispersal routes and ecologically sensitive habitats, particularly within Karare II and adjacent areas where important elephant movement corridors were identified.

A. KARARE II

Karare II exhibits the highest settlement density among the proposed excision areas and forms the focal point of the proposed excision process. The area contains permanent and semi-permanent residential settlements, schools, administrative facilities, grazing areas, water infrastructure, and commercial activities concentrated mainly along the highway corridor.

The area is characterized by intensive human activity and expanding settlement development associated with improved accessibility and infrastructure connectivity. Ground verification further established that sections of Karare II overlap with important elephant movement corridors and wildlife dispersal routes, making it one of the ecologically sensitive sections of the proposed excision areas.

B. KAMBINYE

Kambinye is predominantly characterized by dispersed pastoral settlements, grazing lands, and livestock mobility systems. Settlement clusters within the area are mainly concentrated along access roads and transport routes near the Reserve boundary and Kargi Road.

The dominant land use activity within Kambinye is pastoralism, with extensive grazing activities occurring across the surrounding landscape. Infrastructure development within the area remains relatively moderate compared to Karare II, although settlement expansion and grazing pressure are gradually increasing within the area.

C. KAMBOE

Kamboe is characterized by pastoral settlements, grazing areas, transport infrastructure, and socio-economic service facilities located adjacent to sections of the Marsabit–Isiolo highway corridor. The area contains scattered residential settlements, livestock holding areas, access roads, and community service facilities supporting the local population.

The settlement pattern within Kamboe has been influenced by proximity to the highway and improved accessibility, resulting in gradual expansion of settlement and commercial activities within the area. Livestock production and grazing remain the dominant livelihood activities.

D. PARKISHON

Parkishon is characterized by a mixture of pastoral settlements, grazing lands, institutional infrastructure, and transport corridors. The area contains permanent settlement clusters and community facilities distributed around the western section of the Reserve.

The Parkishon area additionally hosts a Kenya Defence Forces (KDF) base which constitutes a major institutional and security presence within the landscape. The presence of the KDF base has influenced settlement growth patterns, infrastructure development, and accessibility within the area.

Grazing activities and pastoral land use systems remain common within the surrounding landscape, with continued interaction between settlement areas and adjacent wildlife habitats within the broader Marsabit ecosystem.

2.5 PROPOSED PROJECT ACTIVITIES

The proposed project involves the legal excision of approximately 14,402 acres (58 km^2) of settled areas from the Marsabit National Reserve in order to regularize existing settlements and align the legal land status with prevailing land use realities within the project area.

The proposed excision process will be implemented through a series of sequential administrative, technical, legal, planning, and environmental management activities involving national government agencies, county government institutions, local communities, and other stakeholders.

The project activities will commence with stakeholder consultations and public participation aimed at obtaining views, concerns, and recommendations from affected communities, government institutions, conservation agencies, and other interested stakeholders regarding the proposed excision process.

This will be followed by ground verification, georeferenced mapping, and boundary confirmation exercises to establish the spatial extent of the proposed excision areas and identify settlement footprints, ecological sensitivity zones, wildlife corridors, and existing land use patterns within the landscape.

The project further involves undertaking the Environmental and Social Impact Assessment (ESIA) Study to assess potential environmental, ecological, social, economic, and land use implications associated with the proposed excision and recommend appropriate mitigation and management measures.

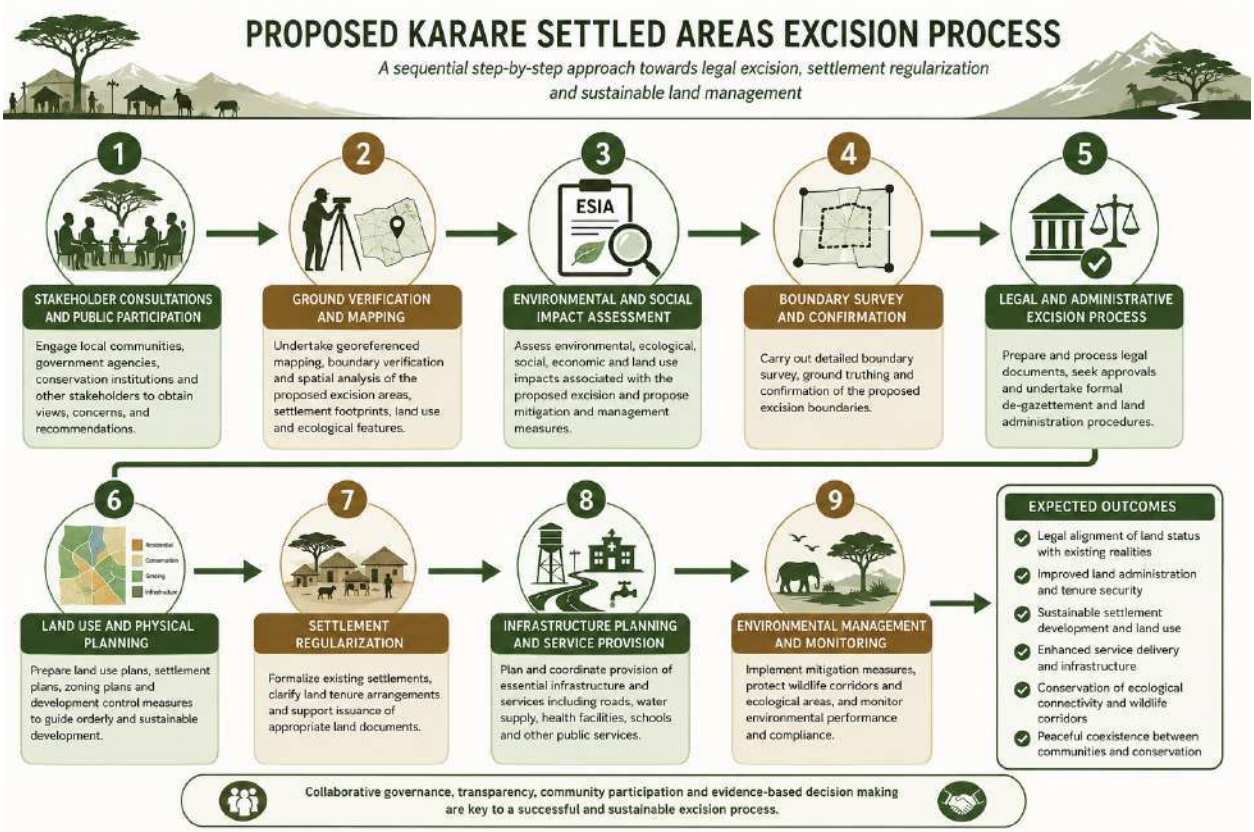


Figure 2-11: Proposed Project Activities

Upon completion of the ESIA process and relevant approvals, the project will proceed with the legal and administrative excision process including preparation and approval of boundary plans, survey verification, land administration procedures, and formal de-gazettement processes in accordance with applicable legal and institutional requirements.

Following the excision process, the project will involve preparation and implementation of land use and physical development plans aimed at guiding future settlement development, infrastructure expansion, environmental conservation, and sustainable natural resource management within the excised areas.

The project will also incorporate environmental management and monitoring measures aimed at protecting wildlife movement corridors, ecological connectivity zones, environmentally sensitive habitats, and other critical ecological resources identified during the ESIA process.

2.6 PROJECT IMPLEMENTATION FRAMEWORK

The implementation of the proposed excision process will involve a coordinated framework comprising national government agencies, county government institutions, conservation agencies, local administration, and affected communities. The process will be guided by applicable legal, policy, environmental, land governance, and conservation frameworks governing protected areas and land administration in Kenya.

Key institutions involved in the implementation process will include:

- National Environment Management Authority (NEMA);
- Kenya Wildlife Service (KWS);
- Marsabit County Government;
- Ministry of Environment, Climate Change and Forestry;
- Ministry of Lands, Public Works, Housing and Urban Development;
- National Land Commission (NLC);
- Local Administration; and
- Other relevant sectoral agencies.

The implementation framework will involve stakeholder engagement and public participation, ground verification and boundary confirmation, environmental and social safeguards implementation, legal and administrative excision procedures, land use planning, and environmental monitoring activities. The process will further require coordination between conservation management objectives and settlement planning considerations in order to ensure sustainable land use management within the wider Marsabit ecosystem.

The ESIA Study and associated specialist assessments will provide the environmental and social safeguards framework for guiding implementation of the proposed excision process.

2.7 POTENTIAL AREA OF INFLUENCE OF THE PROPOSED EXCISION

The proposed excision of approximately 14,402 acres (58 km^2) from Marsabit National Reserve covers areas that have experienced long-term human occupation, settlement expansion, grazing activities, and socio-economic development over several decades. The proposed excision areas currently support established pastoral settlements, public infrastructure, institutional facilities, and community livelihood systems within the wider Marsabit ecosystem.

The potential area of influence of the proposed excision can generally be categorized into direct, indirect, and institutional influence zones based on the anticipated environmental, social, administrative, and land use implications associated with the proposed excision process.

2.7.1 DIRECT AREA OF INFLUENCE

The direct area of influence comprises the proposed excision areas currently occupied by permanent and semi-permanent settlements, schools, health facilities, religious institutions, administrative offices, roads, water infrastructure, livestock holding areas, and other socio-economic facilities supporting the local communities.

The proposed excision will directly result in legal and administrative transition of the affected areas from protected reserve status to community land and settlement areas. The areas have already undergone significant land use transformation characterized by settlement development, grazing activities, infrastructure expansion, and modification of natural habitats over time.

Most sections within the direct area of influence currently exhibit reduced ecological functionality due to long-standing human activities, settlement concentration, and habitat alteration associated with expanding pastoral settlement systems.

2.7.2 INDIRECT AREA OF INFLUENCE

The indirect area of influence includes adjacent sections of Marsabit National Reserve, grazing areas, wildlife dispersal zones, ecological connectivity areas, and surrounding community lands that may experience secondary impacts associated with changing land use patterns following the proposed excision.

Potential indirect impacts may include increased human mobility, settlement expansion, grazing pressure, fencing, infrastructure growth, and changing patterns of natural resource utilization within areas surrounding the proposed excision zones. Some sections of the indirect influence area also contain important wildlife movement corridors and ecologically sensitive habitats interacting with the wider Marsabit ecosystem.

However, the proposed excision also presents an opportunity to improve land use planning, boundary management, environmental governance, and community participation in conservation initiatives through establishment of clearly defined settlement boundaries and sustainable land management measures.

2.7.3 INSTITUTIONAL AND SOCIO-ECONOMIC AREA OF INFLUENCE

The institutional and socio-economic area of influence extends beyond the immediate excision areas to include administrative units, governance structures, service delivery systems, and local institutions within Karare Ward, Saku and Laisamis Sub-Counties, and the wider Marsabit County.

The proposed excision is expected to influence land administration systems, settlement planning processes, infrastructure development, public service delivery, and institutional coordination among agencies responsible for environmental management, land governance, wildlife conservation, and local development planning.

The excision process is further expected to support improved land tenure security, enhanced participation in county development planning, reduced land-related conflicts, and improved coordination between conservation management and community livelihood systems within the wider landscape.

2.8 EXPECTED PROJECT OUTCOMES

The proposed excision is expected to facilitate alignment between the legal land status and the existing settlement realities within Karare II, Kambinye, Kamboe, and Parkishon areas. The project is anticipated to support improved land administration, land tenure regularization, orderly settlement planning, and enhanced provision of public infrastructure and social services within the affected areas.

The project is also expected to contribute towards improved governance of settlement development, reduction of land use conflicts, and enhanced coordination between conservation management and community livelihood needs within the wider Marsabit ecosystem.

Through the proposed land use planning and environmental management measures, the project is further expected to promote sustainable management of wildlife corridors, ecological connectivity zones, grazing systems, and environmentally sensitive habitats identified within the project area.

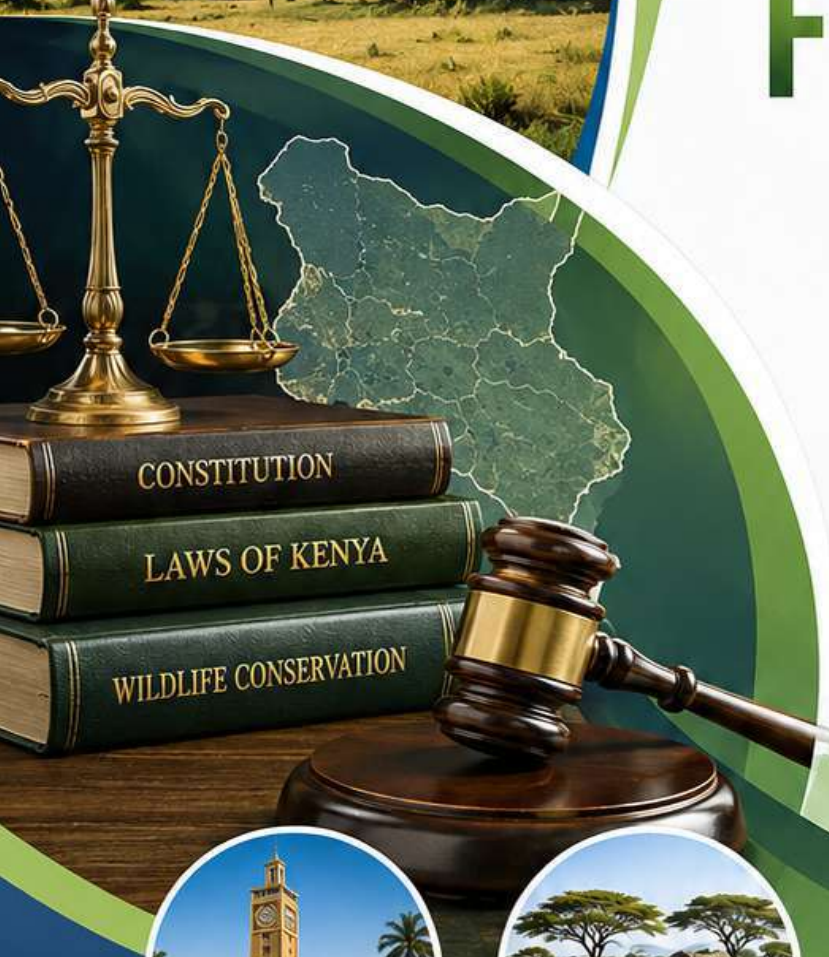
In addition, the proposed excision is anticipated to support improved planning and management of infrastructure development, settlement expansion, and natural resource utilization while strengthening long-term coexistence between conservation objectives and pastoral community livelihoods within the landscape.

CHAPTER 03

POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Establishing the legal, policy and institutional context guiding the proposed excision and ensuring compliance, sustainability and good governance.













LAWS & POLICIES | ENVIRONMENT & WILDLIFE | INSTITUTIONS & STAKEHOLDERS | COMPLIANCE & GOVERNANCE

CONSTITUTIONAL PROVISIONS
Guiding principles on

NATIONAL LAWS & REGULATIONS
Key environmental, wildlife,

INTERNATIONAL CONVENTIONS
Treaties and agreements

INSTITUTIONAL FRAMEWORK
Roles and responsibilities

COMPLIANCE & ACCOUNTABILITY
Ensuring adherence to

CHAPTER 3: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter presents the policy, legal, and institutional frameworks relevant to the proposed excision of Karare settled areas from the Marsabit National Reserve and the Environmental and Social Impact Assessment (ESIA) process. The chapter outlines the applicable national laws, policies, regulations, international conventions, and institutional mandates governing environmental management, wildlife conservation, land administration, physical planning, community land management, climate change, and sustainable development in Kenya.

The chapter further highlights the roles and responsibilities of the key institutions involved in the proposed excision process and provides the regulatory framework guiding environmental protection, land use planning, public participation, and conservation management within the proje

3.1 CONSTITUTIONAL PROVISIONS

The Constitution of Kenya, 2010 provides the overarching legal and governance framework guiding environmental management, land administration, public participation, sustainable development, and protection of natural resources in Kenya. The Constitution recognizes the right to a clean and healthy environment and establishes principles for sustainable utilization, conservation, and management of land, environmental resources, and biodiversity.

The Constitution further provides for public participation in decision-making processes, equitable access to land and natural resources, protection of community land rights, and sustainable land use planning. Various constitutional provisions relating to environmental protection, land governance, devolution, public participation, and sustainable development are therefore relevant to the proposed excision of Karare settled areas from the Marsabit National Reserve and the ESIA process.

Figure 3-1: Constitutional Framework Relevant to the Proposed Excision and ESIA Process

CONSTITUTIONAL PROVISION	RELEVANT CLAUSE/ ARTICLE	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Chapter Two – National Values and Principles of Governance	Article 10	Provides national values including sustainable development, public participation, inclusiveness, equity, transparency, accountability, and protection of marginalized communities, all of which are relevant to the proposed excision and ESIA process.
Bill of Rights	Article 42	Guarantees every person the right to a clean and healthy environment, including the right to have the environment protected for the benefit of present and future generations.
Enforcement of Environmental Rights	Article 70	Provides mechanisms for enforcement of environmental rights where environmental harm or degradation is anticipated or has occurred. This is relevant to environmental safeguards associated with the proposed excision.
Land and Environment	Article 60	Establishes principles of land policy including equitable access to land, sustainable and productive management of land resources, sound conservation and protection of ecologically sensitive areas, and elimination of gender discrimination in land matters.
Classification of Land	Article 61	Classifies land in Kenya as public, community, or private land and provides the constitutional basis for land governance and land use management relevant to the excision process.
Public Land	Article 62	Defines public land and includes government forests, game reserves, national parks, and other protected areas held by the state in trust for the people of Kenya.
Community Land	Article 63	Recognizes community land rights and provides for land lawfully held, managed, or used by communities identified on the basis of ethnicity, culture, or shared community interests. Relevant to settlement regularization and community tenure considerations.
Environment and Natural Resources	Article 69	Obligates the State to ensure sustainable exploitation, utilization, management, and conservation of the environment and natural resources, establish systems of environmental

CONSTITUTIONAL PROVISION	RELEVANT CLAUSE/ ARTICLE	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
		impact assessment, and protect biodiversity and ecological resources.
Obligations Relating to the Environment	Article 69(1)(d), (f), and (g)	Requires the State to encourage public participation in environmental management, establish systems for environmental impact assessment and environmental audit, and eliminate processes and activities likely to endanger the environment.
Duties Relating to the Environment	Article 69(2)	Places a duty on every person to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development.
Consumer Rights	Article 46	Provides for protection of public welfare and access to quality services which is relevant to improved infrastructure and service delivery anticipated under the proposed excision.
Economic and Social Rights	Article 43	Guarantees rights relating to accessible and adequate housing, clean and safe water, health, food, education, and social security, which are relevant to settlement regularization and service provision within the proposed excision areas.
Protection of Marginalized Groups	Article 56	Requires the State to put in place affirmative action programmes designed to ensure marginalized groups participate and are represented in governance and development processes. Relevant to pastoral communities within the project area.
Culture	Article 11	Recognizes culture as the foundation of the nation and obligates the State to promote and protect indigenous knowledge, cultural heritage, and traditional livelihoods relevant to pastoral communities in the project area.
Devolved Government	Chapter Eleven	Establishes county governments and devolved governance structures relevant to county planning, land management, natural resource governance, and service delivery within Marsabit County.
Functions of County Governments	Fourth Schedule	Assigns county governments functions relating to county planning, land survey and mapping, agriculture, county public

CONSTITUTIONAL PROVISION	RELEVANT CLAUSE/ ARTICLE	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
		works, environmental conservation, and implementation of specific national government policies.
Leadership and Integrity	Chapter Six	Provides principles of leadership, accountability, and transparency applicable to public institutions involved in the proposed excision process.
Public Participation	Articles 10, 118, and 232	Emphasizes public participation, involvement of communities in governance and decision-making processes, and responsive public administration. Relevant to stakeholder engagement and ESIA consultations.
Access to Information	Article 35	Guarantees every citizen the right to access information held by the State and information required for protection of any right or fundamental freedom. Relevant to ESIA disclosure and stakeholder consultations.
Sustainable Development	Article 10 and Article 69	Promotes sustainable development as a national governance principle balancing environmental conservation, social development, and economic needs within the proposed excision process.
Protection of Minorities and Marginalized Communities	Article 27 and Article 56	Promotes equality, non-discrimination, and protection of marginalized and pastoral communities affected by the proposed excision process.
Public Finance Principles	Article 201	Requires openness, accountability, and equitable sharing of public resources relevant to future infrastructure and development planning within the excised areas.
National Security	Article 238	Recognizes protection of territorial integrity, public safety, and national security interests relevant to the KDF presence within the Parkishon area.

3.2 NATIONAL ENVIRONMENTAL LAWS

The proposed excision of Karare settled areas from the Marsabit National Reserve is governed by various national environmental laws and regulations aimed at promoting sustainable environmental management, conservation of biodiversity, protection of natural resources, and orderly land use planning in Kenya. These legal frameworks provide the basis for environmental governance, environmental impact assessment, wildlife conservation, land administration, public participation, pollution control, and sustainable development.

The national environmental laws further establish institutional mandates, environmental safeguards, licensing requirements, and compliance obligations relevant to the proposed excision process and the implementation of the ESIA. The following sections outline the key environmental laws and regulations applicable to the proposed project.

Figure 3-2: National Environmental Laws Relevant to the Proposed Excision and ESIA Process

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015)	Establishes the overarching legal framework for environmental management and coordination in Kenya. Provides for Environmental Impact Assessment (EIA), environmental audits, environmental restoration orders, public participation, environmental conservation, and sustainable development.	Forms the principal legal framework guiding the ESIA process for the proposed excision. Requires the project to undergo ESIA before implementation and establishes environmental safeguards applicable to the project.
Environmental (Impact Assessment and Audit) Regulations, 2003	Provides procedures and requirements for conducting Environmental Impact Assessments and Environmental Audits in Kenya, including project screening, scoping, stakeholder engagement, reporting, review, and licensing procedures.	Guides preparation, submission, review, and approval of the ESIA Study Report for the proposed excision.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Environmental Management and Coordination (Strategic Environmental Assessment, Integrated Impact Assessment and Environmental Audit) Regulations, 2023	Provides guidelines for strategic environmental assessment, integrated environmental assessment, cumulative impact analysis, and environmental auditing.	Relevant to cumulative impact assessment, ecological connectivity analysis, and broader landscape-level environmental planning considerations associated with the proposed excision.
Environmental Management and Coordination (Water Quality) Regulations, 2006	Provides standards for water quality management, protection of water resources, prevention of water pollution, and regulation of effluent discharge into the environment.	Relevant to protection of seasonal drainage systems, water resources, and prevention of pollution within the proposed excision areas.
Environmental Management and Coordination (Waste Management) Regulations, 2006	Provides procedures for handling, transportation, storage, treatment, and disposal of waste. Promotes environmentally sound waste management practices.	Relevant to management of solid waste and other waste streams generated within settlement areas and future development activities within the excised areas.
Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009	Provides permissible noise and vibration standards and controls activities likely to generate excessive noise pollution.	Relevant to settlement expansion, infrastructure development, transport activities, and institutional operations within the proposed excision areas.
Environmental Management and Coordination (Air Quality) Regulations, 2014	Provides standards and measures for prevention, control, and monitoring of air pollution.	Relevant to dust emissions, vehicle movement, settlement expansion, and future infrastructure development within the project area.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006	Provides measures for conservation of biodiversity, protection of ecosystems, and sustainable use of biological resources.	Relevant to biodiversity conservation, wildlife habitats, ecological connectivity, and sensitive ecosystems within the wider Marsabit landscape.
Wildlife Conservation and Management Act, 2013	Provides for protection, conservation, management, and sustainable use of wildlife resources in Kenya. Establishes provisions for wildlife conservation areas, wildlife corridors, compensation for human-wildlife conflict, and protection of critical habitats.	Highly relevant to the proposed excision due to the project's location within Marsabit National Reserve and the presence of wildlife movement corridors and dispersal areas.
Forest Conservation and Management Act, 2016	Provides for conservation, protection, and sustainable management of forest resources and water catchment areas.	Relevant to conservation of vegetation cover, ecological integrity, and protection of environmentally sensitive areas within the wider Marsabit ecosystem.
Climate Change Act, 2016	Establishes a legal framework for climate change response measures, climate adaptation, climate resilience, and low-carbon development planning.	Relevant to climate risk assessment, climate resilience planning, sustainable land use management, and greenhouse gas considerations associated with the proposed excision.
Water Act, 2016	Provides for regulation, management, conservation, and protection of water resources and water infrastructure in Kenya.	Relevant to water resource management, protection of seasonal streams, water supply planning, and sustainable utilization of water resources within the project area.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Physical and Land Use Planning Act, 2019	Provides for preparation and implementation of physical development plans, land use planning, zoning, and development control.	Relevant to future settlement planning, zoning, infrastructure development, and land use management within the proposed excision areas.
Land Act, 2012	Provides for sustainable administration and management of public and community land in Kenya.	Relevant to land tenure regularization, land administration, land allocation, and management of excised areas following de-gazettement.
Community Land Act, 2016	Provides for recognition, protection, and registration of community land rights and community land governance structures.	Relevant to community land tenure arrangements and governance structures within the proposed excision areas occupied by pastoral communities.
Land Registration Act, 2012	Provides procedures for registration of land interests and land ownership documentation.	Relevant to future land registration and tenure formalization processes within the excised settlement areas.
National Land Commission Act, 2012	Establishes the National Land Commission and outlines its mandate in land administration and management.	Relevant to land administration, public land management, and legal processes associated with the proposed excision.
County Governments Act, 2012	Provides for county governance, county planning, and public participation in development processes.	Relevant to the role of Marsabit County Government in land use planning, infrastructure development, and stakeholder engagement processes.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Public Health Act (Cap. 242)	Provides measures for protection of public health, sanitation, disease prevention, and environmental health management.	Relevant to sanitation, waste management, settlement planning, and provision of health infrastructure within the proposed excision areas.
Occupational Safety and Health Act (OSHA), 2007	Provides for safety, health, and welfare of workers and protection against occupational hazards.	Relevant during implementation of survey works, infrastructure development, and other project-related field activities.
Energy Act, 2019	Provides for sustainable energy development, energy access, and energy infrastructure regulation.	Relevant to future energy infrastructure development and energy access within the excised settlement areas.
National Museums and Heritage Act, 2006	Provides for protection and conservation of cultural heritage, archaeological sites, and cultural resources.	Relevant to protection of cultural heritage resources and indigenous cultural landscapes within the project area.
Kenya Roads Act, 2007	Provides for development, management, and maintenance of road infrastructure in Kenya.	Relevant to road access, transport infrastructure, and connectivity within the proposed excision areas.
Disaster Risk Management Act, 2023	Provides frameworks for disaster risk reduction, emergency preparedness, and resilience planning.	Relevant to climate-related risks, drought management, environmental hazards, and settlement resilience planning within the project area.

3.3 WILDLIFE AND PROTECTED AREA LEGISLATION

The proposed excision of Karare settled areas from the Marsabit National Reserve directly relates to wildlife conservation, protected area management, biodiversity protection, and ecological sustainability within the wider Marsabit ecosystem. Kenya has established various laws and regulations governing conservation of wildlife resources, management of protected areas, ecological connectivity, habitat protection, and sustainable coexistence between human activities and wildlife conservation.

These legal frameworks provide guidance on management of national reserves, wildlife movement corridors, biodiversity conservation, community participation in conservation, human-wildlife conflict management, and protection of ecologically sensitive habitats. The following wildlife and protected area legislation is relevant to the proposed excision and ESIA process.

Figure 3-3: Wildlife and Protected Area Legislation Relevant to the Proposed Excision and ESIA Process

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Wildlife Conservation and Management Act, 2013	Provides for protection, conservation, management, and sustainable use of wildlife resources in Kenya. Establishes legal provisions for management of national parks, national reserves, wildlife corridors, dispersal areas, protected habitats, and human-wildlife conflict management.	The proposed excision is located within Marsabit National Reserve and directly affects wildlife habitats, ecological connectivity zones, and elephant movement corridors identified within the project area.
Wildlife Conservation and Management (Protected Areas) Regulations, 2015	Provides guidelines for management, protection, access, and regulation of activities within protected areas including national reserves and parks.	Relevant to legal and administrative procedures affecting land use changes and management of protected areas within Marsabit National Reserve.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Wildlife Conservation and Management (Access and Conservation Fees) Regulations, 2015	Establishes mechanisms for conservation funding, protected area management, and regulation of access to wildlife conservation areas.	Relevant to conservation management and future management of remaining protected sections adjacent to the proposed excision areas.
Wildlife Conservation and Management (Wildlife User Rights) Regulations, 2015	Provides for community participation and regulated utilization of wildlife resources through user rights and conservation partnerships.	Relevant to community involvement in conservation and coexistence initiatives within the wider Marsabit ecosystem.
Wildlife Conservation and Management (Compensation Scheme) Regulations, 2015	Provides procedures for compensation arising from human-wildlife conflicts including injury, death, crop destruction, and livestock predation.	Relevant due to the presence of human-wildlife interactions and elephant movement corridors within sections of the proposed excision areas.
Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006	Provides for conservation of biodiversity, protection of ecosystems, sustainable use of biological resources, and protection of ecologically sensitive habitats.	Relevant to biodiversity conservation and protection of ecological resources within Marsabit National Reserve and surrounding landscapes.
Forest Conservation and Management Act, 2016	Provides for protection and sustainable management of forest ecosystems, water catchments, and ecologically sensitive landscapes.	Relevant to conservation of natural vegetation, ecological integrity, and environmentally sensitive habitats within the wider Marsabit ecosystem.
Physical and Land Use Planning Act, 2019	Provides for sustainable land use planning, zoning, and protection of environmentally sensitive areas.	Relevant to future settlement planning, buffer zone management, and protection of wildlife corridors and ecological connectivity zones.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Climate Change Act, 2016	Provides a framework for climate adaptation, climate resilience, and sustainable ecosystem management.	Relevant to climate resilience planning and sustainable management of ecological resources within the project area.
Community Land Act, 2016	Provides for recognition, protection, and registration of community land and community resource governance systems.	Relevant to management of pastoral grazing systems and community participation in sustainable natural resource management adjacent to protected areas.
National Museums and Heritage Act, 2006	Provides for conservation and protection of cultural heritage sites and landscapes.	Relevant to protection of indigenous cultural landscapes and traditional pastoral systems associated with the Marsabit ecosystem.
Kenya Wildlife Service Act (Repealed and incorporated into Wildlife Conservation and Management Act, 2013)	Previously established Kenya Wildlife Service (KWS) as the lead institution for wildlife conservation and management in Kenya.	KWS remains the principal institution responsible for management of Marsabit National Reserve and technical assessments relating to the proposed excision process.
Convention on Biological Diversity (CBD)	International framework promoting biodiversity conservation, sustainable use of biological resources, and ecosystem protection.	Relevant to conservation of biodiversity and ecological sustainability within the Marsabit ecosystem.
Convention on Migratory Species (CMS)	Provides protection for migratory wildlife species and ecological corridors across landscapes.	Relevant to wildlife movement systems and ecological connectivity within the project area.
African Convention on the Conservation of Nature and Natural Resources	Promotes conservation and sustainable use of African natural resources and ecosystems.	Relevant to sustainable management of protected landscapes and ecological resources within the project area.

3.4 LAND AND COMMUNITY LAND LAWS

The proposed excision of Karare settled areas from the Marsabit National Reserve involves land tenure regularization, land administration, settlement planning, and community land governance processes. Kenya has established various legal frameworks governing land ownership, land use planning, public land management, community land rights, land registration, and sustainable utilization of land resources.

These laws provide the legal basis for management of public land, conversion of land use, community participation in land governance, physical planning, land adjudication, and protection of pastoral land use systems. The following land and community land laws are relevant to the proposed excision and ESIA process.

Figure 3-4: Land and Community Land Laws Relevant to the Proposed Excision and ESIA Process

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Land Act, 2012	Provides for sustainable administration and management of public land, private land, and community land in Kenya. Establishes procedures for land allocation, land administration, land management, and settlement planning.	Relevant to land administration, land tenure regularization, and management of excised areas following de-gazettement from the Marsabit National Reserve.
Land Registration Act, 2012	Provides procedures for registration of land rights, land ownership documentation, land transactions, and maintenance of land records.	Relevant to future land registration, issuance of land ownership documents, and formalization of tenure arrangements within the excised settlement areas.
National Land Commission Act, 2012	Establishes the National Land Commission (NLC) and outlines its mandate in management of public land, land administration, and oversight of land use planning processes.	Relevant to public land administration and legal processes associated with the proposed excision and land regularization process.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Community Land Act, 2016	Provides for recognition, protection, registration, and management of community land rights and governance systems. Recognizes customary land rights and community resource management structures.	Highly relevant due to the pastoral and communal land use systems practiced within the proposed excision areas and surrounding landscapes.
Physical and Land Use Planning Act, 2019	Provides for preparation and implementation of physical development plans, zoning, land use control, and sustainable land use management.	Relevant to future settlement planning, zoning, infrastructure planning, and regulation of development within the excised areas.
Land Adjudication Act (Cap. 284)	Provides procedures for ascertainment and recording of rights and interests in community and trust lands prior to registration.	Relevant to future land adjudication and settlement regularization processes within the proposed excision areas.
Land Consolidation Act (Cap. 283)	Provides for consolidation and reorganization of fragmented land holdings in certain areas.	Relevant where future settlement planning and land organization may require restructuring of land parcels and settlement layouts.
Land Control Act (Cap. 302)	Provides for regulation and control of transactions involving agricultural and community land.	Relevant to future land transactions and land management activities within the excised areas.
Survey Act (Cap. 299)	Provides procedures for land surveying, boundary demarcation, preparation of survey plans, and cadastral mapping.	Relevant to boundary verification, georeferenced mapping, and formal demarcation of the proposed excision areas.
Valuation for Rating Act (Cap. 266)	Provides for valuation of land and property for rating purposes by local authorities.	Relevant to future land valuation and county planning processes following settlement regularization.
County Governments Act, 2012	Provides for county governance, county planning, public participation, and decentralized service delivery.	Relevant to Marsabit County Government's role in land use planning, settlement planning, and infrastructure development within the proposed excision areas.

LEGAL FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Urban Areas and Cities Act, 2011	Provides for classification, governance, and management of urban areas and settlement planning.	Relevant to future settlement growth, infrastructure planning, and urban management considerations within expanding settlement areas.
Public Land Act Provisions under the Constitution of Kenya, 2010	Defines public land including protected areas, reserves, and government lands held in trust for the people of Kenya.	Relevant to legal processes associated with excision of land from a protected reserve and conversion to community or settlement land.
Trust Land Provisions (Historical Framework)	Previously governed management of trust land by local authorities prior to constitutional reforms and enactment of community land laws.	Provides historical context to communal land governance systems within pastoral areas of Marsabit County.
National Land Policy, 2009	Provides policy direction on sustainable land management, land tenure security, equitable access to land, and protection of community land rights.	Relevant to settlement regularization, sustainable land use planning, and management of pastoral community land systems.
Community Land Regulations, 2018	Provides procedures for registration, governance, administration, and management of community land.	Relevant to governance and management of community land rights following the proposed excision process.
Public Roads and Roads of Access Act (Cap. 399)	Provides for establishment and protection of public roads and access routes.	Relevant to access roads, settlement connectivity, and infrastructure planning within the excised areas.
National Spatial Plan (2015–2045)	Provides strategic national land use planning framework and spatial development guidance.	Relevant to regional land use planning, environmental conservation, and sustainable settlement development within Marsabit County.

3.5 CLIMATE CHANGE LEGAL FRAMEWORK

The proposed excision of Karare settled areas from the Marsabit National Reserve is closely linked to climate resilience, sustainable land use management, environmental conservation, and adaptation to climate-related risks affecting arid and semi-arid lands (ASALs) in northern Kenya. The project area is vulnerable to climate-related challenges including droughts, water scarcity, land degradation, vegetation loss, and increasing pressure on natural resources resulting from changing climatic conditions.

Kenya has established various legal and policy frameworks aimed at strengthening climate change adaptation, mitigation, environmental sustainability, disaster risk reduction, and resilience planning. These frameworks provide guidance on climate-responsive development planning, sustainable natural resource management, greenhouse gas management, and climate adaptation measures relevant to the proposed excision and ESIA process.

Figure 3-5: Climate Change Legal Framework Relevant to the Proposed Excision and ESIA Process

LEGAL/POLICY FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Climate Change Act, 2016	Establishes the legal and institutional framework for climate change response measures, climate adaptation, mitigation, resilience building, and low-carbon development planning in Kenya.	Relevant to climate risk assessment, climate resilience planning, sustainable settlement development, and environmental sustainability within the proposed excision areas.
National Climate Change Action Plan (NCCAP)	Provides national strategies and actions for climate adaptation, mitigation, resilience building, and climate-responsive development.	Relevant to integrating climate adaptation and sustainable land use planning within the proposed excision process.
National Climate Change Response Strategy (NCCRS), 2010	Provides policy direction on national climate change response measures and adaptation priorities.	Relevant to climate vulnerability management and sustainable environmental planning within ASAL ecosystems such as Marsabit County.

LEGAL/POLICY FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015)	Provides legal framework for environmental protection, environmental assessment, and sustainable resource management.	Relevant to integration of climate considerations into environmental planning and ESIA processes.
Climate Change (Amendment) Act, 2023	Strengthens climate governance mechanisms and implementation of climate response measures in Kenya.	Relevant to institutional coordination and climate compliance obligations associated with the project.
National Adaptation Plan (NAP) 2015–2030	Provides strategies for reducing climate vulnerability and enhancing resilience across sectors and ecosystems.	Relevant to adaptation planning for drought-prone pastoral and conservation landscapes within the Marsabit ecosystem.
Kenya Nationally Determined Contribution (NDC)	Outlines Kenya's commitments towards greenhouse gas emission reduction and climate resilience under the Paris Agreement.	Relevant to sustainable land management, ecological conservation, and climate-responsive development planning within the project area.
Disaster Risk Management Act, 2023	Provides legal framework for disaster risk reduction, preparedness, emergency response, and resilience planning.	Relevant to management of drought risks, environmental hazards, and climate-related vulnerabilities within the proposed excision areas.
National Drought Management Authority (NDMA) Act, 2016	Establishes the National Drought Management Authority and provides mechanisms for drought preparedness and resilience building in ASAL areas.	Relevant to drought resilience, pastoral livelihoods, and sustainable resource management within Marsabit County.
Water Act, 2016	Provides for sustainable management, conservation, and protection of water resources in Kenya.	Relevant to climate-related water resource management and water security within the proposed excision areas.
Forest Conservation and Management Act, 2016	Provides for conservation and sustainable management of forests and ecosystem services.	Relevant to climate regulation, vegetation conservation, and ecological sustainability within the wider Marsabit ecosystem.

LEGAL/POLICY FRAMEWORK	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Physical and Land Use Planning Act, 2019	Provides framework for sustainable physical planning and land use management.	Relevant to climate-responsive settlement planning, zoning, and sustainable land use management within the excised areas.
Kenya Climate Smart Agriculture Strategy (2017–2026)	Promotes climate-resilient agricultural and pastoral production systems.	Relevant to pastoral livelihood resilience and sustainable grazing systems within the project area.
Paris Agreement on Climate Change	International framework aimed at limiting global warming and strengthening climate adaptation and resilience.	Relevant to Kenya's climate commitments and integration of climate sustainability measures within development projects.
United Nations Framework Convention on Climate Change (UNFCCC)	International convention providing global framework for climate change response and cooperation.	Relevant to climate adaptation, mitigation, and environmental sustainability considerations within the ESIA process.
Sendai Framework for Disaster Risk Reduction (2015–2030)	Provides global framework for disaster risk reduction and resilience building.	Relevant to climate risk management, drought preparedness, and resilience planning within the project area.
African Union Climate Change and Resilient Development Strategy	Provides continental framework for climate resilience and sustainable development in Africa.	Relevant to sustainable management of vulnerable ASAL ecosystems and pastoral landscapes.

3.6 COUNTY GOVERNMENT POLICIES AND PLANS

The proposed excision of Karare settled areas from the Marsabit National Reserve is further guided by various county government policies, development plans, spatial planning frameworks, and sectoral strategies developed by the County Government of Marsabit. These frameworks provide direction on land use planning, infrastructure development, environmental conservation, climate resilience, settlement management, natural resource governance, and socio-economic development within the county.

The county policies and plans are important in guiding future settlement regularization, public service provision, environmental management, pastoral livelihood support, and sustainable development within the proposed excision areas and the wider Marsabit ecosystem.

Figure 3-6: County Government Policies and Plans Relevant to the Proposed Excision and ESIA Process

COUNTY POLICY/PLAN	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Marsabit County Integrated Development Plan (CIDP)	Provides the overall county development framework and identifies county priorities in infrastructure, land use planning, water development, environmental conservation, livestock development, and social services.	Relevant to settlement planning, infrastructure development, land management, and socio-economic development within the proposed excision areas.
Marsabit County Spatial Plan	Provides spatial planning framework for land use zoning, settlement planning, environmental conservation, infrastructure development, and sustainable utilization of land resources within the county.	Relevant to future land use planning, zoning, settlement regularization, and management of ecological sensitivity areas within the project area.

COUNTY POLICY/PLAN	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Marsabit County Climate Change Policy	Provides county-level framework for climate adaptation, resilience building, sustainable resource management, and climate-responsive development planning.	Relevant to climate resilience planning and sustainable management of ASAL ecosystems within the proposed excision areas.
Marsabit County Environment Action Plan	Provides strategies for environmental conservation, ecosystem management, pollution control, and sustainable natural resource utilization.	Relevant to environmental management and protection of ecological resources within and around the proposed excision areas.
Marsabit County Livestock Development Policy	Promotes sustainable livestock production systems, grazing management, pastoral livelihoods, and livestock infrastructure development.	Relevant to pastoral land use systems and grazing activities within the proposed excision areas.
Marsabit County Water and Sanitation Policy	Provides strategies for water resource development, water access, sanitation services, and sustainable water management.	Relevant to water infrastructure planning and sustainable water resource management within the settlement areas.
Marsabit County Disaster Risk Management Framework	Provides mechanisms for drought preparedness, resilience building, emergency response, and climate-related disaster management.	Relevant to drought resilience, climate adaptation, and environmental risk management within the project area.
Marsabit County Annual Development Plans (ADPs)	Provides annual implementation priorities and sectoral investment plans within the county.	Relevant to future infrastructure development, settlement planning, and public service delivery within the excised areas.

COUNTY POLICY/PLAN	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
County Land Management and Physical Planning Frameworks	Provides guidelines for land administration, settlement planning, zoning, and development control within the county.	Relevant to land tenure regularization and future development planning within the proposed excision areas.
Marsabit County Natural Resource Management Strategies	Promotes sustainable utilization and conservation of natural resources including rangelands, water resources, and biodiversity.	Relevant to grazing management, ecological sustainability, and environmental conservation within the wider Marsabit ecosystem.
County Public Participation Frameworks	Provides mechanisms for stakeholder engagement and community participation in county planning and development processes.	Relevant to public participation and stakeholder engagement processes undertaken during the ESIA Study and proposed excision process.
Marsabit County ASAL Development Strategies	Provides development approaches for arid and semi-arid lands focusing on resilience, livelihoods, infrastructure, and natural resource management.	Relevant to sustainable pastoral development and climate resilience within the project area.

3.7 INTERNATIONAL CONVENTIONS AND TREATIES

Kenya is a signatory to several international conventions, treaties, and agreements relating to environmental protection, biodiversity conservation, climate change, sustainable development, wildlife management, and protection of natural resources. These international frameworks provide guidance on sustainable environmental governance, ecosystem conservation, climate resilience, protection of biodiversity, and community participation in natural resource management.

The proposed excision of Karare settled areas from the Marsabit National Reserve is therefore subject to various international obligations and commitments aimed at promoting sustainable land use management, ecological conservation, climate adaptation, and protection of environmentally sensitive ecosystems.

Figure 3-7: International Conventions and Treaties Relevant to the Proposed Excision and ESIA Process

CONVENTION/TREATY	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Convention on Biological Diversity (CBD), 1992	Promotes conservation of biodiversity, sustainable use of biological resources, and equitable sharing of benefits arising from genetic resources.	Relevant to biodiversity conservation, habitat protection, ecological sustainability, and management of wildlife habitats within Marsabit National Reserve.
United Nations Framework Convention on Climate Change (UNFCCC), 1992	Provides global framework for addressing climate change through mitigation, adaptation, resilience building, and sustainable development.	Relevant to climate risk assessment, climate adaptation planning, and environmental sustainability considerations within the project area.
Paris Agreement on Climate Change, 2015	Establishes international commitments for reducing greenhouse gas emissions and strengthening climate resilience.	Relevant to climate-responsive settlement planning, sustainable land management, and climate resilience measures within the proposed excision areas.

CONVENTION/TREATY	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Convention on Migratory Species (CMS/Bonn Convention), 1979	Promotes conservation of migratory species and protection of ecological corridors and habitats.	Relevant to wildlife movement systems, elephant corridors, and ecological connectivity within the wider Marsabit ecosystem.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	Regulates international trade in endangered wildlife species and promotes conservation of threatened species.	Relevant to protection of wildlife species occurring within Marsabit National Reserve and surrounding ecosystems.
Ramsar Convention on Wetlands, 1971	Promotes conservation and sustainable use of wetlands and associated ecosystems.	Relevant to protection of seasonal drainage systems and ecologically sensitive water-related habitats within the project area.
United Nations Convention to Combat Desertification (UNCCD), 1994	Promotes sustainable land management and measures to combat desertification and land degradation, particularly in arid and semi-arid lands (ASALs).	Highly relevant due to the ASAL nature of Marsabit County and the need for sustainable grazing and land management systems.
African Convention on the Conservation of Nature and Natural Resources	Provides framework for conservation and sustainable use of African ecosystems and natural resources.	Relevant to ecological conservation, biodiversity protection, and sustainable management of pastoral landscapes within the project area.
Rio Declaration on Environment and Development, 1992	Establishes principles for sustainable development, environmental protection, and public participation in environmental governance.	Relevant to sustainable development, environmental assessment, stakeholder engagement, and environmental management within the ESIA process.
Agenda 21	Provides global action framework for sustainable development and environmental management.	Relevant to sustainable settlement planning, environmental governance, and natural resource management within the project area.

CONVENTION/TREATY	KEY PROVISIONS	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Sustainable Development Goals (SDGs), 2015	Provides global development framework promoting environmental sustainability, climate action, sustainable cities, biodiversity conservation, and poverty reduction.	Relevant to sustainable development, land governance, climate resilience, environmental protection, and community livelihoods associated with the proposed excision.
UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972	Promotes protection and conservation of natural and cultural heritage resources.	Relevant to conservation of ecological landscapes and protection of cultural heritage resources within the wider Marsabit ecosystem.
Aarhus Convention Principles	Promotes access to environmental information, public participation, and access to justice in environmental matters.	Relevant to stakeholder engagement, ESIA disclosure, and public participation processes undertaken during the study.
Stockholm Declaration on the Human Environment, 1972	Establishes principles for environmental protection and sustainable management of natural resources.	Relevant to environmental governance and sustainable utilization of natural resources within the project area.
Sendai Framework for Disaster Risk Reduction (2015–2030)	Provides framework for disaster preparedness, resilience building, and risk reduction.	Relevant to drought resilience, climate adaptation, and environmental risk management within Marsabit County.
African Union Climate Change and Resilient Development Strategy	Provides continental framework for climate resilience and sustainable development in Africa.	Relevant to resilience planning and sustainable management of vulnerable ASAL ecosystems and pastoral landscapes.

3.8 INSTITUTIONAL FRAMEWORK

The proposed excision of Karare settled areas from the Marsabit National Reserve involves multiple institutions with mandates relating to environmental management, wildlife conservation, land administration, physical planning, community development, infrastructure provision, and natural resource governance. These institutions play important roles in the planning, approval, implementation, monitoring, and management of the proposed excision process and associated Environmental and Social Impact Assessment (ESIA).

The institutional framework provides coordination mechanisms for environmental protection, land use planning, stakeholder engagement, conservation management, and implementation of mitigation and monitoring measures associated with the proposed project.

Figure 3-8: Institutional Framework Relevant to the Proposed Excision and ESIA Process

INSTITUTION	MANDATE/RESPONSIBILITY	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
National Environment Management Authority (NEMA)	Principal government institution responsible for environmental management, environmental regulation, ESIA review and approval, environmental monitoring, and compliance enforcement in Kenya.	Responsible for review and approval of the ESIA Study Report and monitoring compliance with environmental regulations and ESMP requirements.
Kenya Wildlife Service (KWS)	Responsible for conservation and management of wildlife resources, protected areas, wildlife corridors, biodiversity conservation, and ecological monitoring.	Key institution responsible for management of Marsabit National Reserve and technical assessments relating to wildlife corridors, ecological sensitivity, and protected area management.
Ministry of Environment, Climate Change and Forestry	Responsible for environmental policy development, environmental governance, climate change coordination, forestry management, and natural resource conservation.	Provides national policy direction and oversight on environmental conservation and climate-related matters relevant to the proposed excision.

INSTITUTION	MANDATE/RESPONSIBILITY	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
Ministry of Lands, Public Works, Housing and Urban Development	Responsible for land administration, land registration, physical planning, surveying, housing development, and land use management.	Relevant to land excision procedures, land tenure regularization, physical planning, and boundary demarcation processes.
National Land Commission (NLC)	Responsible for management of public land, land administration oversight, land allocation, and investigation of land-related matters.	Relevant to public land management and legal processes associated with excision of land from Marsabit National Reserve.
Marsabit County Government	Responsible for county planning, infrastructure development, natural resource management, public service delivery, and local development coordination within Marsabit County.	Key institution involved in stakeholder engagement, settlement planning, infrastructure planning, and implementation coordination within the project area.
County Department of Lands and Physical Planning	Responsible for county physical planning, land use zoning, development control, and settlement planning.	Relevant to future settlement planning, zoning, and land use management within the excised areas.
County Department of Environment and Natural Resources	Responsible for environmental conservation, environmental management, climate resilience, and natural resource governance at county level.	Relevant to environmental monitoring, ecological management, and implementation of environmental safeguards within the project area.
County Department of Water, Irrigation and Sanitation	Responsible for water resource development, water supply planning, and sanitation services.	Relevant to water infrastructure planning and sustainable water resource management within the proposed excision areas.
National Drought Management Authority (NDMA)	Responsible for drought preparedness, resilience building, and coordination of drought management interventions in ASAL areas.	Relevant to climate resilience, drought preparedness, and sustainable pastoral livelihood systems within the project area.
Kenya Forest Service (KFS)	Responsible for management and conservation of forest resources and water catchment areas.	Relevant to protection of vegetation cover and environmentally sensitive ecosystems within the wider Marsabit landscape.

INSTITUTION	MANDATE/RESPONSIBILITY	RELEVANCE TO THE PROPOSED EXCISION AND ESIA
County and National Security Agencies	Responsible for public security, law enforcement, and protection of critical infrastructure.	Relevant due to the presence of the KDF base within Parkishon and broader security coordination within the project area.
Kenya Defence Forces (KDF)	Responsible for national defence and management of defence infrastructure and installations.	Relevant due to the presence of the KDF base within the Parkishon area.
Local Administration	Includes County Commissioners, Deputy County Commissioners, Chiefs, and Assistant Chiefs responsible for local governance and administration.	Relevant to stakeholder coordination, public participation, local governance, and conflict resolution within the proposed excision areas.
Community Land Management Committees and Local Community Institutions	Responsible for local community representation, grazing management, and community participation in land and resource governance.	Relevant to pastoral land use systems, stakeholder engagement, and community participation in the excision process.
Civil Society Organizations (CSOs) and Community-Based Organizations (CBOs)	Support environmental conservation, community development, advocacy, and public awareness initiatives.	Relevant to stakeholder engagement, community sensitization, environmental awareness, and participatory development processes.
Public Health Authorities	Responsible for public health management, sanitation, disease control, and environmental health oversight.	Relevant to sanitation planning, waste management, and environmental health considerations within the settlement areas.
Directorate of Occupational Safety and Health Services (DOSHS)	Responsible for occupational health and safety regulation and compliance.	Relevant during implementation of field activities, surveys, and infrastructure development processes associated with the project.

3.9 ESIA ADMINISTRATIVE AND APPROVAL FRAMEWORK

The ESIA for the proposed excision of Karare settled areas from the Marsabit National Reserve is governed by the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, and other applicable environmental and land governance laws in Kenya.

Under Section 58 of EMCA, projects likely to have significant environmental and social impacts are required to undergo an Environmental and Social Impact Assessment prior to implementation. The proposed excision of land from a protected area therefore constitutes a prescribed activity requiring review and approval by the National Environment Management Authority (NEMA).

The ESIA administrative process commenced with preparation and submission of the Terms of Reference (ToR) for the proposed study to NEMA for review and approval. The ToR outlined the scope of the study, proposed methodology, thematic assessment areas, specialist studies, stakeholder engagement approach, and environmental issues to be investigated during the ESIA process.

Following review of the submitted ToR, NEMA approved the study under License No. NEMA/ENVIS/EIA/TOR/Approval_0232 and Application Reference No. NEMA/ENVIS/EIA/TOR/00147 dated 23rd May 2026. The approval provided conditions and requirements guiding implementation of the ESIA Study including wildlife corridor assessment, biodiversity assessment, cumulative impact analysis, climate risk assessment, public participation, and preparation of mitigation and management measures.

The ESIA process subsequently involved baseline data collection, stakeholder consultations and public participation, ecological and socio-economic assessments, GIS mapping, impact assessment, alternatives analysis, and preparation of the Environmental and Social Management Plan (ESMP).

Upon completion, the ESIA Study Report will be submitted to NEMA for technical review and consideration. The review process may involve circulation of the report to relevant lead agencies and stakeholders for comments in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003.

Subject to satisfactory review and compliance with all applicable legal and environmental requirements, NEMA may issue an ESIA License authorizing implementation of the proposed excision process subject to specified environmental management and monitoring conditions.

The implementation phase of the project will further require continued environmental monitoring, compliance reporting, stakeholder engagement, and implementation of the approved Environmental and Social Management Plan (ESMP) in accordance with applicable environmental laws and licensing conditions.



CHAPTER 04

ESIA METHODOLOGY

A systematic and participatory approach to identify, predict, evaluate and manage the potential environmental and social impacts of the proposed excision for sustainable outcomes.





DESKTOP REVIEW & SECONDARY DATA



FIELD SURVEYS & DATA COLLECTION



GIS MAPPING & SPATIAL ANALYSIS



STAKEHOLDER ENGAGEMENT



SAMPLING & MEASUREMENTS



DATA ANALYSIS & IMPACT ASSESSMENT

1. PLANNING

Define scope, objectives and approach based on TOR and regulatory requirements.

2. INFORMATION GATHERING

Collect baseline data through literature review, field surveys, mapping and consultations.

3. ANALYSIS

Analyze environmental and social baseline conditions and project characteristics.

4. IMPACT IDENTIFICATION & EVALUATION

Identify, predict and evaluate potential impacts using recognized evaluation criteria.

5. MITIGATION & MANAGEMENT

Propose mitigation measures and develop the Environmental and Social Management Plan (ESMP).

6. REPORTING

Document findings, recommendations and monitoring framework for decision making.

GUIDING PRINCIPLES

CHAPTER 4: ESIA METHODOLOGY

This chapter presents the methodology applied in undertaking the Environmental and Social Impact Assessment (ESIA) for the proposed excision of Karare settled areas from the Marsabit National Reserve. The methodology was designed to ensure compliance with the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, and the approved Terms of Reference (ToR) issued by the National Environment Management Authority (NEMA).

The chapter outlines the approaches used in data collection, field investigations, stakeholder engagement, spatial analysis, environmental and socio-economic assessments, impact identification and evaluation, and development of mitigation and management measures for the proposed excision process.

4.1 STUDY APPROACH

The ESIA study was undertaken using an integrated, multidisciplinary, and participatory study approach designed to assess the potential environmental, ecological, social, economic, and land use implications associated with the proposed excision process. The study approach combined field investigations, stakeholder engagement, spatial analysis, specialist assessments, and review of secondary information in order to generate scientifically credible and evidence-based findings to support informed decision-making. The approach further ensured compliance with the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, the approved Terms of Reference (ToR) issued by the National Environment Management Authority (NEMA), and other applicable legal and policy frameworks. The guiding approach for the assignment is summarized in figure 4.1.

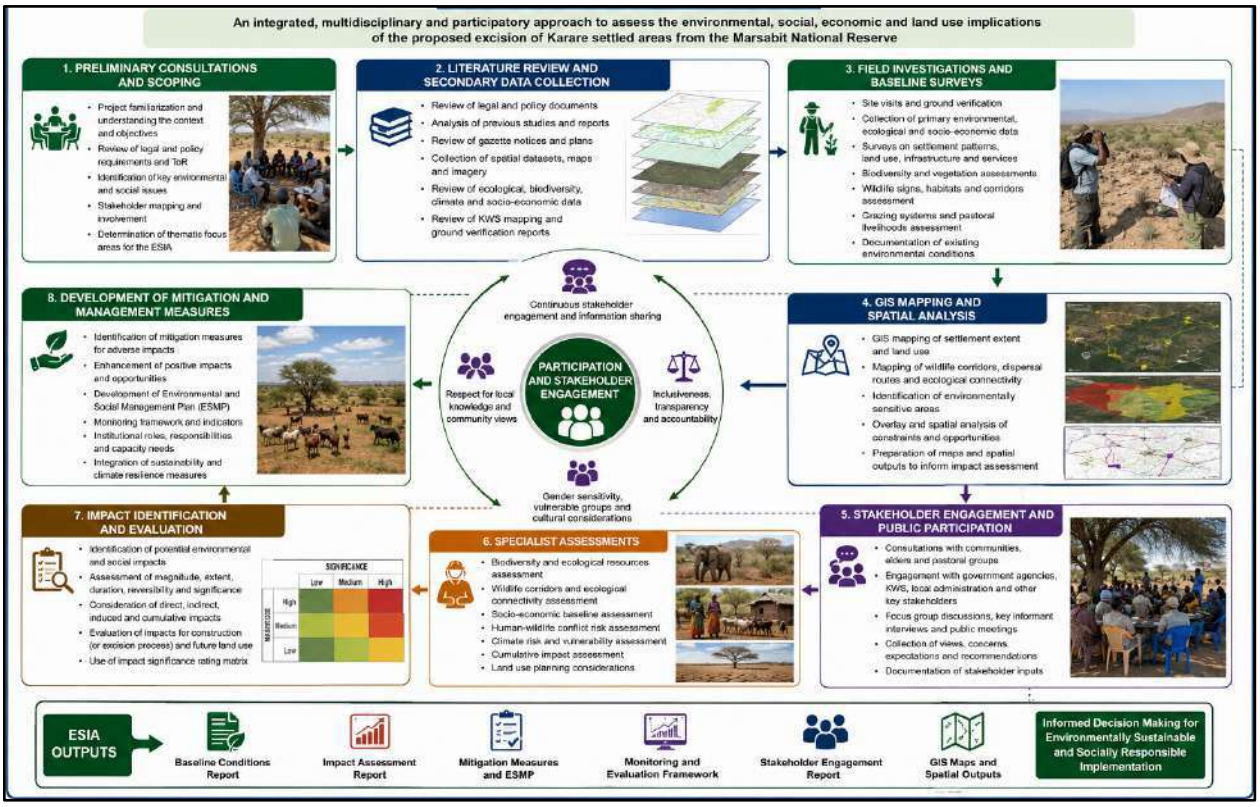


Figure 4-1: ESIA study approach

4.1.1 PRELIMINARY CONSULTATIONS AND SCOPING

The study commenced with preliminary consultations, project familiarization, and scoping exercises aimed at understanding the project context, legal requirements, environmental setting, settlement characteristics, and key issues requiring detailed assessment during the ESIA process. The scoping phase involved identification of key environmental and social concerns, review of the approved Terms of Reference, stakeholder mapping, and determination of the thematic assessment areas that guided the study.

4.1.2 LITERATURE REVIEW AND SECONDARY DATA COLLECTION

A comprehensive review of relevant literature and secondary information was undertaken to support the ESIA process. The review included analysis of legal and policy documents, previous environmental studies, gazette notices, development plans, ecological reports, spatial datasets, land use information, and Kenya Wildlife Service (KWS) mapping and ground verification reports.

Secondary information was important in understanding the historical context, settlement evolution, ecological characteristics, and land use dynamics within the project area.

4.1.3 FIELD INVESTIGATIONS AND BASELINE SURVEYS

Field investigations and baseline surveys were undertaken within the proposed excision areas and surrounding landscapes to collect primary environmental, ecological, and socio-economic data. The field assessments focused on settlement patterns, grazing systems, land use characteristics, biodiversity resources, infrastructure distribution, wildlife movement systems, ecological sensitivity areas, and socio-economic conditions within the project area. Ground verification exercises were also conducted to confirm the spatial extent of the proposed excision areas and existing land use conditions on the ground.

4.1.4 GIS MAPPING AND SPATIAL ANALYSIS

The study incorporated geospatial analysis and GIS-based mapping techniques to assess settlement distribution patterns, land use characteristics, wildlife corridors, ecological connectivity systems, environmentally sensitive areas, and the spatial extent of the proposed excision areas. Georeferenced mapping undertaken by the Kenya Wildlife Service (KWS) formed an important component of the spatial assessment process and assisted in identifying wildlife dispersal routes, ecological constraints, and settlement boundaries within the project area.

4.1.5 STAKEHOLDER ENGAGEMENT AND PUBLIC PARTICIPATION

Stakeholder engagement and public participation formed a key component of the ESIA process. Consultations were undertaken with local communities, elders, pastoral groups, government institutions, conservation agencies, local administration, civil society organizations, and other interested stakeholders. The consultations aimed at obtaining stakeholder views, concerns, local knowledge, and recommendations regarding the proposed excision process and its potential implications.

4.1.6 SPECIALIST ASSESSMENTS

The ESIA adopted a specialist-based assessment approach involving thematic evaluations on biodiversity and ecological resources, wildlife corridors and ecological connectivity, socio-economic conditions, human-wildlife conflict risks, cumulative impacts, climate risks, and land use planning considerations associated with the proposed excision. The specialist assessments provided detailed technical information necessary for evaluating project impacts and developing appropriate mitigation measures.

4.1.7 IMPACT IDENTIFICATION AND EVALUATION

Potential environmental and social impacts associated with the proposed excision were identified, analyzed, and evaluated based on the nature, magnitude, duration, reversibility, spatial extent, and significance of anticipated impacts. The assessment considered direct, indirect, induced, and cumulative impacts likely to arise from the proposed excision process and future land use changes within the project area.

4.1.8 DEVELOPMENT OF MITIGATION AND MANAGEMENT MEASURES

Findings from the various assessments were integrated into the development of mitigation measures, environmental management strategies, monitoring frameworks, and the Environmental and Social Management Plan (ESMP). The proposed mitigation measures were aimed at minimizing adverse environmental and social impacts while promoting sustainable settlement planning, ecological conservation, and long-term coexistence between community livelihoods and conservation objectives within the wider Marsabit ecosystem.

4.2 DESKTOP REVIEW AND SECONDARY DATA COLLECTION

A comprehensive desktop review and secondary data collection exercise was undertaken as an important component of the Environmental and Social Impact Assessment (ESIA) process for the proposed excision of Karare settled areas from the Marsabit National Reserve. The purpose of the review was to obtain relevant background information, establish the historical and policy context of the proposed excision, support baseline characterization, and identify key environmental, ecological, social, legal, and land use issues requiring detailed assessment during the study.

The desktop review involved collection and analysis of existing literature, legal documents, policy frameworks, technical reports, spatial datasets, institutional records, development plans, and previous studies relevant to the project area and the proposed excision process. The review further assisted in understanding the broader ecological and socio-economic characteristics of the Marsabit ecosystem and the historical evolution of settlement patterns within the proposed excision areas.

The secondary data sources reviewed during the study included national and county government policy documents, environmental legislation, land administration frameworks, climate change policies, wildlife conservation regulations, gazette notices, census reports, development plans, and spatial planning documents relevant to the project area. The review also included analysis of Kenya Wildlife Service (KWS) reports on ground verification and georeferenced mapping of the proposed excision areas, including identification of wildlife movement corridors, ecological connectivity zones, settlement footprints, and grazing systems within the landscape.

Specific technical studies and reports reviewed during the ESIA included the **Kenya Wildlife Service Ground Verification and Mapping Report for the Proposed Karare Settled Areas Excision**; the **Marsabit County Integrated Development Plan (CIDP)**; the **Marsabit County Spatial Plan**; the **National Climate Change Action Plan (NCCAP)**; the **National Adaptation Plan (NAP 2015–2030)**; the **Kenya Population and Housing Census Reports** published by the Kenya National Bureau of Statistics (KNBS); the **Northern Kenya Rangelands Biodiversity Assessments**; and previous environmental and socio-economic assessment reports undertaken within Marsabit County and adjacent ASAL ecosystems.

Additional information was obtained from previous ecological studies undertaken within the Marsabit ecosystem, including wildlife corridor assessments, biodiversity surveys, land use and rangeland management studies, climate vulnerability assessments, and reports relating to human-wildlife conflict management within northern Kenya. Satellite imagery, GIS datasets, topographical maps, and spatial databases were also reviewed to support spatial analysis and mapping of settlement areas, land use patterns, infrastructure distribution, ecological sensitivity areas, and wildlife movement systems.

The desktop review further included examination of institutional documents and stakeholder submissions relating to the proposed excision process, including correspondence from the County Government of Marsabit, public participation records, and relevant technical guidance documents from sectoral institutions.

Secondary data collection played an important role in identifying information gaps, guiding field investigations, supporting stakeholder consultations, and informing thematic assessments undertaken during the ESIA process. The information generated through the desktop review was integrated with primary field data and specialist assessments to support comprehensive evaluation of the potential environmental and social implications associated with the proposed excision.

Figure 4-2: Key Secondary Data Sources Reviewed During the ESIA Study

DATA SOURCE/DOCUMENT	INFORMATION OBTAINED	RELEVANCE TO THE ESIA STUDY
Constitution of Kenya, 2010	Constitutional provisions on environment, land, public participation, and sustainable development	Guided legal and governance assessment
Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015)	Environmental management and ESIA requirements	Guided ESIA compliance framework
Wildlife Conservation and Management Act, 2013	Wildlife conservation and protected area management provisions	Guided wildlife and ecological assessment
Community Land Act, 2016	Community land governance and land rights provisions	Guided land tenure and settlement analysis
Physical and Land Use Planning Act, 2019	Land use planning and zoning requirements	Guided settlement planning considerations
Kenya Wildlife Service Ground Verification and Mapping Report for the Proposed Karare Settled Areas Excision	Settlement boundaries, wildlife corridors, ecological sensitivity areas, and spatial extent of proposed excision areas	Supported spatial and ecological analysis
Marsabit County Integrated Development Plan (CIDP)	County development priorities and infrastructure planning	Guided socio-economic and planning assessment

DATA SOURCE/DOCUMENT	INFORMATION OBTAINED	RELEVANCE TO THE ESIA STUDY
Marsabit County Spatial Plan	Land use zoning and spatial planning framework	Supported land use and settlement analysis
Kenya Population and Housing Census Reports (KNBS)	Population distribution and demographic characteristics	Supported socio-economic baseline analysis
National Climate Change Action Plan (NCCAP)	Climate adaptation and resilience priorities	Guided climate risk assessment
National Adaptation Plan (NAP 2015–2030)	Climate vulnerability and adaptation strategies	Supported climate resilience analysis
Northern Kenya Rangelands Biodiversity Assessments	Biodiversity and rangeland ecosystem characteristics	Supported ecological baseline assessment
Previous Environmental and Social Impact Assessment Reports	Environmental baseline conditions and impact management approaches	Supported comparative environmental assessment
GIS and Satellite Imagery Data	Spatial characteristics and land use patterns	Supported mapping and spatial analysis
Topographical Maps and Survey Data	Terrain, drainage systems, and spatial features	Supported field assessment and mapping
Stakeholder Consultation Records and Public Participation Reports	Community concerns, stakeholder views, and local priorities	Guided stakeholder engagement analysis
Climate Vulnerability and Human-Wildlife Conflict Studies in Northern Kenya	Climate risks, ecological pressures, and human-wildlife interaction trends	Supported impact assessment and mitigation planning

4.3 FIELD SURVEYS AND GROUND VERIFICATION

Field surveys and ground verification exercises were undertaken as a critical component of the ESIA process for the proposed excision of Karare settled areas from the Marsabit National Reserve. The field investigations were aimed at validating information obtained through desktop review, collecting primary environmental and socio-economic data, confirming existing land use conditions, and assessing the spatial extent and ecological characteristics of the proposed excision areas.



Figure 4-3: ESIA field team undertaking ground verification and GPS mapping within the proposed excision areas.

The field surveys were conducted within the four proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon, as well as adjacent sections of the Marsabit National Reserve and surrounding community lands. The assessments involved multidisciplinary field teams comprising environmental experts, social specialists, GIS specialists, ecologists, and representatives from relevant institutions including the Kenya Wildlife Service (KWS).

The field verification process focused on assessing settlement patterns, infrastructure distribution, grazing systems, ecological sensitivity areas, wildlife movement routes, land use characteristics, and socio-economic activities within the project area. The surveys further aimed at confirming the extent of human occupation and the current land use realities within the proposed excision areas.

Ground verification exercises undertaken jointly with the Kenya Wildlife Service (KWS) involved georeferenced mapping and spatial confirmation of the proposed settlement boundaries. GPS

coordinates were collected across the four settlement areas to establish the spatial extent of the proposed excision areas and assess their relationship with existing reserve boundaries, transport infrastructure, grazing zones, and ecological connectivity areas.

The field surveys also involved direct observation and assessment of:

- existing settlements and residential structures;
- public infrastructure including schools, health facilities, roads, and water points;
- grazing areas and livestock movement systems;
- natural vegetation cover;
- seasonal drainage systems;
- wildlife signs and habitats;
- and environmentally sensitive areas within the landscape.

Particular attention was given to wildlife movement corridors and ecological connectivity systems identified within sections of Karare II and adjacent areas where elephant movement routes traverse portions of the proposed excision areas. The field assessments further evaluated the extent of habitat modification, settlement expansion, grazing pressure, and human activities within the project area.



Figure 4-4: Mapping of the wildlife movement corridors

Transect walks and site inspections were undertaken across representative sections of the proposed excision areas to support direct environmental observation and validate information obtained during stakeholder consultations and desktop review. The field teams also documented existing land use conflicts, infrastructure development trends, settlement growth patterns, and interactions between community activities and conservation areas within the wider Marsabit ecosystem.

Photographic documentation, GPS data collection, field observation sheets, and spatial mapping tools were used during the field verification exercises to support analysis and documentation of baseline conditions within the project area.

Figure 4-5: Key Components of the Field Surveys and Ground Verification Exercise

ASSESSMENT COMPONENT	DESCRIPTION	PURPOSE
Settlement Verification	Assessment of residential settlements and settlement distribution patterns	To confirm existing settlement footprints within the proposed excision areas
GPS Mapping and Boundary Verification	Collection of georeferenced coordinates and spatial mapping	To establish the spatial extent and boundaries of proposed excision areas
Land Use Assessment	Evaluation of grazing systems, infrastructure, and socio-economic activities	To determine current land use characteristics within the project area
Ecological Assessment	Observation of vegetation, habitats, drainage systems, and ecological sensitivity areas	To identify environmentally sensitive areas and ecological resources
Wildlife Corridor Assessment	Identification of wildlife signs, movement routes, and ecological connectivity systems	To assess wildlife movement interactions within the project area
Infrastructure Survey	Assessment of roads, schools, health facilities, water points, and institutional infrastructure	To document existing socio-economic infrastructure within the settlement areas
Transect Walks and Site Inspections	Direct field observation across representative sections of the project area	To validate field conditions and support environmental assessment
Stakeholder Interactions During Field Surveys	Informal discussions with local communities and resource users	To gather local knowledge and validate observations from the field

ASSESSMENT COMPONENT	DESCRIPTION	PURPOSE
Photographic Documentation	Collection of geo-referenced photographs and visual records	To support documentation of baseline environmental and settlement conditions

4.4 GIS MAPPING AND SPATIAL ANALYSIS

Geographic Information System (GIS) mapping and spatial analysis formed an important component of the ESIA for the proposed excision of Karare settled areas from the Marsabit National Reserve. The GIS-based assessment was undertaken to support spatial characterization of the project area, establish the extent of the proposed excision areas, assess existing land use patterns, identify environmentally sensitive areas, and evaluate the spatial interactions between settlement systems and ecological resources within the wider Marsabit ecosystem.

The GIS and spatial analysis component integrated georeferenced field data, satellite imagery, topographical maps, GPS coordinates, institutional spatial datasets, and ground verification information collected during the field surveys. The analysis was aimed at generating accurate spatial representations of settlement areas, reserve boundaries, wildlife movement corridors, grazing systems, transport infrastructure, drainage systems, and ecological connectivity zones within the project area.

Spatial datasets and mapping information obtained from the Kenya Wildlife Service (KWS) played a key role in the analysis process, particularly in confirming the proposed excision boundaries and identifying wildlife dispersal routes and ecologically sensitive habitats within and adjacent to the proposed settlement areas.

The GIS mapping exercise involved digitization and analysis of the four proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon. The mapping process further involved overlay analysis to assess the relationship between:

- settlement distribution patterns;
- reserve boundaries;
- road infrastructure;
- grazing areas;
- wildlife movement corridors;

- ecological sensitivity zones;
- and existing land use systems within the landscape.

GPS coordinates collected during field verification exercises were processed and integrated into the GIS database to support spatial validation of settlement boundaries and project area extent. The GIS analysis also assisted in identifying areas were settlement expansion and grazing activities interface directly with wildlife habitats and ecological connectivity systems.

Satellite imagery and remote sensing data were further utilized to assess land cover characteristics, settlement growth patterns, vegetation distribution, drainage systems, and landscape fragmentation within the project area. Comparative spatial analysis helped establish the extent of habitat modification and long-term land use changes associated with settlement expansion within sections of the Marsabit National Reserve.

The GIS analysis further supported identification of environmentally sensitive areas requiring special consideration during the proposed excision process, particularly wildlife movement corridors and ecological dispersal routes identified within Karare II and adjacent sections of the project area.

In addition, spatial analysis was used to assess accessibility patterns, infrastructure distribution, settlement clustering, and proximity of socio-economic facilities within the proposed excision areas. This information was important in understanding existing development patterns and supporting future land use planning considerations.

The outputs generated through the GIS and spatial analysis process included:

- project location maps;
- settlement distribution maps;
- proposed excision boundary maps;
- ecological sensitivity maps;
- wildlife corridor maps;
- land use maps;
- and infrastructure distribution maps.

The GIS mapping and spatial analysis process provided an important technical basis for environmental assessment, land use planning, ecological analysis, impact assessment, and development of mitigation and management measures associated with the proposed excision process.

Figure 4-6: GIS Mapping and Spatial Analysis Components

GIS/SPATIAL ANALYSIS COMPONENT	DESCRIPTION	PURPOSE
GPS Data Collection	Collection of georeferenced field coordinates during surveys	To establish accurate spatial location of project features
Boundary Mapping	Digitization and mapping of proposed excision boundaries	To define spatial extent of the proposed excision areas
Settlement Mapping	Spatial mapping of settlement clusters and infrastructure	To assess settlement distribution and land occupation patterns
Land Use Mapping	Mapping of grazing areas, infrastructure, and land use systems	To assess existing land use characteristics within the project area
Wildlife Corridor Mapping	Spatial identification of wildlife movement routes and dispersal areas	To assess ecological connectivity and wildlife interactions
Ecological Sensitivity Analysis	Identification of environmentally sensitive habitats and ecological zones	To support ecological assessment and conservation planning
Satellite Imagery Analysis	Interpretation of satellite imagery and remote sensing data	To assess land cover and settlement expansion trends
Infrastructure Mapping	Mapping of roads, schools, health facilities, and water infrastructure	To assess accessibility and infrastructure distribution
Drainage and Hydrological Mapping	Mapping of seasonal streams and drainage systems	To identify environmentally sensitive hydrological features
Spatial Overlay Analysis	Integration of multiple spatial datasets for comparative analysis	To assess interactions between settlements and ecological systems
Map Production and Visualization	Preparation of thematic GIS maps and spatial outputs	To support reporting, analysis, and decision-making processes

4.5 STAKEHOLDER ENGAGEMENT METHODOLOGY

Stakeholder engagement and public participation formed a fundamental component of the Environmental and Social Impact Assessment (ESIA) process for the proposed excision of Karare settled areas from the Marsabit National Reserve. The stakeholder engagement methodology was designed to ensure inclusive participation, transparency, information sharing, and meaningful consultation with all affected and interested parties throughout the ESIA process.

The stakeholder engagement process was undertaken in accordance with the Constitution of Kenya, 2010, the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, the approved Terms of Reference (ToR) issued by the National Environment Management Authority (NEMA), and international best practices on participatory environmental assessment and Free, Prior and Informed Consent (FPIC).

The methodology adopted a participatory and culturally sensitive approach aimed at obtaining stakeholder views, concerns, expectations, local knowledge, and recommendations regarding the proposed excision process and its potential environmental and social implications. The engagement process further sought to build trust, promote collaboration, and ensure that stakeholder concerns were adequately integrated into the ESIA study findings and recommendations.

Detailed findings, consultation records, attendance registers, stakeholder concerns, photographs, meeting minutes, and outcomes of the stakeholder engagement process are presented in **Chapter 7: Public Consultation and Stakeholder Engagement** of this ESIA Study Report.

4.5.1 STAKEHOLDER IDENTIFICATION AND MAPPING

The first stage of the stakeholder engagement process involved identification and mapping of stakeholders likely to be affected by or interested in the proposed excision process. Stakeholders were identified based on their geographical proximity to the project area, institutional mandates, resource use interactions, conservation interests, livelihood dependence, and potential vulnerability to project impacts.

The stakeholder mapping process identified key stakeholder categories including local communities, pastoral groups, elders, women groups, youth representatives, local administration, county government departments, national government agencies, conservation institutions, civil society organizations, and other interested parties operating within the project area.

Special consideration was given to inclusion of vulnerable and marginalized groups including women, elderly persons, persons living with disabilities, and pastoral households whose livelihoods are closely linked to natural resource utilization within the project area.

4.5.2 COMMUNITY MOBILIZATION AND CONSULTATION PLANNING

Prior to field consultations, community mobilization activities were undertaken in collaboration with local administration, community leaders, village elders, and local mobilizers. The mobilization process involved notification of meeting schedules, consultation venues, objectives of the ESIA process, and the purpose of stakeholder engagement activities.

In line with the NEMA-approved Terms of Reference and public participation requirements, stakeholders and affected communities were issued with prior notices before scheduled consultation meetings. Public notices and meeting announcements were communicated at least seven (7) days prior to the consultation meetings to allow adequate stakeholder preparation and participation.

The consultation planning process also considered local cultural dynamics, settlement distribution patterns, accessibility, pastoral mobility systems, and appropriate timing of meetings to ensure maximum participation and representation across the four proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon.

Section for Further Review and Confirmation: The stakeholder engagement process is expected to include publication of public notices and announcements through local newspapers and radio stations in accordance with the NEMA ToR approval conditions. The specific newspapers, radio stations, advertisement schedules, and copies of published notices will be confirmed and documented under Chapter 7 during the full stakeholder engagement reporting phase.

4.5.3 PUBLIC BARAZAS AND COMMUNITY MEETINGS

Public barazas and community meetings formed the primary stakeholder engagement platform during the ESIA process. The meetings were conducted within the affected settlement areas and provided an open forum for information sharing, discussion of the proposed excision process, identification of community concerns, and collection of stakeholder views regarding environmental and social issues associated with the project.

During the meetings, the ESIA team explained the purpose of the proposed excision, objectives of the ESIA study, potential environmental and social considerations, stakeholder rights and participation opportunities, and the overall ESIA process. Community members were given an opportunity to raise concerns, provide local knowledge, identify sensitive issues, and make recommendations regarding the proposed excision process.

4.5.4 FOCUS GROUP DISCUSSIONS (FGDS)

Focused Group Discussions (FGDs) were undertaken with specific stakeholder groups including women, youth, elders, pastoralists, and community-based organizations. The FGDs provided a smaller and more interactive platform for discussing issues that may not have emerged effectively during larger public meetings.

The FGDs focused on land use systems, pastoral livelihoods, human-wildlife conflict, settlement challenges, resource access, cultural considerations, and community expectations regarding the proposed excision. The discussions also helped capture gender-specific concerns and the perspectives of vulnerable groups within the project area.

4.5.5 KEY INFORMANT INTERVIEWS (KIIS)

Key Informant Interviews were conducted with selected institutional representatives, technical officers, opinion leaders, and individuals possessing specialized knowledge relevant to the proposed excision process. The interviews involved representatives from Kenya Wildlife Service (KWS), National Environment Management Authority (NEMA), Marsabit County Government, local administration, Kenya Forest Service (KFS), local political leadership, religious leaders, and community elders.

The KIIs provided important information on governance systems, conservation concerns, land administration issues, ecological sensitivity areas, development planning, institutional perspectives, and existing environmental and social challenges within the project area.

4.5.6 SITE VISITS AND TRANSECT WALKS

Site visits and transect walks were undertaken jointly with community members, local leaders, and technical representatives to facilitate direct observation of settlement conditions, grazing areas,

ecological features, infrastructure distribution, wildlife movement routes, and environmentally sensitive areas within the proposed excision areas.

The transect walks further enabled validation of issues raised during consultations and supported collection of localized information regarding land use dynamics, settlement expansion, ecological interactions, and conservation concerns within the landscape.

4.5.7 USE OF LOCAL LANGUAGE AND TRANSLATION SUPPORT

To ensure effective communication and meaningful participation, stakeholder engagement activities incorporated the use of local dialects and translation support where necessary. Local interpreters and community mobilizers assisted in facilitating communication with members of the Rendille, Borana, and Samburu communities within the project area.

This approach enhanced understanding of technical issues, promoted trust between the ESIA team and local communities, and encouraged active participation across different stakeholder groups.

4.5.8 DOCUMENTATION AND RECORDING OF STAKEHOLDER VIEWS

All stakeholder engagement activities were systematically documented throughout the ESIA process. Documentation included attendance registers, meeting minutes, stakeholder comments and concerns, photographs, GPS-referenced consultation locations, field notes, and records of institutional consultations.

The issues raised during consultations were analyzed and integrated into the ESIA assessment process, impact analysis, and development of mitigation and management measures.

Section for Further Review and Inclusion: Copies of newspaper advertisements, radio announcement schedules, public notices, attendance registers, consultation photographs, and stakeholder meeting minutes will be annexed to the final ESIA Study Report in accordance with NEMA requirements and public participation guidelines.

4.5.9 INTEGRATION OF STAKEHOLDER INPUT INTO THE ESIA PROCESS

Information and feedback obtained during stakeholder engagement activities were integrated into the ESIA process to support identification of key environmental and social concerns, refinement of

thematic assessment areas, impact identification and evaluation, development of mitigation measures, and formulation of the Environmental and Social Management Plan (ESMP).

The stakeholder engagement process therefore played an important role in ensuring that the ESIA study reflected community perspectives, institutional concerns, and local environmental realities associated with the proposed excision process.

Figure 4-7: Stakeholder Engagement Methods Applied During the ESIA Study

STAKEHOLDER ENGAGEMENT METHOD	PURPOSE	TARGET STAKEHOLDERS
Public Barazas and Community Meetings	Awareness creation, information sharing, and collection of community views	Local communities, elders, pastoralists, residents
Focus Group Discussions (FGDs)	Collection of targeted stakeholder perspectives and group-specific concerns	Women, youth, elders, pastoral groups
Key Informant Interviews (KIIs)	Collection of technical and institutional information	Government agencies, KWS, NEMA, local leaders
Site Visits and Transect Walks	Ground verification and direct field observation	Community representatives and technical teams
Informal Consultations	Collection of localized information and clarification of issues	Community members and local resource users
Stakeholder Mapping	Identification and categorization of stakeholders	All stakeholder groups
Translation and Interpretation Support	Facilitation of effective communication and inclusivity	Local communities and vulnerable groups
Documentation and Record Keeping	Recording stakeholder views and consultation proceedings	All consultation activities

4.6 SAMPLING TECHNIQUES

The ESIA study adopted a combination of purposive, stratified, random, and participatory sampling techniques to ensure representative data collection across the different environmental, ecological, and socio-economic components of the study area.

The sampling approach was designed to capture the diversity of settlement patterns, land use systems, ecological characteristics, stakeholder groups, and socio-economic conditions within the four proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon. The approach further ensured adequate representation of different stakeholder categories, livelihood groups, ecological zones, and institutional actors relevant to the proposed excision process.

4.6.1 PURPOSIVE SAMPLING

Purposive sampling was extensively applied during the ESIA study to identify specific respondents, institutions, locations, and ecological features considered relevant to the assessment objectives. This technique was particularly useful in selecting key informants, government officials, conservation experts, community leaders, and specialized stakeholder groups possessing knowledge relevant to land use dynamics, wildlife conservation, settlement patterns, and community livelihood systems within the project area.



Figure 4-8: Soil samples collection in the project site

Purposive sampling was also used in identifying environmentally sensitive areas, wildlife corridors, grazing hotspots, infrastructure clusters, and settlement zones requiring detailed field assessment and ecological evaluation during the study.

Key informants selected through purposive sampling included:

- Kenya Wildlife Service (KWS) officials;
- National Environment Management Authority (NEMA) representatives;
- Marsabit County Government officers;
- local administration;
- village elders;
- religious leaders;
- women representatives;
- youth leaders;
- pastoral resource users;
- and local opinion leaders.

4.6.2 STRATIFIED SAMPLING

Stratified sampling techniques were applied to ensure balanced representation of the different settlement areas and stakeholder categories within the project area. The study area was divided into distinct strata based on:

- settlement locations;
- land use characteristics;
- stakeholder categories;
- ecological zones;
- and socio-economic activities.

The four proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon formed the primary geographical strata for data collection and field assessments. Within these strata, additional categorization was undertaken to capture perspectives from:

- women groups;
- youth groups;
- pastoral households;

- vulnerable groups;
- local institutions;
- and community leadership structures.

The stratified approach ensured that variations in settlement density, ecological sensitivity, infrastructure distribution, and livelihood systems across the different project areas were adequately represented during the assessment.

4.6.3 RANDOM SAMPLING

Random sampling was applied in selected household consultations and field observations to minimize bias and improve representativeness of socio-economic information collected during the study. Households and respondents within the settlement areas were randomly selected during community consultations and field surveys to provide information on:

- settlement history;
- land use practices;
- grazing systems;
- infrastructure access;
- livelihood activities;
- and environmental concerns.

Random sampling was particularly useful in obtaining general community perspectives and validating information obtained through focused stakeholder consultations and key informant interviews.

4.6.4 TRANSECT-BASED SAMPLING

Transect-based sampling techniques were applied during ecological assessments, land use observations, and field verification exercises within the project area. Transect walks were undertaken across representative sections of the proposed excision areas to facilitate direct observation of:

- settlement distribution;
- vegetation characteristics;
- grazing intensity;

- drainage systems;
- wildlife signs;
- infrastructure distribution;
- and ecological sensitivity areas.

The transect approach enabled systematic coverage of different environmental and land use zones within the project area and supported spatial validation of field observations and GIS analysis outputs.



Figure 4-9: Tree species mapping in vegetation characterization in the project area

4.6.5 PARTICIPATORY SAMPLING APPROACHES

Participatory sampling approaches were integrated into the stakeholder engagement process to ensure inclusion of local knowledge and community perspectives within the ESIA study. Community leaders, elders, pastoral groups, and local residents assisted in identifying:

- key grazing areas;
- wildlife movement routes;
- conflict hotspots;
- settlement growth areas;
- water access points;
- and culturally important sites within the project area.

The participatory approach enhanced local ownership of the ESIA process and improved the reliability of information collected during field investigations and stakeholder consultations.

4.6.6 INSTITUTIONAL SAMPLING

Institutional sampling was undertaken to identify relevant government agencies, conservation institutions, civil society organizations, and development actors with mandates or interests related to the proposed excision process. Institutional consultations targeted organizations involved in:

- wildlife conservation;
- environmental management;
- land administration;
- infrastructure development;
- climate resilience;
- pastoral livelihoods;
- and local governance.

The institutional sampling process ensured that technical, legal, policy, and governance perspectives were adequately incorporated into the ESIA study.

4.6.7 SAMPLING CONSIDERATIONS AND LIMITATIONS

The sampling techniques adopted during the ESIA study were designed to provide representative and reliable information within the available study timeframe and logistical conditions. However, the study recognized certain limitations associated with:

- mobility of some pastoral communities;
- seasonal variability in grazing and wildlife movement patterns;
- accessibility challenges in some locations;
- and dynamic settlement expansion trends within the project area.

Figure 4-10: Sampling Techniques Applied During the ESIA Study

SAMPLING TECHNIQUE	APPLICATION AREA	PURPOSE
Purposive Sampling	Key informant interviews, ecological assessments, institutional consultations	To target respondents and locations with specialized knowledge and relevance to the study
Stratified Sampling	Settlement areas and stakeholder categories	To ensure balanced representation across the four proposed excision areas and stakeholder groups
Random Sampling	Household consultations and community surveys	To reduce bias and improve representativeness of socio-economic information
Transect-Based Sampling	Ecological assessments and field verification	To support systematic field observations across different environmental zones
Participatory Sampling	Community consultations and stakeholder engagement	To incorporate local knowledge and community perspectives into the ESIA process
Institutional Sampling	Government agencies and sectoral institutions	To capture technical, legal, policy, and governance perspectives relevant to the project

To address these limitations, the study adopted multiple complementary sampling techniques, triangulation of information sources, stakeholder validation, and integration of field observations with GIS analysis and secondary data review.

4.7 DATA ANALYSIS METHODS

Data analysis involved the integration of qualitative, quantitative, spatial, and thematic analytical approaches to evaluate environmental, ecological, social, and land use conditions within the project area. The analysis process was designed to ensure systematic interpretation of information collected through desktop review, field surveys, GIS mapping, stakeholder consultations, and specialist assessments. The adopted analytical methods enabled identification of baseline environmental and socio-economic conditions, assessment of spatial interactions between settlement systems and ecological resources, evaluation of stakeholder concerns, and determination of potential impacts associated with the proposed excision process.

4.7.1 QUALITATIVE DATA ANALYSIS

Qualitative data analysis techniques were applied to information obtained through stakeholder consultations, Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), community meetings, field observations, and participatory engagement activities. The qualitative analysis involved thematic categorization of stakeholder views, interpretation of institutional perspectives, identification of recurring concerns and priorities, and assessment of community perceptions regarding the proposed excision process which has been captured in chapter 7.

Information gathered during consultations was organized into thematic areas including land tenure and settlement concerns, human-wildlife conflict, grazing systems, infrastructure and service delivery, conservation issues, livelihood systems, environmental concerns, and community expectations. Narrative analysis and content interpretation techniques were used to synthesize stakeholder feedback and identify key environmental and social issues requiring consideration during impact assessment and development of mitigation measures.

4.7.2 QUANTITATIVE DATA ANALYSIS

Quantitative data analysis methods were applied to numerical and statistical information collected during household consultations, demographic assessments, field surveys, and infrastructure inventories. The quantitative analysis involved compilation and organization of field data, descriptive statistical analysis, frequency distribution analysis, population estimation, and comparison of land

use and settlement characteristics across the four proposed excision areas which has been captured in chapter 7.

Data relating to settlement size, population distribution, grazing patterns, infrastructure availability, and land area coverage were analyzed to support baseline characterization and assessment of existing socio-economic and land use conditions within the project area. Tabular summaries, percentages, proportions, and comparative analysis techniques were used to present and interpret quantitative findings generated during the study.

4.7.3 SPATIAL AND GIS ANALYSIS

Spatial analysis and GIS-based analytical techniques formed a major component of the ESIA data analysis process. GIS software and spatial datasets were used to analyze the extent of proposed excision areas, settlement distribution patterns, reserve boundaries, wildlife corridors, ecological sensitivity zones, grazing areas, infrastructure distribution, and land use systems within the wider Marsabit ecosystem.

Spatial overlay analysis was undertaken to assess interactions between settlement areas and environmentally sensitive zones including wildlife movement corridors and ecological connectivity systems. Satellite imagery and remote sensing analysis were further used to evaluate land cover characteristics, settlement expansion trends, vegetation distribution, and landscape fragmentation patterns within the project area. GPS coordinates collected during field verification exercises were processed and integrated into GIS databases to support boundary confirmation and spatial validation of field observations.

4.7.4 ENVIRONMENTAL AND ECOLOGICAL ANALYSIS

Environmental and ecological data collected during field investigations and specialist assessments were analyzed to determine ecological sensitivity, habitat conditions, vegetation characteristics, wildlife movement patterns, drainage systems, and environmental risks associated with the proposed excision. The ecological analysis incorporated field observations, GIS mapping outputs, wildlife corridor assessments, and secondary ecological information to evaluate potential impacts on biodiversity resources and ecological connectivity systems within the project area.

Comparative analysis was further undertaken to assess the extent of habitat modification and land use transformation associated with long-term settlement and grazing activities within the proposed excision areas.

4.7.5 SOCIO-ECONOMIC ANALYSIS

Socio-economic analysis focused on evaluation of settlement characteristics, livelihood systems, infrastructure access, land use practices, grazing systems, institutional structures, and community resource utilization patterns within the project area. The analysis also considered settlement growth trends, community dependence on natural resources, access to social services, and interactions between settlement systems and conservation landscapes.

Information generated through socio-economic analysis supported identification of potential social impacts, livelihood considerations, land governance issues, and opportunities associated with the proposed excision process.

4.7.6 IMPACT ANALYSIS AND EVALUATION

Potential environmental and social impacts associated with the proposed excision were analyzed and evaluated based on the nature of impacts, magnitude, duration, reversibility, spatial extent, likelihood of occurrence, and significance of anticipated effects. The impact analysis considered direct, indirect, induced, cumulative, short-term, and long-term impacts associated with the proposed excision process and future land use changes within the project area.

Significance ranking and professional judgment were applied in evaluating the severity and importance of identified impacts and determining appropriate mitigation measures and management interventions.

4.7.7 TRIANGULATION AND VALIDATION OF FINDINGS

To enhance reliability and consistency of the study findings, triangulation techniques were applied through integration and comparison of information obtained from desktop review, field observations, GIS analysis, stakeholder consultations, specialist assessments, and institutional data sources. Validation of findings was further undertaken through stakeholder consultations, field

verification exercises, and cross-checking of spatial and thematic information generated during the ESIA process.

4.7.8 DEVELOPMENT OF MITIGATION AND MANAGEMENT MEASURES

The analyzed data and assessment findings formed the basis for development of mitigation measures, environmental management strategies, monitoring indicators, and the Environmental and Social Management Plan (ESMP).

Figure 4-11: Data Analysis Methods Applied During the ESIA Study

DATA ANALYSIS METHOD	TYPE OF DATA ANALYZED	PURPOSE
Qualitative Analysis	Stakeholder views, KIIs, FGDs, field observations	To interpret community concerns, perceptions, and institutional perspectives
Quantitative Analysis	Population data, settlement statistics, infrastructure data	To support statistical and comparative assessment of baseline conditions
GIS and Spatial Analysis	GPS coordinates, spatial datasets, satellite imagery	To assess spatial extent, land use patterns, and ecological interactions
Environmental and Ecological Analysis	Ecological observations, habitat data, biodiversity information	To evaluate ecological sensitivity and environmental conditions
Socio-Economic Analysis	Livelihood systems, settlement patterns, resource use data	To assess socio-economic characteristics and land use dynamics
Impact Evaluation Analysis	Environmental and social impact information	To determine significance and severity of project impacts
Comparative Analysis	Historical and current land use information	To assess land use transformation and settlement expansion trends
Triangulation and Validation	Multiple data sources and assessment outputs	To improve reliability and consistency of study findings

The analysis process therefore supported formulation of practical recommendations aimed at promoting sustainable settlement planning, ecological conservation, environmental protection, and

improved coexistence between pastoral communities and conservation objectives within the wider Marsabit ecosystem.

4.8 IMPACT IDENTIFICATION AND EVALUATION METHODOLOGY

Impact identification and evaluation was undertaken using a systematic and multidisciplinary assessment approach aimed at identifying, predicting, and evaluating the potential environmental, ecological, social, economic, and land use impacts associated with the proposed excision process. The impact assessment methodology was designed to ensure that both positive and negative impacts likely to arise from the proposed excision and subsequent land use changes were comprehensively analyzed in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (Revised 2015), the Environmental (Impact Assessment and Audit) Regulations, 2003, and the approved Terms of Reference (ToR) issued by the National Environment Management Authority (NEMA).

The impact identification process involved integration of information generated through desktop review, field investigations, GIS mapping and spatial analysis, stakeholder consultations, ecological assessments, socio-economic surveys, and specialist studies undertaken during the ESIA process. The assessment focused on identifying potential impacts associated with settlement regularization, land use transformation, grazing systems, infrastructure development, ecological connectivity, wildlife movement corridors, socio-economic changes, and future development pressures within the project area.

4.8.1 IMPACT IDENTIFICATION PROCESS

Potential impacts associated with the proposed excision were identified through field observations, stakeholder consultations, Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), GIS and spatial analysis, ecological assessments, literature review, and professional expert judgment. The assessment considered impacts likely to arise during the implementation of the excision process as well as long-term impacts associated with future settlement growth and land use changes within the project area.

Particular attention was given to interactions between settlement expansion and environmentally sensitive areas including wildlife dispersal zones, elephant corridors, grazing landscapes, drainage

systems, and natural habitats within the wider Marsabit ecosystem. The impact identification process also incorporated local knowledge and institutional perspectives obtained during stakeholder consultations in order to capture site-spebcific environmental and socio-economic concerns relevant to the project area.

4.8.2 IMPACT CATEGORIZATION

Identified impacts were categorized into environmental, ecological, social, economic, land use, institutional, and cumulative impact categories to facilitate systematic analysis and evaluation. The assessment further classified impacts as positive or negative, direct or indirect, induced or cumulative, reversible or irreversible, and short-term or long-term depending on their characteristics and expected implications.

This categorization approach assisted in understanding the nature and complexity of anticipated impacts and provided a structured basis for determining appropriate mitigation and management measures within the ESIA process.

4.8.3 IMPACT EVALUATION CRITERIA

Evaluation of identified impacts was undertaken using a significance assessment framework based on several criteria including magnitude of impact, spatial extent, duration, reversibility, sensitivity of affected receptors, likelihood of occurrence, and overall significance of anticipated effects.

The magnitude criterion considered the scale and intensity of anticipated impacts on environmental and social receptors within the project area. Spatial extent assessed the geographical coverage of impacts ranging from localized site-specific effects to broader ecosystem-level implications. Duration of impacts was evaluated based on whether impacts were temporary, short-term, long-term, or permanent in nature.

Reversibility analysis considered the ability of affected environmental or social systems to recover following occurrence of impacts. Sensitivity assessment focused on the vulnerability and ecological importance of affected receptors including wildlife corridors, ecological habitats, grazing systems, settlement areas, and community livelihood systems within the project area. Likelihood analysis evaluated the probability of identified impacts occurring during implementation of the proposed excision process and future settlement development activities.

4.8.4 SIGNIFICANCE RATING OF IMPACTS

The significance of impacts was determined through professional judgment and comparative analysis based on the combined influence of impact magnitude, sensitivity of receptors, duration, spatial extent, and likelihood of occurrence. Impacts were generally classified into negligible, low, moderate, high, and critical significance categories.

Negligible and low impacts were considered manageable through standard environmental management measures, while moderate to high impacts required targeted mitigation and monitoring interventions. Critical impacts represented impacts with potentially significant environmental or social implications requiring strong management controls, avoidance measures, and long-term monitoring.

4.8.5 ASSESSMENT OF DIRECT, INDIRECT, AND CUMULATIVE IMPACTS

The impact assessment methodology considered direct, indirect, induced, and cumulative impacts associated with the proposed excision process. Direct impacts referred to impacts occurring immediately within the proposed excision areas as a result of settlement regularization, land use changes, infrastructure expansion, and human activities.

Indirect impacts referred to secondary effects occurring outside the immediate project area including increased grazing pressure, settlement expansion, resource competition, and ecological fragmentation within adjacent landscapes. The assessment further evaluated induced impacts associated with future population growth, increased development activities, and changing land use dynamics following the proposed excision process.

Cumulative impact assessment considered the combined effects of historical excisions within Marsabit National Reserve, ongoing settlement expansion, grazing pressures, infrastructure development, climate-related stresses, and ecological changes occurring within the wider Marsabit ecosystem. This approach was important in understanding broader long-term implications of the proposed excision on ecological sustainability and landscape connectivity within the project area.

4.8.6 STAKEHOLDER INPUT IN IMPACT EVALUATION

Stakeholder views and local knowledge obtained during consultations formed an important component of the impact evaluation process. Community concerns, institutional perspectives, and

local observations assisted in identifying socially significant issues, conflict hotspots, resource use dynamics, and environmentally sensitive areas within the project area.

The stakeholder engagement process further supported validation of identified impacts and prioritization of key issues requiring mitigation and management interventions. This participatory approach enhanced the reliability and contextual relevance of the impact assessment findings.

4.8.7 DEVELOPMENT OF MITIGATION MEASURES

Following identification and evaluation of impacts, appropriate mitigation and enhancement measures were developed to avoid adverse impacts, minimize environmental and social risks, enhance positive project outcomes, and promote sustainable land use management within the project area.

The mitigation hierarchy applied during the assessment prioritized avoidance, minimization, restoration, rehabilitation, and compensation measures where necessary. The identified mitigation measures formed the basis for preparation of the Environmental and Social Management Plan (ESMP) and monitoring framework for the proposed excision process.

Figure 4-12: Impact Evaluation Criteria Applied During the ESIA Study

IMPACT EVALUATION CRITERION	DESCRIPTION	PURPOSE
Magnitude	Scale and intensity of anticipated impact	To assess severity of impacts
Spatial Extent	Geographical coverage of impact	To determine area of influence
Duration	Time period over which impact occurs	To assess whether impacts are temporary or permanent
Reversibility	Ability of affected systems to recover	To determine long-term implications
Sensitivity of Receptors	Vulnerability and importance of affected environmental or social receptors	To assess ecological and social significance
Likelihood of Occurrence	Probability of impact occurrence	To evaluate potential risk levels

IMPACT EVALUATION CRITERION	DESCRIPTION	PURPOSE
Nature of Impact	Whether impact is positive or negative	To support impact categorization
Cumulative Effects	Combined impacts from multiple activities and stressors	To assess broader ecosystem and social implications
Significance Ranking	Overall importance of identified impacts	To prioritize mitigation and management measures

4.9 LIMITATIONS OF THE STUDY

The ESIA study was undertaken within the available project timelines, logistical conditions, and prevailing environmental circumstances within the project area. While reasonable efforts were made to ensure comprehensive data collection and analysis, the study experienced a few limitations that are important to acknowledge.

Some sections of the project area were relatively difficult to access due to poor road conditions, dispersed settlement patterns, and the vast geographical coverage of the proposed excision areas. In addition, the mobility of pastoral communities and seasonal grazing movements limited the availability of some respondents during field consultations.

The study was also undertaken within a specific seasonal period, and therefore some ecological and wildlife movement patterns may vary across different seasons of the year. Nonetheless, the assessment incorporated secondary ecological information, GIS analysis, and stakeholder knowledge to supplement field observations and minimize seasonal limitations.

Despite these limitations, the ESIA adopted multiple data collection methods, stakeholder consultations, GIS mapping, field verification exercises, and triangulation of information sources to ensure that the study findings remain representative, reliable, and sufficient for environmental and social assessment of the proposed excision process.

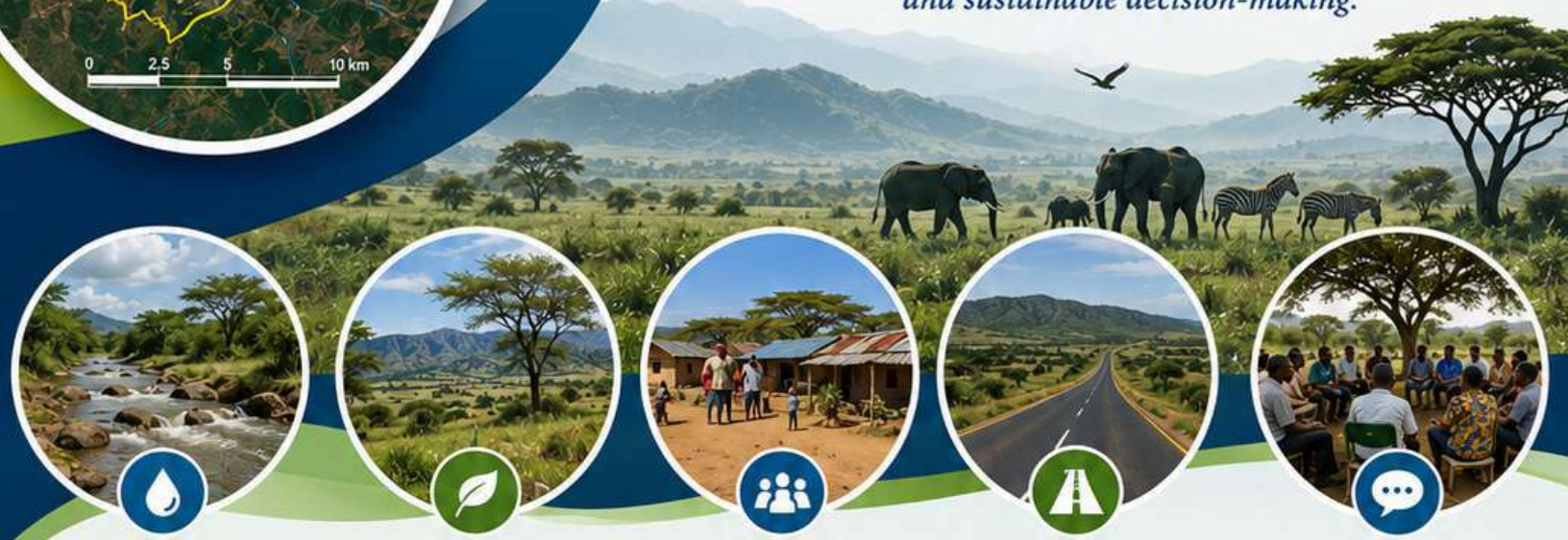




CHAPTER 05

BASELINE ENVIRONMENT

Establishing the existing environmental and social baseline conditions of the study area to inform impact prediction, evaluation and sustainable decision-making.



PHYSICAL ENVIRONMENT

Climate, geology, soils, topography, surface and groundwater, and air quality.

BIOLOGICAL ENVIRONMENT

Terrestrial and aquatic ecosystems, flora, fauna, habitats and ecological connectivity.

SOCIO-ECONOMIC ENVIRONMENT

Population, settlements, livelihoods, education, health, culture and community resources.

BUILT ENVIRONMENT

Infrastructure, utilities, land use, services and public facilities.

INSTITUTIONAL & GOVERNANCE CONTEXT

Administrative setup, institutional roles, community structures and local governance arrangements.

BASELINE COMPONENTS

DATA COLLECTION

Field surveys, literature review, mapping, monitoring and stakeholder inputs.

BASELINE INDICATORS

Key environmental and social indicators used to describe existing conditions.

SPATIAL ANALYSIS

GIS and remote sensing used to analyze landscapes, resources and sensitive receptors.

TEMPORAL CONTEXT

Seasonal variations and trends influencing environmental and social dynamics.

QUALITY ASSURANCE

Data validation, accuracy checks and stakeholder verification for reliability of findings.

CHAPTER 5: BASELINE ENVIRONMENTAL CONDITIONS

This chapter presents the baseline environmental conditions within the proposed excision areas and the surrounding Marsabit ecosystem. This baseline assessment provides an overview of the existing biophysical environment including climate, topography, geology, soils, hydrology, vegetation, biodiversity, wildlife resources, ecological sensitivity areas, and other environmental characteristics relevant to the proposed excision process.

The baseline environmental information was obtained through field investigations, GIS and spatial analysis, ecological assessments, stakeholder consultations, and review of secondary data and existing environmental studies relating to the project area. The chapter provides the environmental context against which potential impacts of the proposed excision are assessed and forms the basis for development of appropriate mitigation and environmental management measures.

5.1 CLIMATE AND METEOROLOGY

The proposed excision areas are located within the arid and semi-arid lands (ASALs) of Marsabit County in northern Kenya, an area characterized by generally hot and dry climatic conditions with high spatial and temporal variability in rainfall distribution. The climate of the project area is influenced by altitude variations, seasonal wind systems, topography of the Marsabit highlands, and regional climatic patterns affecting northern Kenya.

The project area experiences a predominantly semi-arid to arid climate characterized by low and unreliable rainfall, high evapotranspiration rates, prolonged dry periods, and periodic drought events. Climatic conditions within the area play an important role in shaping settlement patterns, pastoral production systems, vegetation distribution, wildlife movement, water availability, and natural resource utilization within the wider Marsabit ecosystem.

5.1.1 RAINFALL PATTERNS

Rainfall within the project area is generally bimodal in nature, with the long rains typically occurring between March and May, while the short rains occur between October and December. However,

rainfall distribution remains highly erratic and uneven both spatially and temporally, resulting in significant seasonal variability in water and pasture availability across the landscape.

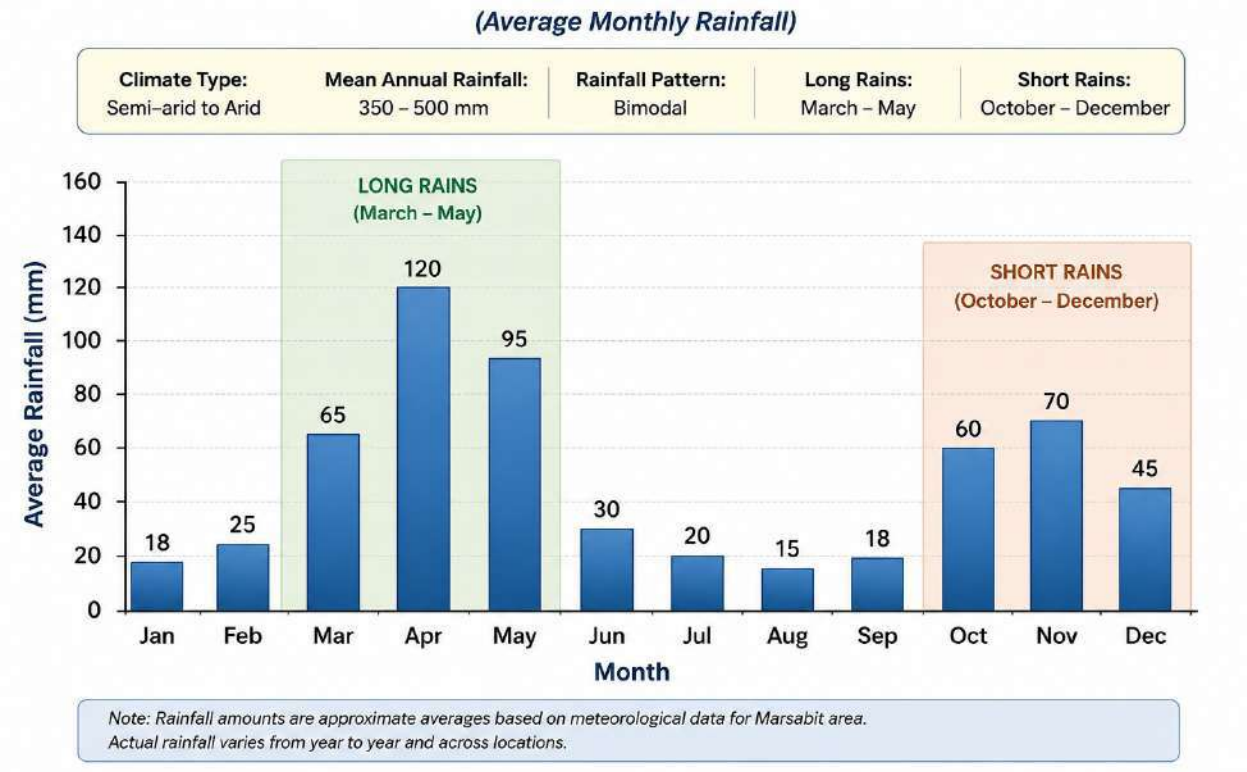


Figure 5-1: Average annual rainfall of the project area (Source: CHIRPS rainfall datasets)

The lower plains and settlement areas surrounding Karare, Kambinye, Kamboe, and Parkishon generally receive relatively low annual rainfall ranging between approximately 200 mm and 600 mm per annum, although localized variations occur depending on elevation and proximity to the Marsabit highlands. The upland areas around Mount Marsabit tend to receive relatively higher rainfall due to orographic influence.

Rainfall variability significantly influences grazing systems, livestock mobility, vegetation regeneration, seasonal drainage flows, and wildlife dispersal patterns within the project area. During prolonged dry periods, grazing pressure often increases within available pasture zones, potentially intensifying interactions between livestock and wildlife within sections of the reserve ecosystem.

5.1.2 TEMPERATURE CONDITIONS

The project area experiences generally high temperatures throughout the year, characteristic of ASAL environments in northern Kenya. Mean annual temperatures typically range between

approximately 24°C and 32°C, although daytime temperatures may exceed these levels during prolonged dry seasons.

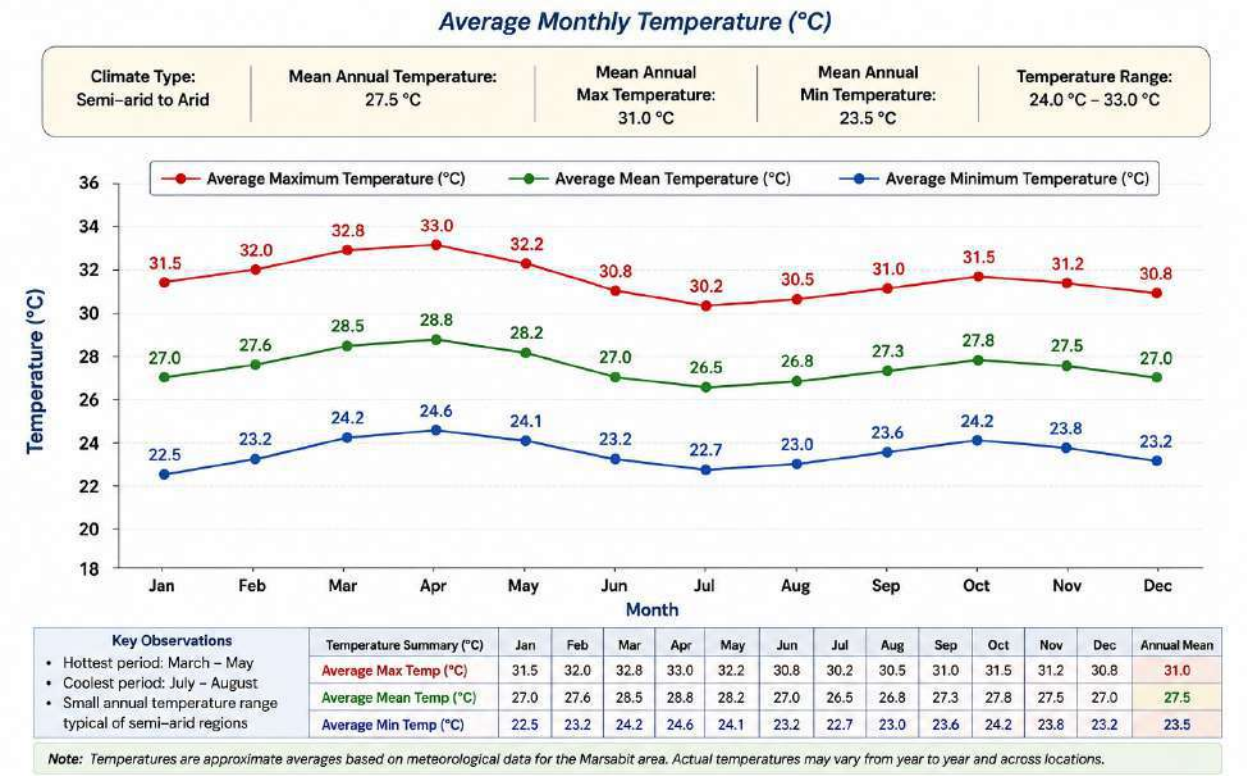


Figure 5-2: Average annual temperature in the project area (Source: WorldClim climate datasets)

Temperature conditions vary slightly depending on altitude, with lower elevations experiencing hotter conditions compared to the relatively cooler upland sections around Marsabit Mountain. High evaporation rates associated with elevated temperatures contribute to water stress, reduced soil moisture retention, and seasonal scarcity of water resources within the project area.

The prevailing temperature conditions influence vegetation productivity, livestock production systems, water demand, and ecological processes within the wider Marsabit ecosystem.

5.1.3 WIND PATTERNS

The project area experiences moderate to occasionally strong wind conditions influenced by seasonal atmospheric circulation patterns across northern Kenya. Wind speeds tend to increase during dry seasons and open plain conditions, particularly within exposed rangeland areas surrounding the proposed excision zones.

Wind action contributes to dust generation, soil erosion, and localized land degradation in sparsely vegetated areas, especially during prolonged dry periods. Wind conditions also influence evapotranspiration rates and microclimatic conditions within the landscape.

5.1.4 HUMIDITY AND EVAPOTRANSPIRATION

Relative humidity levels within the project area are generally low due to the arid and semi-arid climatic conditions prevailing within the region. Evapotranspiration rates remain high throughout most parts of the year owing to elevated temperatures, low rainfall, and strong solar radiation.

The high evapotranspiration rates contribute to rapid loss of soil moisture and reduced water retention capacity within the landscape. These climatic conditions have a direct influence on pasture availability, seasonal vegetation dynamics, livestock mobility, and water resource availability within the project area.

5.1.5 CLIMATE VARIABILITY AND DROUGHT CONDITIONS

Marsabit County frequently experiences climate variability and recurrent drought events which significantly affect pastoral livelihoods, water resources, grazing systems, biodiversity, and ecological stability within the wider ecosystem. Prolonged drought periods often result in reduced pasture productivity, water scarcity, livestock losses, and increased pressure on available natural resources.

Climate variability has also contributed to changing settlement dynamics, increased competition over grazing resources, and heightened interactions between pastoral communities and wildlife within sections of the Marsabit ecosystem. Seasonal migration patterns of both livestock and wildlife are strongly influenced by rainfall distribution and availability of pasture and water resources across the landscape.

5.1.6 CLIMATE CHANGE CONSIDERATIONS

The project area remains vulnerable to the impacts of climate change including increasing temperatures, prolonged drought periods, unpredictable rainfall patterns, vegetation degradation, and increased environmental stress on fragile ASAL ecosystems. Climate change is expected to

further influence settlement expansion, grazing dynamics, water resource availability, and ecological resilience within the wider Marsabit landscape.

The proposed excision process therefore requires consideration of climate resilience and sustainable land use planning measures aimed at promoting environmentally sustainable settlement systems, protection of ecological resources, sustainable grazing management, and improved adaptation capacity for local communities within the project area.

Figure 5-3: General Climatic Characteristics of the Project Area

CLIMATIC PARAMETER	DESCRIPTION
Climate Type	Semi-arid to arid climate
Rainfall Pattern	Bimodal rainfall regime with long and short rains
Average Annual Rainfall	Approximately 200–600 mm per annum
Temperature Range	Approximately 24°C – 32°C
Relative Humidity	Generally low
Evapotranspiration	High throughout most of the year
Dry Seasons	Predominantly January–March and June–September
Main Climate Risks	Droughts, rainfall variability, water scarcity, land degradation
Dominant Climatic Influence	ASAL climatic conditions and Mount Marsabit topography

5.2 TOPOGRAPHY AND GEOLOGY

The proposed excision areas are located within the broader Marsabit landscape in northern Kenya, an area characterized by varied topographical features comprising gently undulating plains, isolated volcanic hills, lava outcrops, seasonal drainage systems, and elevated upland areas associated with the Mount Marsabit volcanic complex. The physical terrain of the project area plays an important role in influencing settlement distribution, drainage patterns, vegetation characteristics, grazing systems, infrastructure development, wildlife movement, and land use dynamics within the wider Marsabit ecosystem.

5.2.1 TOPOGRAPHY

The topography of the project area generally consists of low-lying plains interspersed with gently rolling terrain and isolated rocky outcrops. Elevation within the proposed excision areas varies gradually across the landscape, with lower elevations occurring within the surrounding plains and relatively higher elevations occurring towards the Mount Marsabit highlands.



Figure 5-4: The topography of the project area

The Karare, Kambinye, Kamboe, and Parkishon settlement areas are predominantly situated within gently sloping plains characterized by sparse vegetation cover, seasonal drainage channels, and open rangeland systems suitable for pastoral grazing activities. The terrain within most sections of the project area is relatively accessible and has supported gradual settlement expansion, road infrastructure development, livestock mobility, and socio-economic activities over time.

The broader Marsabit landscape is strongly influenced by the Mount Marsabit volcanic massif, which rises prominently above the surrounding lowlands and significantly influences local climatic and ecological conditions. The elevated highland areas around Mount Marsabit receive relatively higher rainfall compared to the surrounding plains and support denser vegetation cover and important ecological habitats within the reserve ecosystem.

The project area also contains localized topographical variations including shallow valleys, ephemeral drainage lines, seasonal water flow channels, and gently elevated ridges which influence surface runoff patterns and localized soil erosion processes during rainy seasons.

Topographical characteristics within the project area influence:

- settlement distribution patterns;
- infrastructure alignment;
- grazing systems;
- water flow dynamics;

- wildlife movement routes;
- and ecological connectivity within the wider Marsabit ecosystem.

Areas with relatively flat terrain have experienced greater settlement concentration and infrastructure expansion, particularly along transport corridors and accessible grazing zones.



Figure 5-5: Settlement in a relatively flat terrain in Parkishon village

5.2.2 DRAINAGE CHARACTERISTICS

The proposed excision areas are characterized by predominantly seasonal drainage systems associated with episodic rainfall events experienced during the long and short rainy seasons. Surface runoff within the project area occurs mainly through ephemeral streams, shallow drainage depressions, natural watercourses, and localized runoff channels traversing sections of the proposed excision areas and surrounding rangelands. Most drainage systems remain dry for extended periods during dry seasons but may experience short-duration surface flows following intense rainfall events.

The drainage systems contribute to localized groundwater recharge, vegetation regeneration, seasonal pasture development, and temporary water availability within parts of the landscape. Some of the seasonal drainage corridors also function as ecological movement routes and grazing concentration zones for both livestock and wildlife during wet seasons.

Within **Karare II**, the drainage system is relatively more pronounced compared to the other proposed excision areas due to its location along gently sloping terrain adjacent to sections of the Mount Marsabit foot slopes. The area contains several shallow seasonal drainage channels and runoff depressions that direct stormwater flows towards lower plains during rainfall events. Some of these drainage corridors intersect wildlife movement routes, particularly elephant dispersal pathways

traversing sections of the Karare landscape. During rainy seasons, localized vegetation regeneration occurs along these drainage lines, attracting both livestock and wildlife grazing activities.

The **Kambinye** area is characterized by relatively shallow and dispersed seasonal runoff channels traversing the open plains and grazing fields surrounding the settlement area. Surface runoff within Kambinye is generally moderate due to the relatively flat terrain and sandy soils which facilitate infiltration in some sections. Seasonal drainage depressions within the area support temporary pasture regeneration and localized groundwater recharge following rainfall events. However, some sections are susceptible to localized erosion where runoff becomes concentrated along livestock movement routes and access roads.

Within **Kamboe**, drainage characteristics are influenced by gently undulating volcanic plains and roadside runoff systems associated with the nearby transport corridor. The area contains several ephemeral watercourses and shallow drainage channels which remain dry during most parts of the year but become active during periods of intense rainfall. Surface runoff within Kamboe contributes to temporary water accumulation in low-lying sections and supports seasonal grazing activities. The relatively sandy and gravelly soils within parts of the area promote moderate infiltration, although localized runoff erosion is evident in disturbed and sparsely vegetated sections.

The **Parkishon** area exhibits relatively confined seasonal drainage features associated with localized runoff from surrounding plains and rocky surfaces near the KDF installation and adjacent settlement zones. Drainage channels within the area are generally shallow and seasonal, with runoff flows occurring mainly during rainy periods. The rocky terrain and compacted surfaces in some sections contribute to rapid runoff generation and localized erosion during heavy rainfall events. Seasonal drainage depressions within Parkishon also support temporary vegetation growth and limited seasonal water retention for livestock use.

5.2.3 GEOLOGICAL CHARACTERISTICS

Geologically, the project area forms part of the extensive volcanic geological formations associated with the Mount Marsabit volcanic complex and the broader northern Kenya volcanic province. The area is predominantly underlain by volcanic rocks including basaltic lava flows, volcanic ash deposits, pyroclastic materials, and weathered volcanic formations resulting from historical volcanic activity within the region.

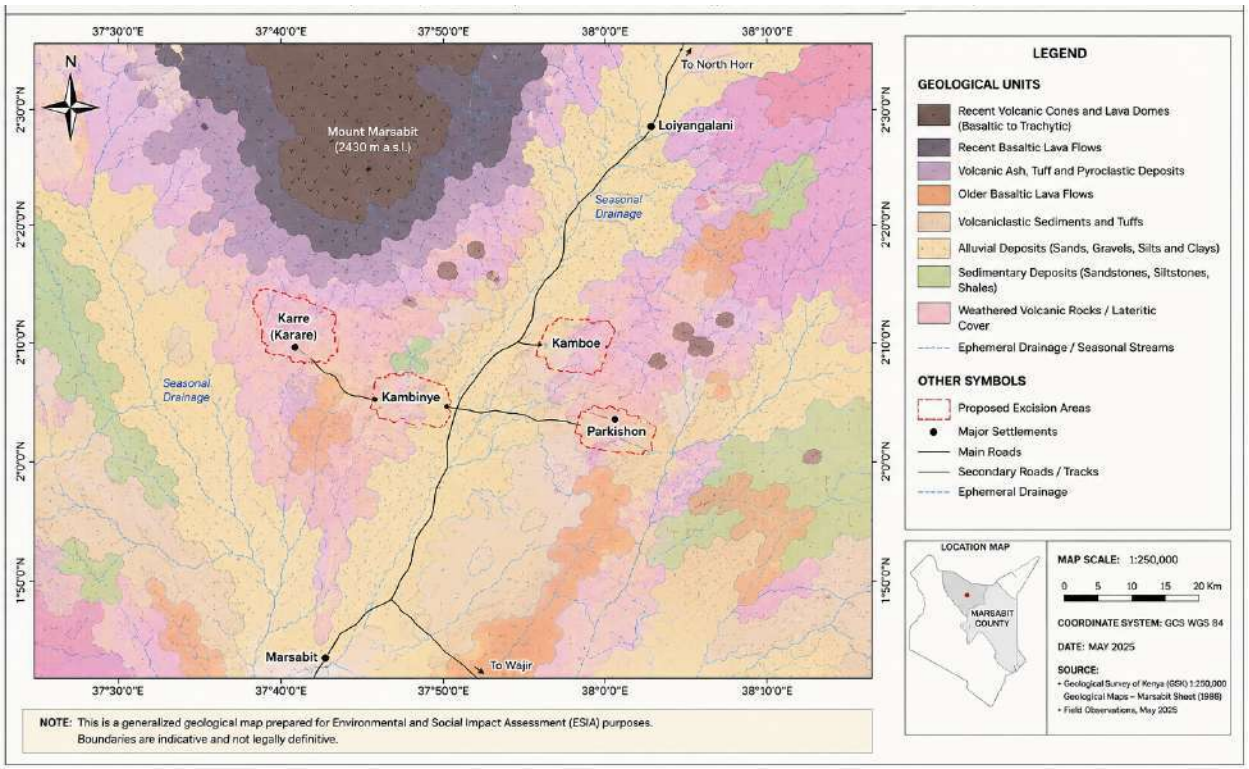


Figure 5-6: Geological map of the project area

The volcanic geology has contributed significantly to the formation of the present landscape including lava plains, rocky outcrops, volcanic hills, and gently sloping volcanic foot plains characteristic of the Marsabit ecosystem.

Weathering of volcanic parent materials has contributed to the development of soils supporting sparse grassland vegetation, shrublands, and localized woodland vegetation within the project area. In some areas, exposed rock outcrops and shallow stony soils are evident, particularly within elevated sections and erosion-prone landscapes.

The geological formations within the project areas also influence groundwater occurrence, drainage patterns, soil formation processes, and vegetation distribution across the landscape.

5.2.4 GEOMORPHOLOGICAL FEATURES

The project areas exhibit several geomorphological features typical of ASAL volcanic landscapes including:

- lava plains;
- rocky ridges;

- gently undulating volcanic foot slopes;
- seasonal drainage depressions;
- and localized erosion surfaces.

The geomorphology of the area has evolved through long-term volcanic activity, weathering processes, erosion, and sediment deposition within the broader Marsabit landscape.

Localized erosion features including sheet erosion and surface runoff channels were observed in some sections of the project area, particularly within sparsely vegetated grazing zones and areas experiencing concentrated livestock movement.

5.2.5 TOPOGRAPHY AND GEOLOGY IN RELATION TO THE PROPOSED EXCISION

The topographical and geological conditions of the proposed excision areas generally support existing settlement patterns, grazing activities, transport accessibility, and socio-economic development within the landscape. However, variations exist across Karare II, Kambinye, Kamboe, and Parkishon in terms of terrain characteristics, erosion susceptibility, drainage behavior, and ecological sensitivity.

Within **Karare II**, the terrain is characterized by gently sloping volcanic foot plains interspersed with shallow drainage depressions and localized rocky outcrops. The area lies relatively closer to the Mount Marsabit highlands and forms part of an important ecological transition zone between settlement areas and wildlife dispersal landscapes. The open terrain and natural drainage corridors within Karare II facilitate movement of wildlife, particularly elephants, across sections of the landscape. However, increasing settlement concentration and grazing pressure within the area have contributed to localized vegetation degradation, soil compaction, and surface runoff erosion in some sections. The relatively fragile volcanic-derived soils within Karare II are therefore susceptible to erosion and land degradation where uncontrolled settlement expansion and overgrazing occur.

The **Kambinye** area is predominantly characterized by relatively flat to gently undulating plains with scattered volcanic rock outcrops and shallow seasonal drainage systems. The terrain supports extensive grazing activities and dispersed settlement patterns concentrated along access routes and open rangelands. The generally sandy and moderately drained soils within Kambinye facilitate moderate infiltration; however, sections experiencing concentrated livestock movement and road runoff exhibit localized surface erosion and vegetation disturbance. The open plains within

Kambinye also support seasonal livestock mobility and ecological connectivity between grazing areas during wet seasons.

Within **Kamboe**, the landscape is dominated by gently undulating volcanic plains with gravelly surfaces, shallow runoff channels, and scattered lava-derived landforms associated with the broader Marsabit volcanic complex. The area benefits from relatively good transport accessibility due to its proximity to the highway corridor, which has influenced settlement growth and infrastructure development within the landscape. However, sections of Kamboe characterized by sparse vegetation cover and disturbed surfaces are vulnerable to sheet erosion and surface runoff during heavy rainfall events. The volcanic-derived soils within the area remain moderately suitable for grazing systems but require proper land management to minimize land degradation risks associated with increasing human activities.

The **Parkishon** area exhibits relatively rocky terrain with localized ridges, compacted surfaces, and shallow drainage channels influenced by volcanic geological formations and infrastructural development associated with the KDF installation. Surface runoff within the area is relatively rapid due to the compacted and rocky nature of the terrain, increasing susceptibility to localized erosion during rainfall events. The area also contains sparsely vegetated sections with shallow stony soils and exposed rock surfaces supporting limited pasture productivity. Despite these constraints, the open terrain within Parkishon continues to support localized grazing activities and seasonal ecological interactions within adjacent reserve landscapes.

The relatively open terrain across sections of the proposed excision areas facilitates wildlife movement and ecological connectivity within parts of the wider Marsabit ecosystem, particularly along seasonal drainage systems, grazing corridors, and open rangeland sections. Future land use planning within the excised areas will therefore require careful consideration of site-specific topographical constraints, erosion-prone zones, drainage systems, ecological sensitivity areas, and sustainable settlement development approaches in order to minimize environmental degradation and maintain ecological stability within the wider landscape.

Figure 5-7: Site-Specific Topographical and Geological Characteristics of the Proposed Excision Areas

PROJECT SITE	TOPOGRAPHICAL CHARACTERISTICS	GEOLOGICAL CHARACTERISTICS	ENVIRONMENTAL SENSITIVITY
Karare II	Gently sloping volcanic foot plains with shallow	Volcanic-derived soils, basaltic formations,	High ecological sensitivity due to wildlife corridors,

	drainage depressions and rocky outcrops	weathered volcanic materials	erosion susceptibility, and settlement pressure
Kambinye	Relatively flat to gently undulating plains with scattered volcanic outcrops	Sandy volcanic soils and shallow sediment deposits	Moderate sensitivity associated with grazing pressure and localized erosion
Kamboe	Undulating volcanic plains with gravelly surfaces and shallow runoff channels	Basaltic volcanic formations and lava-derived soils	Moderate sensitivity due to settlement expansion and runoff erosion
Parkishon	Rocky terrain with localized ridges, compacted surfaces, and shallow drainage channels	Shallow stony soils, exposed volcanic rocks, compacted volcanic surfaces	Moderate to high sensitivity due to erosion risks and limited vegetation cover

5.3 SOILS AND LAND CAPABILITY

The proposed excision areas are located within the arid and semi-arid lands (ASALs) of Marsabit County and are characterized by predominantly shallow to moderately deep soils derived mainly from volcanic parent materials associated with the Mount Marsabit volcanic complex and surrounding volcanic plains. Soil formation within the project area has been influenced by geological processes, climatic conditions, topography, vegetation cover, drainage characteristics, and long-term land use activities including grazing and settlement expansion.

The soils within the project area play an important role in supporting pastoral grazing systems, vegetation growth, settlement development, surface drainage processes, and ecological productivity within the wider Marsabit ecosystem. However, the fragile ASAL environment and low rainfall conditions limit the agricultural potential of most parts of the landscape and increase susceptibility to land degradation and soil erosion under intensified land use pressure.

5.3.1 SOIL CHARACTERISTICS

Soil sampling and laboratory analysis were undertaken as part of the baseline environmental assessment to determine the physical and chemical characteristics of soils within the proposed excision areas. A total of sixteen (16) representative soil samples were collected on 25th May 2026

across the four proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon, with four samples collected from each site. The sampling exercise targeted representative land use zones, grazing areas, settlement zones, drainage sections, and relatively undisturbed locations within the project area.

The dominant soils within the proposed excision areas generally consist of sandy loam, sandy clay loam, volcanic loam, and shallow stony soils occurring across gently undulating plains and volcanic foot slopes. In some areas, the soils are characterized by loose sandy textures mixed with gravel, weathered volcanic materials, and rock fragments derived from underlying basaltic formations.

The lower plains surrounding Karare, Kambinye, Kamboe, and Parkishon are predominantly covered by shallow to moderately deep soils with relatively low organic matter content due to sparse vegetation cover and limited moisture retention associated with the semi-arid climatic conditions. Localized areas with finer-textured soils occur within seasonal drainage depressions and low-lying sections where sediment deposition and runoff accumulation take place during rainy seasons.

In elevated and rocky sections of the landscape, particularly near volcanic outcrops and erosion-prone areas, shallow stony soils and exposed rock surfaces are common. These areas generally support sparse shrub vegetation and limited pasture productivity. The volcanic origin of the soils contributes to relatively moderate mineral content in some locations; however, soil fertility remains constrained by low rainfall, limited organic matter accumulation, and high evapotranspiration rates characteristic of ASAL ecosystems.

Laboratory analysis focused on key soil parameters including soil texture, pH, organic matter content, nitrogen, phosphorus, potassium, electrical conductivity, drainage characteristics, and general land capability interpretation. The results generally indicate that the soils within the project area are moderately suitable for pastoral grazing systems and settlement development but possess limited agricultural potential due to low moisture retention, low organic matter content, and climatic constraints associated with ASAL environments.

Figure 5-8: Baseline Soil Analysis Results from the Proposed Excision Areas

Sample ID	Sampling Location	Soil Depth (cm)	Soil Texture	pH	Organic Matter (%)	Nitrogen (%)	Phosphorus (ppm)	Potassium (cmol/kg)	Electrical Conductivity (dS/m)	Drainage Characteristics	Land Capability Interpretation
KR-01	Karare II	0–30	Sandy Loam	6.8	1.2	0.08	9.5	0.34	0.21	Well Drained	Suitable for grazing and settlement
KR-02	Karare II	30–60	Sandy Clay Loam	7.1	1.0	0.07	8.7	0.30	0.25	Moderately Drained	Moderate grazing suitability
KR-03	Karare II	0–20	Loamy Sand	6.5	0.9	0.05	6.2	0.28	0.18	Excessively Drained	Low moisture retention
KR-04	Karare II	20–50	Sandy Loam	6.9	1.1	0.06	7.9	0.31	0.23	Well Drained	Suitable for controlled grazing
KB-01	Kambinye	0–30	Sandy Clay Loam	7.2	1.4	0.09	10.4	0.42	0.27	Moderately Drained	Moderate land productivity
KB-02	Kambinye	20–45	Sandy Loam	6.7	1.1	0.07	8.3	0.33	0.19	Well Drained	Suitable for settlement development
KB-03	Kambinye	0–25	Loamy Sand	6.4	0.8	0.05	5.8	0.24	0.15	Excessively Drained	Susceptible to moisture stress
KB-04	Kambinye	25–60	Sandy Clay Loam	7.0	1.3	0.08	9.1	0.37	0.22	Moderately Drained	Moderate grazing capability
KM-01	Kamboe	0–30	Sandy Loam	6.6	1.0	0.06	7.2	0.29	0.20	Well Drained	Suitable for grazing systems

Sample ID	Sampling Location	Soil Depth (cm)	Soil Texture	pH	Organic Matter (%)	Nitrogen (%)	Phosphorus (ppm)	Potassium (cmol/kg)	Electrical Conductivity (dS/m)	Drainage Characteristics	Land Capability Interpretation
KM-02	Kamboe	30–60	Gravelly Sandy Loam	6.8	0.9	0.05	6.9	0.27	0.18	Excessively Drained	Low agricultural suitability
KM-03	Kamboe	0–20	Sandy Clay Loam	7.1	1.2	0.08	9.0	0.35	0.24	Moderately Drained	Moderate land capability
KM-04	Kamboe	20–50	Volcanic Loam	6.9	1.5	0.09	11.3	0.44	0.26	Well Drained	Relatively productive grazing zone
PK-01	Parkishon	0–30	Sandy Loam	6.7	1.1	0.07	8.1	0.32	0.21	Well Drained	Suitable for settlement and grazing
PK-02	Parkishon	20–45	Gravelly Loam	7.0	1.0	0.06	7.4	0.30	0.23	Moderately Drained	Moderate productivity
PK-03	Parkishon	0–25	Loamy Sand	6.5	0.7	0.04	5.6	0.22	0.17	Excessively Drained	Low moisture retention
PK-04	Parkishon	25–60	Sandy Clay Loam	7.2	1.4	0.08	10.1	0.39	0.25	Moderately Drained	Suitable for controlled development

Figure 5-9: Soil Sampling Coordinates within the Proposed Excision Areas

Sample ID	Sampling Location	GPS Coordinates (UTM)	Sampling Area Description
KR-01	Karare II	37N 376210 / UTM 0245750	Settlement edge near grazing zone
KR-02	Karare II	37N 375884 / UTM 0246015	Seasonal drainage section
KR-03	Karare II	37N 374955 / UTM 0244628	Open grazing field
KR-04	Karare II	37N 373790 / UTM 0241186	Rocky shrubland section
KB-01	Kambinye	37N 365010 / UTM 0265255	Settlement expansion zone
KB-02	Kambinye	37N 366284 / UTM 0266742	Grazing field near access road
KB-03	Kambinye	37N 367542 / UTM 0268150	Drainage depression area
KB-04	Kambinye	37N 368706 / UTM 0265481	Volcanic foot slope section
KM-01	Kamboe	37N 379864 / UTM 0233465	Grazing zone adjacent to highway
KM-02	Kamboe	37N 378622 / UTM 0235180	Sandy plain section
KM-03	Kamboe	37N 376895 / UTM 0234716	Settlement fringe area
KM-04	Kamboe	37N 375462 / UTM 0232850	Volcanic loam section
PK-01	Parkishon	37N 376980 / UTM 0249055	Settlement cluster near KDF area
PK-02	Parkishon	37N 375844 / UTM 0250242	Grazing and livestock holding zone
PK-03	Parkishon	37N 373420 / UTM 0251088	Seasonal runoff section
PK-04	Parkishon	37N 372215 / UTM 0249785	Rocky and sparsely vegetated area

5.3.2 SOIL DRAINAGE AND MOISTURE RETENTION

Most soils within the project area exhibit moderate to excessive drainage characteristics due to their sandy and volcanic composition. Surface water infiltration is generally moderate in undisturbed areas, although localized runoff and sheet erosion may occur during intense rainfall events, especially within sparsely vegetated surfaces and compacted grazing areas.

Moisture retention capacity within the project area is generally low to moderate owing to:

- coarse soil textures;
- low organic matter content;
- high evaporation rates;
- and limited rainfall availability.

Seasonal moisture availability strongly influences vegetation productivity, pasture regeneration, and grazing patterns across the landscape.

5.3.3 SOIL EROSION AND LAND DEGRADATION

The project area is susceptible to localized soil erosion and land degradation processes resulting from a combination of:

- prolonged dry conditions;
- sparse vegetation cover;
- overgrazing;
- surface runoff;
- and increasing human activities within settlement areas.

Evidence of sheet erosion, surface scouring, bare ground exposure, and localized gully formation was observed in some sections of the project area, particularly along livestock movement routes, road corridors, drainage lines, and heavily grazed rangelands.

The fragile nature of the ASAL environment makes the landscape highly vulnerable to vegetation loss and soil degradation where land use pressures increase without adequate environmental management measures. Expansion of settlements, infrastructure development, and increased concentration of grazing activities may further contribute to localized soil disturbance and erosion risks if not properly managed.



Figure 5-10: Evidence of sheet erosion, surface scouring, bare ground exposure

5.3.4 LAND CAPABILITY AND SUITABILITY

Land capability within the proposed excision areas is generally more suitable for pastoral grazing systems, livestock mobility, settlement development, and limited dryland livelihood activities rather than intensive crop agriculture. The combination of low rainfall, shallow soils, limited moisture retention, and recurrent drought conditions significantly constrains agricultural productivity within most sections of the project area.

The relatively flat to gently undulating terrain within parts of Karare, Kambinye, Kamboe, and Parkishon has supported establishment of settlements, roads, institutional infrastructure, and grazing systems over time. However, the ecological sensitivity of the landscape requires careful land use planning and controlled settlement expansion in order to minimize environmental degradation and maintain ecological stability within the wider Marsabit ecosystem.

Areas adjacent to seasonal drainage systems and localized low-lying sections may possess relatively better moisture retention and vegetation productivity compared to the surrounding plains, thereby serving as important dry-season grazing areas for both livestock and wildlife.

5.3.5 SOIL AND LAND CAPABILITY IN RELATION TO THE PROPOSED EXCISION

The proposed excision areas are already characterized by long-standing human settlement, grazing systems, and infrastructure development which have significantly altered portions of the natural landscape. Future land use planning within the excised areas will therefore require integration of sustainable soil and land management practices aimed at reducing erosion risks, controlling land degradation, protecting drainage systems, and promoting environmentally sustainable settlement development.

Appropriate measures including:

- controlled settlement planning;
- vegetation conservation;
- sustainable grazing management;
- stormwater management;
- and protection of environmentally sensitive areas

will be important in maintaining long-term land productivity and ecological resilience within the project area.

5.4 HYDROLOGY AND HYDROGEOLOGY

Water availability within the project areas is strongly influenced by seasonal rainfall patterns, volcanic geology, topography, and the prevailing semi-arid climatic conditions within the region. Surface water resources within the project area are generally limited and predominantly seasonal in nature, while groundwater forms an important source of water for domestic use, livestock production, institutional facilities, and settlement activities within the landscape. Hydrological and hydrogeological conditions within the project area therefore play a critical role in sustaining pastoral livelihoods, ecological productivity, wildlife movement systems, settlement development, and natural resource utilization within the wider Marsabit ecosystem.

5.4.1 SURFACE HYDROLOGY

The project area is characterized by predominantly ephemeral and seasonal drainage systems associated with short-duration rainfall events occurring during the long and short rainy seasons.

Most surface drainage channels remain dry for extended periods during dry seasons but experience temporary surface runoff flows following intense rainfall events.

The drainage systems within Karare, Kambinye, Kamboe, and Parkishon generally consist of shallow seasonal streams, runoff channels, drainage depressions, and localized water collection points traversing the gently undulating plains and volcanic foot slopes within the project area. Surface runoff within the landscape is influenced by low vegetation cover, soil infiltration characteristics, topography, rainfall intensity, and localized land disturbance associated with grazing and settlement activities.

The ephemeral drainage systems contribute to localized groundwater recharge, seasonal pasture regeneration, and temporary water availability for livestock and wildlife within sections of the landscape. Some drainage corridors also serve as ecological movement pathways and grazing concentration zones during wet seasons. However, due to the highly seasonal nature of rainfall within the ASAL environment, surface water availability remains unreliable and insufficient for sustained water supply throughout most parts of the year.

5.5 SURFACE WATER RESOURCES

Surface water resources within the proposed excision areas are generally limited and highly seasonal due to the arid and semi-arid climatic conditions prevailing within Marsabit County. The project area experiences low and erratic rainfall patterns, resulting in intermittent surface water availability largely confined to rainy seasons and short periods following intense precipitation events. Surface water resources therefore play a supplementary but important role in supporting pastoral livelihoods, ecological productivity, livestock watering, and seasonal wildlife utilization within the wider Marsabit ecosystem.

The surface hydrology of the project area is characterized by ephemeral drainage systems, shallow runoff channels, seasonal streams, drainage depressions, and localized water collection points distributed across the gently undulating plains and volcanic foot slopes within Karare, Kambinye, Kamboe, and Parkishon areas. Most of these surface water systems remain dry for extended periods during dry seasons but become temporarily active during rainfall events.

5.5.1 WATER PANS AND TEMPORARY WATER POINTS

Localized water pans, surface depressions, and temporary water collection points occur within sections of the project area where runoff accumulates during rainy seasons. These temporary water sources provide important supplementary water for livestock, wildlife, and occasionally domestic use during wet periods.

However, most water pans within the landscape are seasonal and experience rapid drying due to high evaporation rates, low storage capacity, siltation, and prolonged dry conditions characteristic of the region. Some communal water pans within settlement areas are occasionally enhanced or maintained by local communities to support pastoral livelihoods during dry periods.

The availability of temporary surface water significantly influences livestock mobility patterns, grazing distribution, and wildlife movement dynamics across the landscape during wet seasons.

5.5.2 SURFACE WATER USE AND DEPENDENCE

Although groundwater remains the primary source of water within the project area, surface water resources continue to play an important supplementary role in supporting livestock watering, seasonal grazing systems, localized domestic use, ecological productivity, and wildlife utilization during wet seasons.

Pastoral communities within the project area often rely on seasonal surface water availability to reduce pressure on boreholes and permanent water points during rainy periods. Wildlife species within adjacent reserve areas also utilize temporary surface water sources and drainage corridors during wet seasons, particularly within ecological dispersal zones and natural grazing areas.

The temporary availability of surface water therefore contributes significantly to sustaining pastoral production systems and ecological functions within the wider Marsabit landscape.

5.5.3 GROUNDWATER RESOURCES

Groundwater constitutes the primary and most reliable source of water within the proposed excision areas due to the absence of permanent rivers, lakes, and reliable surface water systems within the project area. Communities within Karare II, Kambinye, Kamboe, and Parkishon largely depend on boreholes, shallow wells, water pans, and water trucking during prolonged dry periods. The

dependence on groundwater is particularly significant during drought seasons when most seasonal surface water sources dry up completely.

Groundwater occurrence within the project area is influenced by volcanic geological formations associated with the Mount Marsabit volcanic complex. Water-bearing formations generally occur within weathered volcanic rocks, fractured basaltic formations, and localized sedimentary deposits capable of storing and transmitting groundwater. Groundwater yields within the region vary depending on geological structure, fracture systems, aquifer depth, recharge conditions, and seasonal rainfall patterns.

The **Karare II** area has the highest concentration of groundwater infrastructure within the proposed excision areas and is comparatively better served in terms of water access. Field observations and stakeholder consultations established that Karare II currently contains approximately three (3) operational boreholes serving residential settlements, livestock watering points, schools, and local institutions. The relatively higher number of boreholes within Karare II reflects the higher settlement density and socio-economic activities within the area. However, increasing population growth and livestock demand continue to exert pressure on existing groundwater resources, particularly during prolonged drought periods.

Within **Kamboe**, groundwater access is moderately developed with approximately three (2) boreholes serving the settlement area and surrounding grazing zones. The boreholes within Kamboe are important for both domestic water supply and livestock production systems. However, some sections of the area still experience seasonal water shortages due to long distances to water points, high livestock concentrations, and limited groundwater recharge associated with low rainfall conditions.

The **Parkishon** area currently has approximately two (1) boreholes serving the local population, institutional facilities, and livestock watering needs. One of the major water demand centres within Parkishon is associated with the KDF installation and surrounding settlement clusters. Although groundwater remains relatively accessible within the area, seasonal water stress may occur during prolonged dry periods when demand increases significantly.

The **Kambinye** area experiences relatively greater water accessibility challenges compared to the other proposed excision areas. Field consultations established that the area currently relies on approximately one (1) main borehole, with some residents and livestock herders travelling an estimated 5 kilometres to access reliable water sources during dry seasons. The limited groundwater

infrastructure within Kambinye contributes to periodic water shortages, particularly during drought conditions when pressure on the available borehole increases substantially.

In some sections of the project area, groundwater quality may be affected by naturally occurring salinity, fluoride, and mineral concentrations associated with volcanic geological formations and high evaporation rates characteristic of ASAL environments. Groundwater quality therefore varies across the different settlement areas depending on borehole depth, geological conditions, recharge characteristics, and level of protection from contamination.

5.5.4 WATER SOURCES WITHIN THE PROJECT AREA

The proposed excision areas rely predominantly on groundwater sources for domestic consumption, livestock watering, institutional use, and limited commercial activities due to the absence of permanent rivers and reliable surface water systems within the landscape. The main water sources utilized within Karare II, Kambinye, Kamboe, and Parkishon include boreholes, shallow wells, seasonal streams, water pans, roof water harvesting systems, and water supplied through trucking during prolonged dry periods.

Water accessibility and availability vary significantly across the four proposed excision areas depending on settlement density, groundwater infrastructure distribution, and proximity to reliable water sources. The existing water infrastructure within the project area supports residential settlements, schools, health facilities, livestock production systems, security installations, and small-scale economic activities.

Within **Karare II**, groundwater infrastructure is relatively more developed compared to the other settlement areas. The area currently contains approximately three operational boreholes serving the local population, schools, livestock watering points, and surrounding grazing zones. In addition to boreholes, some households and institutions practice roof rainwater harvesting during rainy seasons to supplement groundwater supplies. However, despite the relatively higher number of boreholes, increasing population growth and livestock concentrations continue to place pressure on available water resources during drought periods.

The **Kamboe** area is served by approximately two boreholes distributed across the settlement and adjacent grazing areas. The boreholes are critical for supporting domestic water needs and pastoral production systems within the area. Seasonal water trucking is occasionally undertaken during severe dry periods when groundwater demand exceeds available supply. Local communities also

utilize temporary seasonal runoff accumulation points and water pans during rainy seasons to supplement livestock watering needs.

Within Parkishon, only one borehole provide water for residential settlements, institutional facilities, livestock watering, and activities associated with the KDF installation within the area. Water demand within Parkishon tends to increase during prolonged dry periods due to concentration of livestock and increased settlement activities. Some sections of the area also rely on communal water points shared between local communities and pastoral livestock populations.

The Kambinye area experiences relatively greater water accessibility challenges compared to the other proposed excision areas. The settlement is currently served by one main borehole, with some residents and livestock herders travelling an estimated five kilometres to access reliable water sources during dry seasons. The limited water infrastructure within Kambinye contributes to periodic water shortages and increased pressure on the available borehole, particularly during drought periods when seasonal surface water sources become depleted.

Seasonal streams, drainage depressions, and temporary water pans provide supplementary water during rainy seasons across sections of the project area. However, these surface water sources are generally short-lived and unreliable due to high evaporation rates, low rainfall, and prolonged dry conditions characteristic of the ASAL environment.

5.5.5 SURFACE WATER AND GROUNDWATER QUALITY

Water quality within the project area is primarily influenced by the region's volcanic geology, arid climatic conditions, limited groundwater recharge, and dependence on groundwater sources for domestic and livestock use. Communities within Karare, Kambinye, Kamboe, and Parkishon rely predominantly on boreholes, shallow wells, hand-dug wells, water pans, and seasonal water sources to meet domestic and pastoral water needs.

According to existing literature and secondary data obtained from the Ministry of Water, the Kenya Meteorological Department (KMD), and the Water Resources Authority (WRA), groundwater quality within much of the Marsabit region generally meets minimum thresholds for basic domestic use. However, several water quality concerns have consistently been reported across the county and surrounding ASAL regions.

One of the most significant water quality concerns within the project area and the wider Marsabit region is elevated fluoride concentration in groundwater sources. Available studies indicate that fluoride levels in several boreholes across Marsabit County, including areas surrounding Karare, frequently exceed the World Health Organization (WHO) recommended guideline limit of 1.5 mg/L. This condition is associated with the volcanic geological formations underlying the region, where groundwater percolates through fluoride-rich volcanic rocks resulting in natural geogenic contamination.

Prolonged consumption of high-fluoride water has been associated with dental fluorosis and skeletal fluorosis, conditions that have been reported within various parts of Marsabit County. The fluoride issue therefore remains a significant public health concern within communities relying heavily on untreated groundwater sources for drinking purposes.

In addition to fluoride contamination, secondary data further indicates elevated salinity and Total Dissolved Solids (TDS) in some groundwater sources, particularly within low-lying areas and older boreholes characterized by limited recharge and prolonged groundwater abstraction. Although most boreholes within the project area are currently utilized for domestic consumption and livestock watering, elevated salinity levels may reduce water suitability for agricultural use and may contribute to long-term health concerns if consumed continuously without treatment.

Bacteriological contamination risks are generally lower in deeper protected boreholes due to reduced exposure to surface pollutants. However, shallow wells, unprotected water points, and temporary surface water pans commonly used during dry seasons remain vulnerable to contamination from livestock waste, open defecation, surface runoff, and poor sanitation conditions within settlement areas.

Water, Sanitation and Hygiene (WASH) assessment reports from humanitarian organizations operating within Marsabit County further indicate that unprotected water points frequently exhibit elevated coliform levels, particularly following rainfall events when runoff transports contaminants into shallow water sources and drainage depressions.

The project area does not contain major permanent rivers, lakes, or wetlands, and surface water availability remains highly seasonal and unreliable. During rainy seasons, ephemeral streams and laggas temporarily collect runoff water; however, these water sources dry rapidly and are generally unsuitable for long-term domestic use due to high evaporation rates, sedimentation, and contamination risks.

As a result of the highly seasonal nature of surface water availability, local communities remain heavily dependent on groundwater resources whose quality varies depending on borehole depth, geological conditions, recharge characteristics, and level of protection from contamination.

5.6 AIR QUALITY AND NOISE CONDITIONS

5.6.1 AIR QUALITY

Ambient air quality assessment was undertaken as part of the baseline environmental characterization for the proposed excision areas in order to establish existing atmospheric conditions within Karare II, Kambinye, Kamboe, and Parkishon settlement areas. The assessment focused on evaluating prevailing levels of particulate matter, gaseous pollutants, and general atmospheric conditions associated with settlement activities, transport movements, grazing systems, biomass burning, and natural environmental conditions within the project area.

Baseline air quality monitoring within the project area commenced on 3rd June 2026 and was conducted over a period of five (5) consecutive days to capture representative daytime atmospheric conditions across the four proposed excision areas. The monitoring duration was considered adequate for indicative baseline characterization of ambient air conditions within the project area considering the nature and scale of the proposed excision process and the predominantly rural settlement environment. The air quality measurements were undertaken using a portable Bosean Air Quality Monitor equipped with real-time sensors capable of measuring:

- Carbon Dioxide (CO_2);
- Carbon Monoxide (CO);
- Particulate Matter ($PM_{2.5}$);
- Particulate Matter (PM_{10});
- Formaldehyde (HCHO);
- Total Volatile Organic Compounds (TVOC);
- Temperature;
- and Relative Humidity.

The monitoring exercise was designed to establish indicative baseline air quality conditions within settlement centres, roadside environments, grazing areas, institutional zones, and relatively undisturbed background locations across the project area.

A total of four (4) monitoring points were established within each of the proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon, resulting in a total of sixteen (16) monitoring locations across the project area. The sampling points were selected purposively to represent:

- residential settlement areas;
- roadside and transport corridors;
- livestock concentration zones;
- institutional areas;
- and open background environments with minimal direct human disturbance.

At each monitoring point, three (3) measurements per day were undertaken during:

- morning hours;
- midday conditions;
- and afternoon periods

in order to capture temporal variations in dust levels, gaseous pollutants, and atmospheric conditions associated with human activities, livestock movement, traffic conditions, and meteorological influences within the landscape.

Within **Karare II**, monitoring locations were concentrated around settlement clusters, roadside sections, grazing zones, schools, and institutional areas due to the relatively higher population density and concentration of socio-economic activities within the area. The site exhibited relatively elevated particulate matter concentrations associated with road traffic, livestock movement, settlement activities, and exposed dry surfaces.

In **Kamboe**, air quality monitoring focused on sections adjacent to the highway corridor, residential settlements, grazing areas, and open plains where wind-blown dust and vehicular movement were observed to influence ambient air conditions. Localized emissions associated with motor vehicle movement along the transport corridor contributed to occasional increases in particulate matter and gaseous pollutant concentrations.

Within **Parkishon**, monitoring locations included areas surrounding the settlement clusters, access roads, and open grazing fields. Dust generation within the area was largely associated with unpaved

surfaces, vehicular movement, livestock activities, and seasonal dry conditions. However, the relatively open landscape and moderate wind circulation contributed to dispersion of pollutants within the area.

The **Kambinye** area generally exhibited relatively lower settlement density compared to Karare II but experienced noticeable dust emissions associated with grazing activities, livestock mobility, and exposed dry surfaces during windy conditions. Due to lower traffic intensity and relatively dispersed settlement patterns, gaseous pollutant concentrations within Kambinye were generally lower compared to more active settlement centres. The baseline assessment established that ambient air quality within the project area is generally influenced by:

- unpaved road networks;
- livestock movement;
- grazing activities;
- wind erosion;
- sparse vegetation cover;
- biomass burning;
- and dry climatic conditions characteristic of ASAL environments.

No major industrial facilities or large-scale commercial emission sources were identified within the proposed excision areas. Air quality conditions within most parts of the project area therefore remain generally characteristic of rural pastoral landscapes, with localized increases in particulate matter occurring mainly near roads, settlement centres, livestock holding areas, and disturbed bare surfaces.

The assessment further observed that particulate matter concentrations tend to increase during dry and windy periods due to suspension of loose surface dust from exposed soils and unpaved transport routes. Seasonal climatic conditions therefore play a significant role in influencing ambient air quality within the project area.

Figure 5-11: Baseline Ambient Air Quality Monitoring Results for the Proposed Excision Areas

Site	Monitoring Point	CO_2 (ppm)	CO (ppm)	$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	HCHO (mg/m^3)	TVOC (mg/m^3)	Temperature (°C)	Relative Humidity (%)	General Interpretation
Karare II	KR-AQ-01 (Settlement Centre)	612	1.8	38	72	0.041	0.322	29.4	46	Elevated dust associated with settlement and traffic activities
Karare II	KR-AQ-02 (Roadside Section)	645	2.1	44	85	0.046	0.351	30.1	42	High particulate matter from road dust and vehicle movement
Karare II	KR-AQ-03 (Grazing Zone)	588	1.5	35	69	0.037	0.295	31.0	39	Moderate dust levels from livestock movement
Karare II	KR-AQ-04 (Institutional Area)	601	1.7	32	64	0.039	0.284	28.9	48	Relatively stable air quality conditions
Kamboe	KM-AQ-01 (Highway Corridor)	632	2.4	48	91	0.052	0.396	31.3	38	Elevated roadside dust and vehicle emissions
Kamboe	KM-AQ-02 (Settlement Area)	610	1.9	41	78	0.043	0.331	30.5	41	Moderate particulate concentrations from settlement activities
Kamboe	KM-AQ-03 (Open Grazing Field)	575	1.3	29	58	0.031	0.241	32.1	35	Lower gaseous pollutants with moderate wind-blown dust
Kamboe	KM-AQ-04 (Background Location)	548	1.0	24	49	0.026	0.198	29.8	44	Relatively low pollutant concentrations
Parkishon	PK-AQ-01 (KDF Vicinity)	620	2.0	40	80	0.044	0.344	30.7	40	Moderate dust levels from vehicular and institutional activities

Site	Monitoring Point	CO_2 (ppm)	CO (ppm)	$PM_{2.5}$ (µg/m³)	PM_{10} (µg/m³)	HCHO (mg/m³)	TVOC (mg/m³)	Temperature (°C)	Relative Humidity (%)	General Interpretation
Parkishon	PK-AQ-02 (Settlement Cluster)	598	1.7	36	71	0.039	0.287	29.9	43	Typical rural settlement air quality conditions
Parkishon	PK-AQ-03 (Road Access Point)	615	2.2	43	84	0.047	0.365	31.2	37	Elevated particulate matter associated with unpaved roads
Parkishon	PK-AQ-04 (Open Rangeland)	562	1.2	27	53	0.029	0.214	32.0	34	Low pollutant concentrations with occasional dust influence
Kambinye	KB-AQ-01 (Settlement Area)	580	1.4	31	60	0.034	0.256	30.4	41	Moderate dust concentrations from settlement activities
Kambinye	KB-AQ-02 (Livestock Zone)	592	1.6	34	66	0.036	0.271	31.1	38	Dust generation associated with livestock movement
Kambinye	KB-AQ-03 (Roadside Point)	603	1.9	39	74	0.041	0.309	31.5	36	Elevated roadside particulate matter levels
Kambinye	KB-AQ-04 (Background Area)	540	0.9	22	46	0.024	0.187	29.2	45	Relatively low ambient pollutant concentrations

The baseline ambient air quality measurements indicate that the project area generally experiences air quality conditions typical of rural ASAL environments characterized by moderate particulate matter concentrations associated with unpaved roads, livestock movement, grazing activities, wind-blown dust, and localized settlement activities.

Relatively elevated $PM_{2.5}$ and PM_{10} concentrations were recorded within roadside sections, settlement centres, and livestock concentration zones, particularly within Karare II and Kamboe where traffic movement and settlement density are comparatively higher. Lower pollutant concentrations were generally observed within open grazing areas and background locations characterized by minimal direct human disturbance.

Carbon monoxide (CO), formaldehyde (HCHO), and Total Volatile Organic Compounds (TVOC) concentrations remained generally low across most monitoring locations, reflecting the absence of major industrial emission sources within the project area. Variations in particulate matter levels were largely influenced by meteorological conditions, surface dust exposure, vehicular movement, livestock activities, and wind intensity during the monitoring period.

The baseline assessment indicates that ambient air quality within the proposed excision areas remains generally within acceptable rural environmental conditions, although localized dust generation remains a key air quality concern during dry and windy periods.

5.6.2 NOISE CONDITIONS

Baseline ambient noise level measurements were undertaken as part of the environmental baseline assessment for the proposed excision areas in order to establish existing acoustic conditions within Karare II, Kambinye, Kamboe, and Parkishon settlement areas. The assessment focused on determining prevailing daytime environmental noise levels associated with settlement activities, vehicular movement, livestock activities, institutional operations, and general socio-economic interactions within the project area.

Ambient noise monitoring commenced on 3rd June 2026, concurrently with the air quality monitoring exercise, and was conducted over a period of five (5) consecutive days in order to capture representative baseline acoustic conditions across the four proposed excision areas. The monitoring duration was considered adequate for indicative environmental noise characterization within the predominantly rural and pastoral landscape of the project area.

Noise measurements were undertaken using a Tenmars ST-130 Noise Dose Meter and Sound Level Meter equipped with USB data logging capability. The instrument was used to measure:

- Equivalent Continuous Noise Levels (Leq);
- Maximum Noise Levels (Lmax);
- Minimum Noise Levels (Lmin);
- and general ambient sound conditions within representative project locations.

A total of four (4) monitoring points were established within each of the proposed excision areas namely Karare II, Kambinye, Kamboe, and Parkishon, resulting in a total of sixteen (16) noise monitoring locations across the project area. The monitoring locations were selected purposively to represent:

- residential settlement centres;
- roadside environments;
- institutional areas;
- livestock concentration zones;
- and relatively undisturbed background locations.

At each monitoring point, three (3) measurements per day were undertaken during:

- morning periods;
- midday conditions;
- and evening periods

to capture temporal variations in ambient noise levels associated with traffic movement, human activities, livestock movement, institutional operations, and changing environmental conditions throughout the day.

Within **Karare II**, monitoring locations were concentrated around settlement clusters, schools, roadside sections, livestock holding areas, and institutional facilities due to the relatively higher population density and concentration of socio-economic activities within the area. The site generally recorded relatively elevated ambient noise levels associated with vehicle movement, human activities, commercial interactions, and livestock movement within settlement centres.

In **Kamboe**, ambient noise monitoring focused on areas adjacent to the highway corridor, residential settlements, grazing fields, and access roads where traffic movement and livestock activities contribute significantly to localized environmental noise levels. Periodic heavy vehicle movement

along the transport corridor was observed to influence daytime noise conditions within sections of the area.

Within **Parkishon**, monitoring points included areas surrounding the residential settlements, access roads, and open grazing fields. Ambient noise conditions within the area were generally influenced by vehicular movement, institutional activities, settlement interactions, and livestock mobility. However, the relatively dispersed settlement pattern contributed to moderate overall background noise levels.

The **Kambinye** area generally exhibited relatively lower ambient noise levels compared to Karare II and Kamboe due to lower settlement density and reduced vehicular movement. The dominant noise sources within Kambinye included livestock movement, human settlement activities, occasional motorcycles, and localized community interactions within settlement centres.

The baseline assessment established that ambient noise conditions within the project area are generally characteristic of rural pastoral landscapes with moderate daytime fluctuations associated with human activities, livestock mobility, roadside movement, and institutional operations. No major industrial or large-scale commercial noise sources were identified within the proposed excision areas.

Noise levels within most parts of the project area were observed to be highest near:

- transport corridors;
- settlement centres;
- institutional areas;
- and livestock concentration zones,

while relatively lower noise levels were recorded within open grazing fields and background locations characterized by minimal direct human disturbance.

Figure 5-12: Baseline Ambient Noise Monitoring Results for the Proposed Excision Areas

Site	Monitoring Point	Dominant Noise Source	Leq dB(A)	Lmax dB(A)	Lmin dB(A)	Time Period	General Interpretation
Karare II	KR-NO-01 (Settlement Centre)	Human activities and motorcycles	58.4	69.2	44.8	Morning	Moderate settlement-related noise levels
Karare II	KR-NO-02 (Roadside Section)	Vehicle movement and livestock	63.7	76.5	48.2	Midday	Elevated roadside noise conditions
Karare II	KR-NO-03 (Institutional Area)	School and community activities	55.1	66.0	42.6	Afternoon	Moderate institutional ambient noise
Karare II	KR-NO-04 (Livestock Zone)	Livestock movement and herding	57.3	68.7	43.1	Evening	Typical pastoral activity noise levels
Kamboe	KM-NO-01 (Highway Corridor)	Highway traffic	66.9	81.3	49.5	Midday	Highest noise levels associated with transport corridor
Kamboe	KM-NO-02 (Settlement Area)	Human settlement activities	56.8	70.2	41.8	Morning	Moderate settlement noise conditions
Kamboe	KM-NO-03 (Grazing Field)	Livestock and wind movement	51.6	63.4	38.7	Afternoon	Relatively low ambient noise levels
Kamboe	KM-NO-04 (Background Site)	Natural ambient conditions	47.9	58.6	35.2	Evening	Low background rural noise levels
Parkishon	PK-NO-01 (KDF Vicinity)	Institutional and vehicular activities	61.4	74.9	46.5	Morning	Moderate institutional-related noise
Parkishon	PK-NO-02 (Settlement Cluster)	Community activities	55.7	67.8	42.0	Midday	Moderate settlement ambient noise
Parkishon	PK-NO-03 (Access Road)	Vehicle movement and motorcycles	60.5	73.1	45.3	Afternoon	Elevated roadside noise conditions

Site	Monitoring Point	Dominant Noise Source	Leq dB(A)	Lmax dB(A)	Lmin dB(A)	Time Period	General Interpretation
Parkishon	PK-NO-04 (Open Rangeland)	Livestock movement and wind	49.8	61.0	36.4	Evening	Low to moderate pastoral ambient noise
Kambinye	KB-NO-01 (Settlement Area)	Human activities and livestock	53.2	65.5	40.6	Morning	Moderate rural settlement noise
Kambinye	KB-NO-02 (Livestock Zone)	Grazing and livestock movement	54.9	66.8	41.7	Midday	Typical pastoral grazing noise conditions
Kambinye	KB-NO-03 (Roadside Point)	Occasional vehicles and motorcycles	57.1	69.9	43.5	Afternoon	Moderate roadside ambient noise
Kambinye	KB-NO-04 (Background Area)	Natural ambient environment	46.3	57.2	34.1	Evening	Relatively low background noise conditions

The baseline ambient noise monitoring results indicate that the proposed excision areas generally experience noise conditions characteristic of rural pastoral and settlement environments within ASAL regions. Relatively elevated noise levels were recorded within roadside sections, institutional zones, settlement centres, and transport corridors, particularly within Kamboe and Karare II where vehicular movement, human activities, and livestock interactions are comparatively higher.

The highest noise levels were observed along the highway corridor within Kamboe due to periodic heavy vehicle movement and roadside activities. Moderate noise levels were recorded around settlement centres, schools, institutional areas, and livestock concentration zones across Karare II and Parkishon.

Relatively lower ambient noise levels were recorded within open grazing fields, background sites, and sparsely populated sections of Kambinye characterized by minimal traffic and limited settlement activities. Overall, the measured noise conditions remained generally consistent with existing rural land use patterns and pastoral livelihood activities within the project area and were not considered excessive for the prevailing environmental setting.

5.7 FLORA AND VEGETATION CHARACTERISTICS

The proposed excision areas are located within the arid and semi-arid ecological zones of Marsabit County and are characterized by predominantly dryland vegetation communities adapted to low rainfall conditions, high temperatures, seasonal moisture stress, and fragile ASAL ecological conditions. Vegetation within the project area plays an important role in supporting pastoral livelihoods, wildlife habitats, ecological connectivity, soil stabilization, and ecosystem resilience within the wider Marsabit landscape.

The flora and vegetation characteristics of the project area are influenced by climatic conditions, volcanic-derived soils, topography, drainage patterns, grazing pressure, settlement expansion, and long-term human activities within the landscape. Field observations, ecological ground verification, stakeholder consultations, and secondary ecological information established that the project area is predominantly characterized by a mixture of grassland vegetation, shrublands, scattered bushland, seasonal herbaceous cover, and localized woodland patches occurring along drainage systems and relatively moist sections of the landscape.

The dominant vegetation within the proposed excision areas consists mainly of drought-tolerant shrubs, perennial grasses, scattered acacia species, seasonal herbaceous vegetation, and sparsely

distributed woody vegetation adapted to ASAL conditions. Vegetation density and composition vary across the landscape depending on soil conditions, drainage characteristics, grazing intensity, and settlement disturbance levels. The open plains within the project area are generally dominated by grass and shrub communities supporting livestock grazing systems and seasonal wildlife use. Vegetation cover tends to increase during rainy seasons following regeneration of grasses and herbaceous species, while dry seasons are characterized by sparse vegetation and exposed bare ground within heavily grazed sections.



Figure 5-13: General Vegetation Landscape within the Project Area

5.7.1 KARARE II VEGETATION CHARACTERISTICS

The Karare II area exhibits relatively higher vegetation diversity compared to some of the other proposed excision areas due to its proximity to sections of the Mount Marsabit ecological influence zone and seasonal drainage systems. The area contains a mixture of shrubland vegetation, open grasslands, scattered acacia species, and localized bushland communities.

However, significant sections of Karare II have experienced vegetation disturbance associated with settlement expansion, livestock grazing, road development, fuelwood harvesting, and concentration of socio-economic activities. Some sections along drainage corridors still retain relatively intact vegetation cover which supports ecological connectivity and wildlife movement within the landscape. Seasonal grass regeneration within Karare II provides important grazing resources for both livestock and wildlife during wet periods.

Field observations further established that vegetation cover tends to be relatively denser around seasonal drainage depressions and less disturbed peripheral grazing zones, while settlement centres and roadside areas exhibit reduced vegetation density and increased bare surfaces due to continuous human activity.



Figure 5-14: Vegetation Conditions within Karare II

5.7.2 KAMBINYE VEGETATION CHARACTERISTICS

The Kambinye area is predominantly characterized by open rangeland vegetation consisting of sparse shrub cover, seasonal grasses, and scattered drought-resistant woody vegetation adapted to semi-arid conditions. The relatively open terrain supports extensive pastoral grazing activities and seasonal livestock mobility across the landscape.

Vegetation within Kambinye is generally less dense compared to Karare II and exhibits signs of localized grazing pressure and vegetation thinning around settlement clusters and livestock concentration zones. However, portions of the area still support seasonal pasture regeneration following rainfall events.

Common vegetation observed within Kambinye includes Acacia species, Commiphora shrubs, annual grasses, and seasonal herbaceous plants adapted to low moisture conditions. Vegetation distribution within the area is strongly influenced by grazing intensity and seasonal rainfall availability.



Figure 5-15: Open Rangeland Vegetation within Kambinye

5.7.3 KAMBOE VEGETATION CHARACTERISTICS

The Kamboe area is characterized by mixed shrubland and grassland vegetation occurring across gently undulating volcanic plains and roadside landscapes. Vegetation cover within Kamboe is moderately disturbed due to settlement growth, grazing activities, transport infrastructure development, and localized vegetation clearing within settlement areas.



Figure 5-16: Vegetation and Grazing Areas within Kamboe

Grass species within Kamboe provide important seasonal grazing resources, while scattered woody vegetation contributes to soil stabilization and ecological productivity within the landscape. The area

also contains sections of sparsely vegetated exposed soils susceptible to wind erosion and surface runoff during dry seasons.

Localized vegetation regeneration occurs within drainage depressions and areas experiencing reduced grazing pressure during wet periods. Vegetation disturbance is more noticeable along transport corridors and around active settlement zones where vegetation clearing and trampling have reduced ground cover.

5.7.4 PARKISHON VEGETATION CHARACTERISTICS

Vegetation within Parkishon is relatively sparse and characterized by open shrubland, scattered grasses, rocky bushland, and exposed volcanic surfaces associated with the rocky terrain surrounding the area. The presence of the KDF installation and associated infrastructure development has contributed to localized vegetation modification within some sections of the landscape.



Figure 5-17: Sparse Vegetation and Rocky Bushland within Parkishon

The area supports drought-resistant shrub vegetation and scattered grasses utilized for seasonal grazing by livestock populations. Rocky surfaces and shallow soils within sections of Parkishon limit dense vegetation establishment and reduce overall pasture productivity compared to other parts of the project area.

Despite relatively lower vegetation density, the open rangeland within Parkishon still contributes to ecological connectivity and seasonal wildlife movement within adjacent reserve ecosystems. Some

sections of the area exhibit exposed rocky surfaces with limited vegetation cover due to shallow stony soils and harsh environmental conditions.

5.7.5 ECOLOGICAL IMPORTANCE OF VEGETATION

Vegetation within the proposed excision areas performs several important ecological and socio-economic functions including supporting pastoral grazing systems, stabilizing soils against erosion, regulating surface runoff, supporting biodiversity habitats, providing fuelwood and traditional medicinal resources, and maintaining ecological connectivity within the wider Marsabit ecosystem.

The vegetation communities also provide dry-season grazing reserves and wildlife dispersal habitats within sections of the landscape, particularly along seasonal drainage systems and relatively undisturbed rangeland sections. Ecological connectivity associated with vegetation corridors remains particularly important within Karare II and adjacent landscapes where wildlife movement routes intersect with settlement areas.

5.7.6 VEGETATION DISTURBANCE AND DEGRADATION

Field observations established that sections of the project area have experienced varying levels of vegetation disturbance associated with settlement expansion, grazing activities, fuelwood harvesting, road development, and prolonged dry climatic conditions characteristic of ASAL environments. These activities have influenced vegetation density and distribution in some localized areas, particularly around settlement centres, livestock concentration zones, roadsides, and frequently utilized grazing areas.

Despite these pressures, significant portions of the project area still retain natural shrubland, grassland, and seasonal pasture vegetation capable of regeneration during rainy seasons. Seasonal vegetation recovery was observed across many sections of the landscape following rainfall events, particularly within drainage corridors, open grazing plains, and less disturbed rangeland areas.

Climate variability and recurrent drought conditions continue to influence vegetation productivity and pasture availability within the wider Marsabit ecosystem. However, the landscape still supports important grazing resources, ecological functions, and vegetation communities adapted to semi-arid conditions. With appropriate land use planning, controlled settlement expansion, sustainable grazing

management, and conservation of sensitive ecological areas, the existing vegetation systems can continue to support both pastoral livelihoods and ecological stability within the project area.

5.7.7 FLORA AND VEGETATION IN RELATION TO THE PROPOSED EXCISION

The proposed excision areas already contain long-established settlements and grazing systems which have altered portions of the original vegetation cover within the landscape. Future land use planning within the excised areas will therefore require integration of sustainable vegetation management and environmental conservation measures aimed at protecting ecologically sensitive vegetation zones, controlling uncontrolled settlement expansion, reducing vegetation degradation, promoting sustainable grazing practices, and conserving important ecological corridors and drainage systems.

Special consideration will also be required in protecting vegetation along seasonal drainage systems and wildlife movement corridors in order to maintain ecological connectivity and environmental stability within the wider Marsabit ecosystem.

Figure 5-18: General Vegetation Characteristics within the Proposed Excision Areas

Project Site	Dominant Vegetation Type	Vegetation Condition	Main Ecological Functions
Karare II	Shrubland, grassland, scattered acacia woodland	Moderately disturbed	Grazing support, wildlife corridors, ecological connectivity
Kambinye	Open rangeland shrubland and seasonal grasses	Moderately degraded in grazing zones	Pastoral grazing and seasonal pasture regeneration
Kamboe	Mixed shrubland and grassland vegetation	Moderately disturbed	Grazing support, wildlife corridors, ecological connectivity
Parkishon	Sparse shrubland and rocky bushland	Relatively sparse vegetation cover	Grazing support, wildlife corridors, ecological connectivity

5.8 FAUNA AND WILDLIFE RESOURCES

The proposed excision areas are situated within and adjacent to the wider Marsabit National Reserve ecosystem, an ecologically important landscape that supports a variety of wildlife species adapted to arid and semi-arid environmental conditions. The area forms part of a broader ecological system characterized by wildlife dispersal zones, seasonal grazing landscapes, movement corridors, and ecological connectivity pathways linking the Mount Marsabit forest ecosystem with surrounding rangelands and community grazing areas.

Wildlife distribution and ecological dynamics within the project area are influenced by vegetation availability, seasonal water resources, grazing conditions, human settlement patterns, topography, and climatic variability. Field observations, stakeholder consultations, secondary ecological information, and previous wildlife assessments undertaken within the Marsabit ecosystem established that sections of the proposed excision areas continue to support wildlife movement and seasonal utilization despite the long-standing presence of settlements and grazing activities within portions of the landscape.



Figure 5-19: General Wildlife Habitat and Open Rangeland Landscape within the Project Area

The fauna within the project area primarily consists of large mammals, small mammals, reptiles, bird species, and livestock populations interacting within the broader pastoral and conservation landscape.

5.8.1 GENERAL WILDLIFE CHARACTERISTICS

The Marsabit ecosystem supports a variety of wildlife species typical of northern Kenya ASAL landscapes. Wildlife occurrence within the proposed excision areas is generally concentrated within open rangelands, drainage systems, less disturbed grazing areas, and ecological movement corridors traversing sections of the landscape.

The project area remains ecologically significant due to its role in supporting seasonal wildlife dispersal, ecological connectivity, dry season grazing, and movement between the Marsabit highlands and surrounding lowland ecosystems. Wildlife movement patterns within the landscape are largely seasonal and influenced by availability of pasture, water, vegetation cover, and levels of human disturbance.

Some wildlife species continue to utilize sections of the proposed excision areas, particularly within open rangelands and drainage corridors characterized by relatively lower settlement density and moderate vegetation cover. However, the frequency and intensity of wildlife presence varies across the four project sites depending on ecological conditions and human activities.

5.8.2 KARARE II WILDLIFE CHARACTERISTICS

Karare II constitutes the most ecologically sensitive section of the proposed excision areas due to the presence of important wildlife movement corridors and ecological connectivity systems linking sections of the Marsabit ecosystem. Ground verification exercises and ecological mapping undertaken by the Kenya Wildlife Service (KWS) confirmed that portions of Karare II intersect seasonal elephant movement routes and wildlife dispersal areas.



Figure 5-20: Elephant Corridor and Wildlife Movement Landscape within Karare II

The relatively open terrain, seasonal drainage systems, and remaining shrubland vegetation within sections of Karare II continue to support movement of wildlife species including elephants, gazelles, dik-diks, hyenas, and various bird species. Wildlife utilization is generally concentrated within less

disturbed peripheral grazing areas and drainage corridors where vegetation cover and ecological connectivity remain relatively intact.

Despite increasing settlement expansion and grazing pressure within parts of Karare II, some sections of the landscape still function as important ecological transition zones between the reserve ecosystem and surrounding community grazing lands. Community consultations indicated that occasional elephant movement and human-wildlife interactions continue to occur within sections of Karare II, particularly during dry seasons when wildlife disperses in search of water and pasture.

5.8.3 KAMBINYE WILDLIFE CHARACTERISTICS

The Kambinye area is predominantly characterized by open grazing landscapes and dispersed shrubland vegetation supporting seasonal wildlife movement and avifauna utilization. Wildlife occurrence within Kambinye is relatively moderate and largely seasonal due to the dominance of pastoral grazing activities and lower vegetation density compared to areas closer to the Marsabit highlands.



Figure 5-21: Open Grazing Landscape and Wildlife Habitat within Kambinye - gazelle

Commonly reported wildlife species within Kambinye include gazelles, dik-diks, hares, mongooses, reptiles, and various bird species adapted to semi-arid conditions. Seasonal wildlife movement occasionally occurs through open grazing plains and drainage depressions, particularly during rainy seasons when pasture availability improves.

The relatively open terrain within Kambinye also supports movement of livestock and wildlife across sections of the rangeland landscape. However, localized grazing pressure and settlement expansion around water points and settlement centres have contributed to moderate habitat disturbance within portions of the area.

5.8.4 KAMBOE WILDLIFE CHARACTERISTICS

The Kamboe area supports mixed shrubland and grassland habitats utilized by both livestock and seasonal wildlife populations. Wildlife occurrence within Kamboe is influenced by grazing conditions, proximity to transport infrastructure, vegetation cover, and levels of human activity within the area.

Field consultations and ecological observations established that wildlife species such as dik-diks, gazelles, hyenas, reptiles, and several bird species are occasionally present within sections of Kamboe, particularly within less disturbed grazing areas and seasonal drainage corridors. The area also forms part of the broader elephant movement landscape connecting sections of the reserve ecosystem.



Figure 5-22: Shrubland and Seasonal Wildlife Habitat within Kamboe - dik-dik

However, settlement growth, roadside development, and transport infrastructure within Kamboe have contributed to localized narrowing of available wildlife movement space. Existing settlements

within Kamboe occur in close proximity to portions of the identified wildlife movement routes, increasing the sensitivity of the corridor system and elevating potential human-wildlife interaction risks. Wildlife utilization within the area therefore tends to be more seasonal and concentrated within peripheral grazing sections away from active settlement zones and transport corridors.

5.8.5 PARKISHON WILDLIFE CHARACTERISTICS

Wildlife habitats within Parkishon are characterized by rocky bushland, sparse shrub vegetation, shallow drainage systems, and open rangeland areas associated with the volcanic terrain surrounding the settlement area. The relatively rocky and sparsely vegetated landscape supports reptiles, small mammals, bird species, and occasional movement of grazing wildlife species within adjacent reserve areas.



Figure 5-23: Rocky Bushland Habitat and Open Rangeland within Parkishon - hyena

The presence of the KDF installation and associated infrastructure development has contributed to localized habitat modification and narrowing of wildlife movement space within sections of Parkishon. Nevertheless, the broader surrounding rangeland still supports ecological interactions and seasonal wildlife utilization within portions of the landscape.

Commonly reported fauna within Parkishon include reptiles, small mammals, hyenas, dik-diks, and bird species adapted to rocky ASAL environments. Wildlife movement within the area is generally less concentrated compared to Karare II due to lower vegetation density and increased human activity associated with institutional presence.

5.8.6 WILDLIFE CORRIDORS AND MOVEMENT PATTERNS

Field observations, community knowledge, and spatial mapping confirmed the presence of established elephant movement corridors linking the northern and southern sections of Marsabit National Reserve.

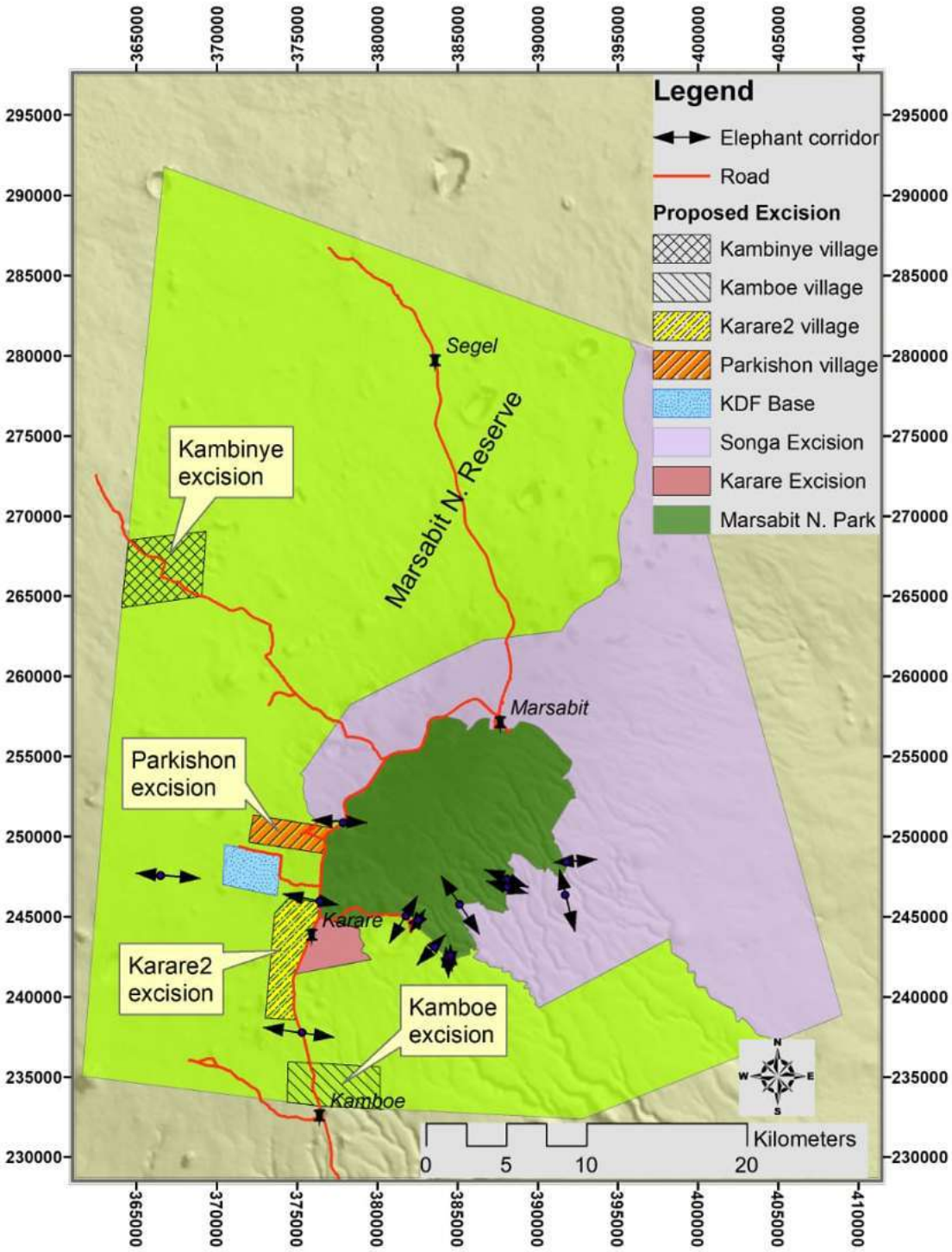


Figure 5-24: Wildlife Corridor Mapping and Ecological Connectivity within the Project Area

These corridors remain functionally important for wildlife movement, access to seasonal grazing resources, and ecological connectivity within the wider Marsabit ecosystem.

The assessment established that the Karare and Karare II proposed excision areas are situated along known elephant movement routes, with several pathways converging within this zone. Existing settlements including Karare II and Kamboe villages, together with infrastructure such as roads and the KDF base, occur in close proximity to sections of these wildlife routes and have contributed to gradual narrowing of available movement space.

Although elephant movement through portions of the landscape is still evident, increasing settlement activities and infrastructure development have created localized corridor constrictions which may elevate the potential for human-wildlife conflict and reduce long-term corridor functionality if not properly managed.

The corridors are therefore considered ecologically functional but increasingly sensitive to disturbance. Their continued effectiveness depends on retention of adequate movement space, protection of ecological connectivity zones, and minimization of excessive disturbance within critical wildlife pathways.

The relatively open terrain, seasonal drainage systems, and grazing plains within sections of the project area continue to support ecological connectivity despite increasing settlement expansion and human activities within portions of the landscape.

5.8.7 AVIFAUNA AND SMALL FAUNA

The project area supports a variety of bird species commonly associated with ASAL shrublands, open grasslands, rocky habitats, and settlement environments. Common bird species reported within the area include weaver birds, hornbills, doves, guinea fowls, vultures, eagles, ostriches, and various passerine species.



Figure 5-25: Typical Avifauna and Shrubland Habitat within the Project Area

Drainage corridors, scattered woodland patches, rocky outcrops, and open grazing landscapes provide feeding,

nesting, and movement habitats for avifauna within the project area. Seasonal bird movement patterns are influenced by rainfall conditions, vegetation productivity, and availability of water sources within the landscape.

The project area also supports several small mammal and reptile species including hares, mongooses, rodents, monitor lizards, geckos, agamas, and various snake species adapted to semi-arid environmental conditions.

5.8.8 HUMAN-WILDLIFE INTERACTIONS

The project area experiences varying degrees of interaction between local communities, livestock populations, and wildlife species due to the close interface between settlements and reserve ecosystems. Community consultations indicated that occasional human-wildlife conflicts occur within sections of the landscape, particularly involving elephants, hyenas, and livestock predation incidents.

In areas where wildlife corridors overlap with settlements, local residents reported occasional elephant movement, property destruction, livestock predation, and safety concerns. The assessment established that increasing settlement concentration and infrastructure development within wildlife movement zones may contribute to elevated human-wildlife interaction risks if ecological connectivity is not adequately maintained.

Competition over grazing resources and water access also occasionally contributes to interactions between livestock and wildlife during dry periods. Local communities nevertheless demonstrated awareness of wildlife conservation importance and the need for coexistence between settlement systems and ecological resources within the landscape.

5.8.9 EMERGING ECOLOGICAL AND SPATIAL CONCERNS

The assessment identified several emerging ecological and spatial concerns associated with settlement expansion and proposed excision patterns within the Marsabit ecosystem. These include:

- increasing risk of elephant corridor blockage;
- progressive habitat fragmentation;
- reduction of available wildlife dispersal space;
- increasing pressure on seasonal water points;

- and potential escalation of human-wildlife conflict.

The assessment also noted that lack of clear physical demarcation along some proposed boundaries may contribute to future settlement expansion pressures and management challenges within adjacent reserve areas. Lessons from previous excisions within the Marsabit landscape indicate that settlement intensification and habitat conversion may accelerate following formal excision if land use planning controls are not effectively implemented.

5.8.10 FAUNA AND WILDLIFE RESOURCES IN RELATION TO THE PROPOSED EXCISION

The proposed excision areas already contain long-established settlements, grazing systems, and socio-economic infrastructure which have modified portions of the original wildlife habitat within the landscape. However, sections of the broader rangeland environment continue to support ecological functions, wildlife movement, and seasonal habitat utilization within the wider Marsabit ecosystem.

The proposed excision covers approximately 58 km^2 and would reduce the effective area of Marsabit National Reserve if formally implemented. The assessment established that portions of the proposed excision areas intersect ecologically sensitive wildlife movement zones and dispersal landscapes, particularly within Karare II and adjacent corridor systems.

Future land use planning within the excised areas will therefore require integration of:

- ecological corridor protection;
- sustainable grazing management;
- controlled settlement planning;
- habitat conservation measures;
- and human-wildlife conflict mitigation strategies.

Particular attention will be required in protecting identified wildlife movement corridors, seasonal drainage systems, and ecologically sensitive zones within Karare II and adjacent landscapes in order to maintain ecological connectivity and reduce long-term habitat fragmentation within the wider Marsabit ecosystem.

5.9 SENSITIVE ECOSYSTEMS AND HABITATS

The proposed excision areas occur within the broader Marsabit National Reserve ecosystem, an ecologically important landscape supporting a variety of sensitive habitats, wildlife movement corridors, seasonal grazing systems, drainage networks, and ecological connectivity zones characteristic of northern Kenya ASAL ecosystems. Although portions of the proposed excision areas have experienced long-term human settlement and grazing activities, sections of the landscape still retain environmentally sensitive habitats that continue to perform important ecological functions within the wider Marsabit ecosystem. Sensitive ecosystems and habitats within the project area are influenced by:

- topography;
- vegetation distribution;
- seasonal drainage systems;
- wildlife movement patterns;
- groundwater recharge areas;
- and levels of human disturbance.

Field observations, spatial analysis, ecological mapping, and stakeholder consultations established that ecological sensitivity within the proposed excision areas varies significantly across Karare II, Kambinye, Kamboe, and Parkishon depending on settlement intensity, habitat condition, and wildlife utilization patterns.

5.9.1 WILDLIFE CORRIDORS AND ECOLOGICAL CONNECTIVITY ZONES

One of the most environmentally sensitive features identified within the project area is the presence of wildlife movement corridors linking the northern and southern sections of Marsabit National Reserve. Spatial mapping and ground verification confirmed that portions of Karare and Karare II fall within important elephant movement pathways and wildlife dispersal zones utilized seasonally by wildlife populations within the ecosystem.

Several wildlife movement routes converge within the Karare landscape, making the area an important ecological connectivity zone within the reserve system. Seasonal drainage systems, open grazing plains, and shrubland vegetation within sections of Karare II continue to support wildlife movement and ecological interactions despite increasing settlement pressure.

The corridors remain functionally important although increasing settlement expansion, road infrastructure, grazing activities, and localized habitat modification have contributed to narrowing of available wildlife movement space in some sections. The ecological sensitivity of these areas is therefore considered high due to their importance in maintaining landscape connectivity, wildlife dispersal, and ecological resilience within the Marsabit ecosystem.

The Kamboe area also forms part of the broader wildlife movement landscape connecting sections of the reserve ecosystem. Settlement growth and roadside development within portions of Kamboe have however contributed to localized habitat fragmentation and corridor sensitivity.

5.9.2 SEASONAL DRAINAGE SYSTEMS AND RIPARIAN HABITATS

Seasonal drainage systems and associated riparian habitats constitute another important environmentally sensitive component within the project area. Although the area does not contain permanent rivers or wetlands, several ephemeral drainage channels, runoff depressions, and seasonal watercourses traverse sections of Karare II, Kambinye, Kamboe, and Parkishon.

These drainage systems support localized vegetation concentration, groundwater recharge, seasonal pasture regeneration, and temporary wildlife and livestock utilization during rainy seasons. Vegetation occurring along drainage corridors tends to be relatively denser compared to surrounding upland plains and therefore provides important ecological refuge areas within the semi-arid landscape.

The drainage corridors also contribute to ecological connectivity by supporting movement of wildlife species, avifauna, and small fauna across sections of the ecosystem. However, some drainage systems within settlement areas are increasingly vulnerable to disturbance associated with settlement expansion, grazing pressure, erosion, waste disposal, and surface runoff obstruction.

5.9.3 GRAZING ECOSYSTEMS AND RANGELAND HABITATS

The open rangelands and grazing ecosystems within the project area form an important ecological and socio-economic component of the wider Marsabit landscape. These grazing habitats support pastoral livestock production systems while simultaneously providing seasonal forage resources for wildlife species utilizing surrounding reserve ecosystems.

The rangeland habitats within Kambinye and sections of Kamboe remain relatively open and continue to support ecological interactions between livestock, wildlife, and natural vegetation systems. Seasonal pasture regeneration during rainy periods contributes to ecological productivity and supports wildlife dispersal within portions of the landscape.

However, localized overgrazing, settlement concentration, vegetation disturbance, and prolonged drought conditions have contributed to varying levels of habitat degradation within heavily utilized grazing areas. Despite these pressures, substantial sections of the rangeland environment still retain ecological value and continue to support seasonal ecosystem functions within the broader Marsabit ecosystem.

5.9.4 ROCKY OUTCROPS AND VOLCANIC HABITAT SYSTEMS

The Parkishon area and sections of the broader project landscape contain rocky outcrops, volcanic surfaces, shallow stony soils, and bushland habitats associated with the Mount Marsabit volcanic complex. These habitats support reptiles, small mammals, avifauna, and drought-resistant vegetation species adapted to rocky ASAL environments.

Although relatively less productive in terms of pasture availability, these rocky habitats contribute to ecological diversity and provide refuge areas for specialized fauna and vegetation species within the landscape. The rocky terrain also influences drainage behavior, runoff concentration, and localized vegetation distribution within sections of the project area.

The ecological sensitivity of these habitats is considered moderate due to their role in supporting localized biodiversity and maintaining geomorphological stability within the volcanic landscape.

5.9.5 GROUNDWATER RECHARGE AREAS

Localized groundwater recharge zones associated with seasonal drainage systems, permeable volcanic soils, and fractured geological formations also constitute environmentally sensitive areas within the project landscape. These zones contribute to replenishment of groundwater resources relied upon by settlements, livestock populations, institutions, and surrounding communities.

Given the high dependence on groundwater within the project area, protection of recharge zones and drainage systems remains important for maintaining long-term water availability and ecological sustainability within the landscape.

Uncontrolled settlement expansion, vegetation clearance, drainage obstruction, and poor waste management practices within recharge areas may negatively affect infiltration processes and groundwater quality over time.

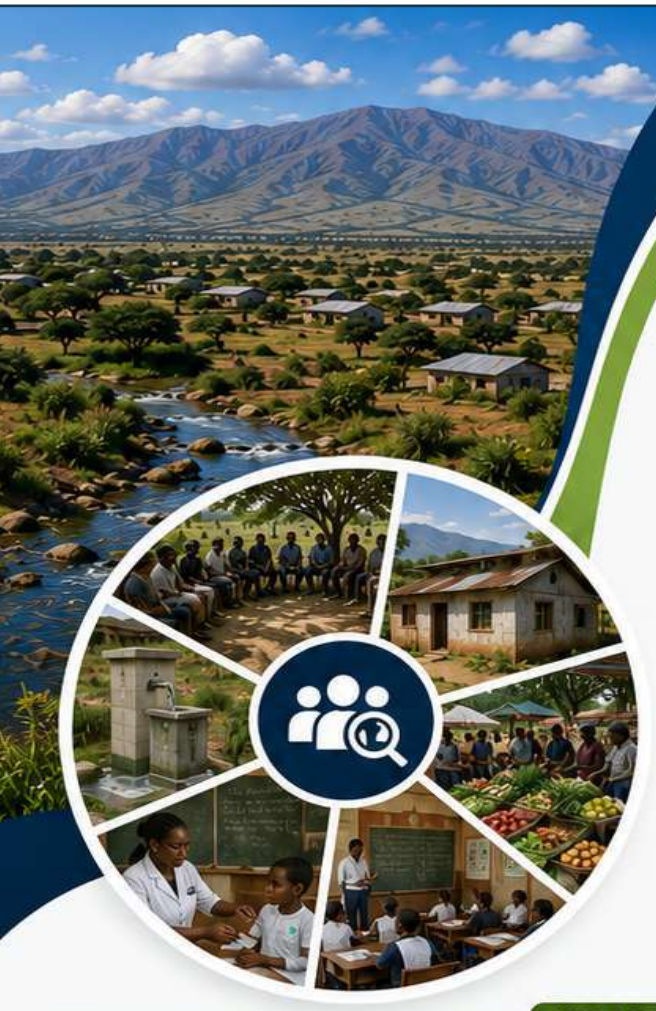
5.9.6 ECOLOGICAL SENSITIVITY IN RELATION TO THE PROPOSED EXCISION

The proposed excision areas already contain long-established settlements and grazing systems which have modified portions of the original ecosystem within the landscape. Nevertheless, the assessment established that environmentally sensitive habitats and ecological functions still occur within sections of the proposed excision areas and adjacent reserve ecosystems.

Particular ecological sensitivity was identified within wildlife movement corridors in Karare II, seasonal drainage systems, grazing dispersal areas, and ecological connectivity zones traversing sections of the project landscape. These ecological features continue to play an important role in supporting wildlife movement, seasonal grazing dynamics, groundwater recharge, vegetation regeneration, and broader ecosystem functionality within the Marsabit ecosystem.

The assessment established that the proposed excision may present potential environmental risks including habitat fragmentation, gradual narrowing of wildlife movement corridors, increased pressure on seasonal grazing systems, disturbance of drainage ecosystems, and possible escalation of human-wildlife interactions if future land use changes are not properly planned and managed. Existing settlement expansion and infrastructure development within portions of the landscape have already contributed to localized ecological pressure in some areas, particularly within sections intersecting wildlife movement pathways.

Nevertheless, the proposed excision also presents an opportunity to promote more structured land use planning and improved environmental management within areas already characterized by long-standing settlement and pastoral land use. Future land use planning within the excised areas will therefore require careful integration of wildlife corridor protection measures, sustainable settlement planning approaches, drainage conservation strategies, controlled grazing management, and protection of ecologically sensitive habitats in order to support long-term coexistence between human settlement systems and ecological conservation objectives within the wider Marsabit ecosystem.



CHAPTER 06

BASELINE SOCIO-ECONOMIC CONDITIONS

Establishing a clear understanding of existing socio-economic conditions provides the reference point for assessing potential impacts, identifying vulnerable groups and supporting informed decision-making and effective management.

KEY AREAS OF BASELINE ASSESSMENT

1. POPULATION AND DEMOGRAPHICS
- Population size and distribution
- Age and gender structure
- Household composition
- Migration patterns

2. LIVELIHOODS AND INCOME
- Main livelihood activities
- Employment status
- Income levels and sources
- Economic trends

3. EDUCATION AND SKILLS
- Education levels
- School attendance
- Literacy and numeracy
- Vocational skills

4. HEALTH AND WELL-BEING
- Health status
- Access to health services
- Nutrition and sanitation
- Prevalent diseases

5. INFRASTRUCTURE AND SERVICES
- Housing conditions
- Water and sanitation
- Energy access
- Transport and communication

6. SOCIAL AND CULTURAL CONTEXT
- Cultural heritage
- Social institutions
- Community cohesion
- Vulnerable groups

HOW TO COLLECT BASELINE DATA

DESK REVIEW
Review existing documents, reports and statistics from relevant sources.

HOUSEHOLD SURVEYS
Collect quantitative data from a representative sample of households.

KEY INFORMANT INTERVIEWS
Engage local leaders, experts, service providers and other key stakeholders.

FOCUS GROUP DISCUSSIONS
Engage community members in group discussions to gather diverse perspectives.

DIRECT OBSERVATION
Observe and record conditions, facilities and ongoing activities.

MAPPING AND GIS
Use maps and spatial data to understand land use, infrastructure and resource distribution.

BASELINE DATA INFORMS DECISIONS ON

- Identifying potential impacts and opportunities
- Designing effective mitigation and enhancement measures
- Setting realistic indicators and targets
- Monitoring change over time
- Supporting equitable and inclusive project outcomes

OUR COMMITMENT

- Conduct baseline studies with accuracy, transparency and inclusiveness.
- Ensure participation of all relevant stakeholders, especially vulnerable and marginalized groups.
- Use data responsibly and protect the privacy and confidentiality of participants.
- Provide a reliable foundation for impact assessment, planning and decision-making.

Understanding where we are today enables us to make better decisions for a sustainable and inclusive future.

CHAPTER 6: BASELINE SOCIO-ECONOMIC CONDITIONS

This chapter presents the baseline socio-economic conditions of the proposed excision areas and the surrounding communities within Karare Ward, Marsabit County. The assessment provides an overview of the existing demographic characteristics, settlement patterns, livelihoods, land use systems, social infrastructure, economic activities, and community services within the project area. It further examines the social and cultural dynamics influencing resource utilization and community well-being, including pastoral production systems, access to education and healthcare, water supply, infrastructure development, land tenure arrangements, and human–wildlife interactions. The baseline information establishes the existing socio-economic environment against which the potential impacts of the proposed excision are assessed and provides a basis for developing appropriate mitigation and management measures.

6.1 DEMOGRAPHIC CHARACTERISTICS

The proposed excision areas are located within Karare Ward in Marsabit County and comprise four major settlement zones namely Kamboe, Karare II, Kambinye, and Parkishon. These areas are predominantly occupied by pastoralist communities and have experienced progressive population growth and settlement expansion over the years due to increasing sedentarization, infrastructure development, and improved accessibility within the wider Marsabit area. The settlements are situated within the southern and western sections of Marsabit National Reserve and currently host established residential settlements together with various forms of social and public infrastructure.

The demographic characteristics of the project area are largely influenced by pastoral livelihood systems, traditional social structures, availability of social services, and the strategic location of the settlements along transport corridors and administrative centres. The population is generally youthful, with a significant proportion of children and youth who depend on household livestock production and emerging informal economic activities for their livelihoods.

According to data obtained during field consultations and community profiling, the proposed excision areas collectively support an estimated population of approximately 9,520 people distributed across the four settlement clusters. Kamboe has the highest estimated population followed by Karare II, Kambinye, and Parkishon respectively.

The settlements are characterized by relatively large household sizes consistent with pastoral communities in the arid and semi-arid lands (ASALs) of northern Kenya. Household structures are largely organized around extended family systems and clan-based social arrangements that continue to play an important role in social support systems, resource sharing, livestock management, and traditional governance. Based on field consultations and household estimates, the average household size within the project area ranges between five and seven persons per household.

Settlement distribution within the project area is largely concentrated around existing social amenities including schools, health centres, markets, water points, churches, mosques, and administrative centres. Population concentration is also higher along the Isiolo–Marsabit–Moyale (A2) highway due to improved accessibility and availability of transport and commercial services. In some areas, settlement expansion has gradually extended towards ecologically sensitive zones and wildlife movement corridors, particularly within portions of Kambinye and Parkishon areas.

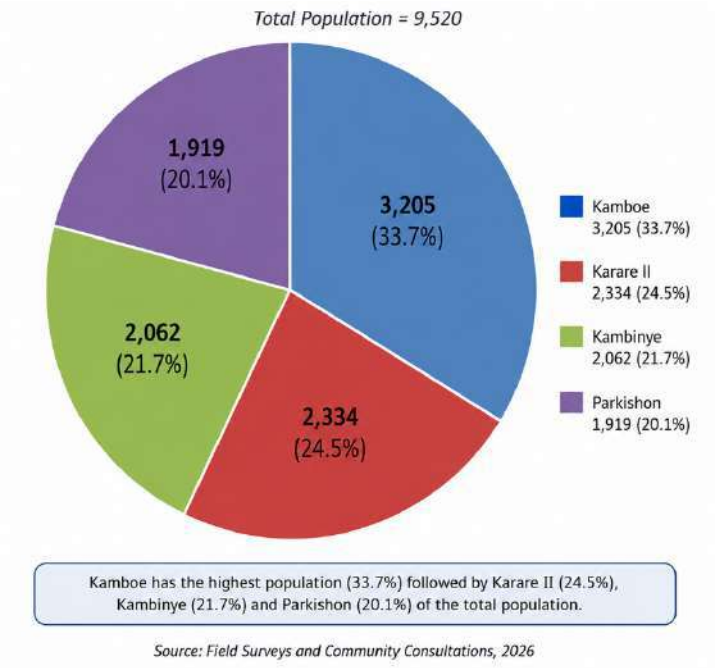


Figure 6-1: Population Distribution by Settlement Area

The project area is predominantly inhabited by Rendille, Samburu, Borana, and Gabra communities whose livelihoods are closely linked to pastoral livestock production. Livestock keeping remains the dominant economic activity and forms the backbone of household income, food security, and cultural identity. However, increasing settlement permanence has also contributed to diversification of livelihood activities including small-scale trade, boda boda transport services, casual labour, retail businesses, charcoal trade, and limited subsistence farming in suitable locations.

The age structure within the project area reflects a youthful and rapidly growing population typical of many ASAL regions in Kenya. Children and youth account for a significant proportion of the total population, resulting in increasing demand for educational facilities, healthcare services, water supply infrastructure, and employment opportunities. The relatively high dependency ratio within

the settlement's places additional pressure on household incomes and available natural resources, particularly during periods of drought and livestock losses.

Figure 6-2: Estimated Demographic Characteristics within the Project Area

INDICATOR	ESTIMATED VALUE
Total Estimated Population	9,520
Estimated Number of Households	1,587
Average Household Size	6 Persons
Estimated Male Population	49%
Estimated Female Population	51%
Estimated Children Below 18 Years	43%
Estimated Youth Population (18–35 Years)	34%
Main Livelihood Activity	Pastoralism
Secondary Livelihood Activities	Trade, Transport, Casual Labour

Source: Field Surveys and Community Consultations, 2026

The area continues to experience several socio-economic challenges associated with ASAL environments including water scarcity, recurrent droughts, poverty, limited employment opportunities, inadequate infrastructure, and occasional insecurity. Human–wildlife interactions also remain common within some settlement zones due to the proximity of the settlements to wildlife habitats and movement corridors within the wider Marsabit ecosystem.

Despite these challenges, the continued growth of permanent settlements and social infrastructure within the proposed excision areas demonstrates the increasing transition from temporary pastoral occupation towards more permanent settlement patterns. The proposed excision is therefore expected to support improved land administration, planning, infrastructure development, and service delivery within the affected communities while also providing a framework for sustainable land use management.

6.2 SETTLEMENT PATTERNS

Settlement patterns within the proposed excision areas are largely influenced by accessibility, availability of water resources, grazing systems, proximity to social infrastructure, and historical pastoral settlement dynamics. The identified settlement zones, namely Kamboe, Karare II, Kambinye, and Parkishon, have progressively evolved from temporary pastoral grazing and seasonal occupation

areas into more permanent settlement centres supporting residential, social, commercial, and administrative functions.

The settlement distribution within the project area generally exhibits clustered and linear settlement characteristics, particularly along the Isiolo–Marsabit–Moyale (A2) highway, access roads, seasonal drainage systems, and areas with relatively reliable access to water and social amenities. Settlement concentration is notably higher around schools, health facilities, administrative centres, markets, churches, mosques, and security installations where access to services and economic opportunities is comparatively better.

Kamboe and Karare II exhibit relatively higher settlement density and physical expansion compared to Kambinye and Parkishon. This is mainly attributed to improved accessibility, increased population concentration, and availability of public infrastructure within these areas. The settlement areas are characterized by a mixture of permanent, semi-permanent, and traditional housing structures reflecting the gradual transition from mobile pastoral occupation toward permanent settlement systems.

The dominant settlement typologies within the project area include:

- clustered village settlements around service centres;
- dispersed pastoral homesteads;
- roadside linear settlements;
- and emerging peri-urban settlement patterns in areas closer to major transport corridors.

In some sections, particularly within Kambinye and Parkishon, settlements remain relatively dispersed due to the pastoral nature of land use and dependence on livestock grazing systems. However, continued population growth and infrastructure development are gradually increasing settlement concentration and land subdivision within these areas.

The settlement areas currently support a wide range of social and economic infrastructure including schools, health centres, water points, markets, churches, mosques, security installations, and administrative facilities. This demonstrates the increasing permanence of the settlements and the growing need for formal land administration, spatial planning, infrastructure development, and environmental management.

Field observations further established that settlement expansion in some areas has gradually extended toward ecologically sensitive zones and wildlife dispersal areas within the wider Marsabit

ecosystem. In particular, portions of Karare II and Kambinye exhibit increasing proximity between residential developments and identified wildlife movement corridors, contributing to occasional human–wildlife interactions and land use conflicts.

Figure 6-3: General Settlement Characteristics within the Proposed Excision Areas

Settlement Area	Dominant Settlement Pattern	Settlement Density	Dominant Housing Type
Kamboe	Clustered and Linear	High	Permanent & Semi-permanent
Karare II	Clustered	High	Permanent & Semi-permanent
Kambinye	Dispersed and Clustered	Moderate	Semi-permanent & Traditional
Parkishon	Dispersed	Moderate	Traditional & Semi-permanent

The existing settlement patterns also reflect broader socio-economic changes occurring within Marsabit County, including increased sedentarization of pastoral communities, improved road infrastructure, urban influence from Marsabit Town, and changing livelihood systems. The continued transformation of the area into permanent settlement zones has therefore intensified the need for a structured legal and planning framework to guide sustainable land use and future development within the proposed excision areas. Description of Proposed Excision Areas

6.3 LIVELIHOOD SYSTEMS

Livelihood systems within the proposed excision areas are predominantly pastoral in nature and are closely linked to livestock production, natural resource utilization, and mobility across the wider Marsabit ecosystem. The local communities largely depend on pastoralism as the primary source of household income, food security, social identity, and cultural continuity. Livestock keeping remains the backbone of the local economy and plays a central role in sustaining household livelihoods within Kamboe, Karare II, Kambinye, and Parkishon settlements.

The dominant livestock species kept within the project area include cattle, goats, sheep, camels, and donkeys. Livestock mobility continues to be an important coping mechanism, particularly during drought periods when communities move animals in search of pasture and water. Seasonal grazing

patterns are influenced by rainfall availability, water accessibility, security conditions, and the condition of rangeland resources within and outside the settlement areas.

Figure 6-4: Main Livelihood Activities within the Project Area

LIVELIHOOD ACTIVITY	RELATIVE IMPORTANCE	MAIN BENEFICIARIES
Pastoralism	Very High	Majority of Households
Small-scale Trade	High	Women and Youth
Casual Labour	Moderate	Youth
Transport Services (Boda boda)	Moderate	Youth
Charcoal Trade	Low–Moderate	Vulnerable Households
Formal Employment	Low	Skilled Individuals
Subsistence Farming	Low	Limited Households

Pastoralism within the project area is practiced under both sedentary and semi-mobile systems. While many households have established permanent settlements, livestock movement to seasonal grazing areas remains common, particularly during prolonged dry seasons. The increasing establishment of permanent settlements and infrastructure development has, however, gradually reduced grazing flexibility in some sections of the project area.

Livestock products including milk, meat, hides, skins, and live animal sales constitute important sources of household income and nutrition. Local livestock markets within Marsabit Town and surrounding centres provide critical economic linkages for pastoral households. In addition, livestock ownership remains an important indicator of wealth, social status, and resilience among the local communities.



Plate 6-1: Livestock Grazing is the main livelihood in the project area

In recent years, livelihood diversification has increased within the settlement areas due to changing socio-economic conditions, recurrent droughts, reduced grazing resources, and increased settlement permanence. Small-scale businesses such as retail shops, kiosks, livestock trading, food vending, and petty trade

have emerged within the settlement centres, particularly along major roads and market areas. Youth within the area are increasingly engaging in boda boda transport services, casual labour, and small-scale entrepreneurship as alternative income sources.

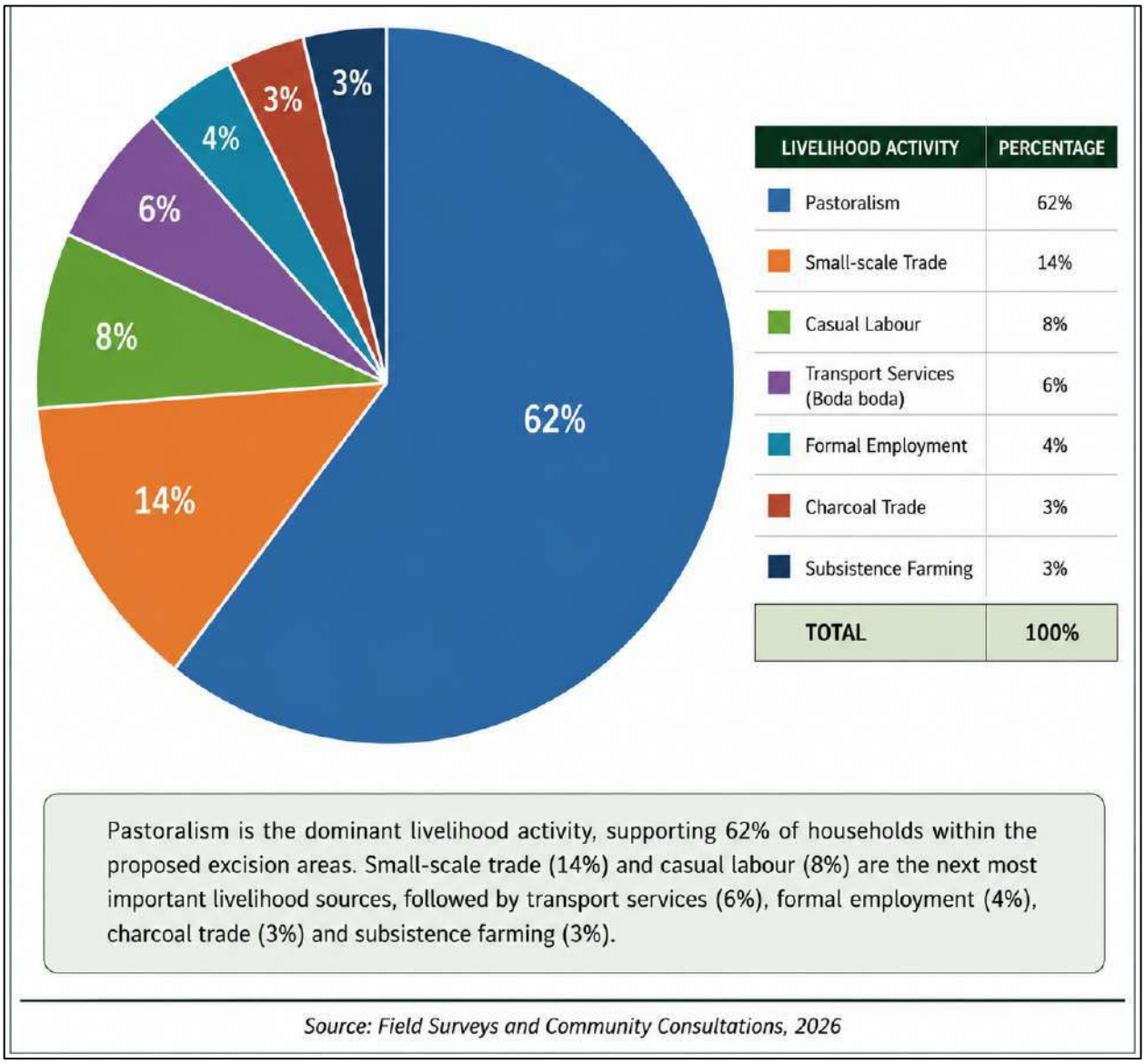


Figure 6-5: Main Livelihood Activities within the Proposed Excision Areas

Women within the project area play a significant role in household livelihood systems through:

- milk trading,
- beadwork and handicrafts,
- petty trade,
- firewood collection,

- and management of household food supplies.

Women also contribute significantly to livestock management and water collection activities, particularly during drought periods when household resource pressures intensify.

Figure 6-6: Common Livestock Types within the Project Area

Livestock Type	Relative Prevalence	Main Purpose
Goats	Very High	Income and Food
Sheep	High	Food and Livestock Trade
Cattle	High	Wealth, Milk and Meat
Camels	Moderate	Drought Resilience and Milk
Donkeys	Moderate	Transport

The project area continues to experience several livelihood-related challenges associated with the arid and semi-arid environment. These include:

- recurrent droughts,
- declining pasture availability,
- water scarcity,
- livestock diseases,
- market fluctuations,
- insecurity,
- and increasing human–wildlife interactions.

Climate variability remains one of the most significant threats to pastoral livelihoods within the area, frequently contributing to livestock losses, food insecurity, migration pressures, and household vulnerability.

Settlement expansion and increasing infrastructure development within portions of the reserve have also influenced traditional grazing systems and livestock mobility patterns. In some areas, expansion of permanent settlements has reduced access to grazing areas and increased competition over natural resources. Stakeholder consultations indicated that some wildlife movement corridors and seasonal grazing areas are increasingly intersecting with human settlement zones, occasionally contributing to crop damage, livestock predation, and competition for water resources.

Despite these challenges, pastoralism continues to remain the most viable and culturally significant livelihood system within the project area. The proposed excision is expected to support improved land administration, settlement planning, and infrastructure development, which may positively

influence socio-economic development and livelihood security within the affected communities if appropriately managed.

6.4 GRAZING AND PASTORAL SYSTEMS

6.4.1 TRADITIONAL GRAZING SYSTEMS

Grazing within the project area is primarily undertaken under communal land management systems characterized by shared access to pasture, water resources, livestock movement routes, and seasonal grazing zones. Traditional grazing governance is largely administered through customary institutions led by elders and clan leadership structures that regulate access to grazing resources and coordinate livestock mobility during drought periods.

The local communities rely heavily on extensive livestock production systems adapted to the fragile dryland environment. Grazing activities are influenced by seasonal rainfall variability, pasture regeneration, water availability, and prevailing climatic conditions. The dominant livestock species grazed within the project area include goats, sheep, cattle, and camels, with goats and sheep being more prevalent due to their resilience under harsh climatic conditions.

Figure 6-7: Main Grazing Resources within the Project Area

GRAZING RESOURCE	DESCRIPTION
Open Rangelands	Primary communal grazing areas used during normal seasons
Seasonal Grazing Areas	Areas utilized during drought periods and dry seasons
Seasonal Drainage Zones	Temporary grazing zones with relatively better vegetation
Water Points	Boreholes, pans and seasonal streams supporting livestock watering
Livestock Routes	Traditional livestock movement corridors linking grazing areas

6.4.2 SEASONAL LIVESTOCK MOBILITY

Livestock mobility remains an important pastoral adaptation strategy within the project area. During wet seasons, grazing activities are generally concentrated around settlement areas and nearby grazing fields where pasture and water are relatively available. However, during dry seasons and

drought periods, livestock movement intensifies as pastoral households move animals toward distant grazing areas with better pasture conditions and reliable water sources.

Field consultations established that livestock movement commonly extends beyond the immediate settlement areas into surrounding communal rangelands within the wider Marsabit landscape. Temporary grazing camps are often established during severe drought periods to reduce pressure on localized grazing resources around permanent settlements.

The mobility system is essential for:

- reducing overgrazing;
- maintaining livestock productivity;
- minimizing drought-related livestock losses;
- and supporting long-term rangeland recovery.

However, increasing settlement expansion and infrastructure development within portions of the project area are gradually constraining traditional livestock movement routes and grazing flexibility.

6.4.3 GRAZING RESOURCES AND WATER POINTS

The project area depends on a combination of natural grazing fields, seasonal vegetation, boreholes, water pans, and seasonal drainage systems to support pastoral production. Water availability remains one of the most critical determinants of grazing patterns and livestock distribution within the area.

Livestock watering points within the project area include:

- boreholes;
- shallow wells;
- water pans;
- and seasonal streams.

Settlement concentration around permanent water sources has contributed to localized grazing pressure and vegetation degradation in some areas, particularly during prolonged dry periods.

Figure 6-8: Main Livestock Water Sources within the Project Area

WATER SOURCE TYPE	RELATIVE IMPORTANCE	RELIABILITY
Boreholes	Very High	Permanent

Water Pans	High	Seasonal
Seasonal Streams	Moderate	Seasonal
Shallow Wells	Moderate	Semi-permanent

The availability and distribution of water infrastructure strongly influence settlement concentration, livestock movement, and grazing intensity within the proposed excision areas.

6.4.4 GRAZING PRESSURE AND SETTLEMENT EXPANSION

Field observations established that increasing settlement expansion within Kamboe, Karare II, Kambinye, and Parkishon has gradually reduced available grazing space in some sections of the project area. Expansion of residential settlements, roads, schools, health centres, markets, and other infrastructure has contributed to fragmentation of communal grazing areas and increased concentration of livestock within remaining open rangelands.

The continued growth of permanent settlements has also increased pressure on vegetation resources around settlement centres and water points, leading to localized overgrazing and vegetation degradation in some areas. This trend is more pronounced near densely settled zones and transport corridors where livestock concentrations are relatively high.

Stakeholder consultations further indicated that:

- grazing areas near settlements are shrinking;
- livestock routes are becoming increasingly constrained;
- and grazing competition intensifies during drought periods.

Despite these pressures, significant portions of the surrounding landscape continue to support active grazing systems and seasonal livestock movement.

6.4.5 HUMAN–WILDLIFE INTERACTIONS WITHIN GRAZING AREAS

The grazing landscape within the proposed excision areas overlaps with sections of the wider Marsabit wildlife dispersal system and identified wildlife movement corridors. Livestock and wildlife frequently share grazing fields, water points, and seasonal movement routes within portions of Kambinye, Parkishon, and Karare II.

Community consultations indicated that human–wildlife interactions are relatively common and occasionally result in:

- livestock predation;
- competition over water resources;
- crop damage in localized farming areas;
- and occasional destruction of property by wildlife species such as elephants.

At the same time, local communities acknowledged the long history of coexistence between pastoral systems and wildlife within the wider Marsabit ecosystem. Traditional pastoral grazing systems have historically allowed relatively flexible coexistence between livestock production and wildlife movement across the landscape.

6.4.6 CLIMATE VULNERABILITY OF PASTORAL SYSTEMS

Pastoral systems within the project area are highly vulnerable to climatic variability and recurrent drought conditions characteristic of northern Kenya. Reduced rainfall, prolonged dry seasons, pasture depletion, and declining water availability continue to pose significant risks to livestock productivity and household resilience.

Recurring droughts frequently contribute to:

- livestock mortality;
- reduced milk production;
- food insecurity;
- increased livestock migration;
- and heightened pressure on available grazing resources.

Climate change is further expected to intensify existing environmental stresses through increased frequency of droughts, unpredictable rainfall patterns, and declining rangeland productivity. These conditions may increase vulnerability of pastoral households and further influence future settlement and grazing dynamics within the project area.

Sustainable management of grazing systems, livestock mobility routes, water infrastructure, and settlement expansion will therefore remain critical for maintaining pastoral livelihoods and ecological sustainability within the proposed excision areas.

6.5 LAND TENURE AND LAND USE

The proposed excision areas fall within sections of the Marsabit National Reserve that have experienced long-term human occupation, settlement growth, and socio-economic transformation over several decades. Land tenure within the project area is characterized by a complex interaction between protected area status, customary communal land management systems, and increasing permanent settlement development. Although the land remains legally gazetted as part of the Marsabit National Reserve, the affected communities have historically occupied and utilized the area for settlement, grazing, socio-economic activities, and development of public infrastructure.

The current land tenure situation reflects the gradual evolution of pastoral settlement systems within northern Kenya where communities traditionally relied on communal grazing landscapes and customary resource governance systems. Over time, increasing sedentarization, infrastructure development, and concentration of public services within the project area have contributed to transformation of portions of the reserve landscape into permanent settlement zones supporting both residential and institutional land uses.

6.5.1 EXISTING LAND TENURE SYSTEM

The local communities within Karare II, Kambinye, Kamboe, and Parkishon predominantly practice customary communal land management systems typical of pastoral areas within northern Kenya. Access to grazing areas, water resources, livestock routes, and communal facilities is generally governed through traditional leadership structures, clan systems, and community-based resource management arrangements.

Land ownership at household level remains largely informal and is primarily based on customary occupation, inheritance systems, and long-term settlement patterns rather than formal land title registration. The absence of formalized tenure arrangements has historically limited structured land administration processes and constrained long-term investment and infrastructure planning within the affected settlements.

Despite the protected area status of the land, communities have continued to establish permanent and semi-permanent settlement structures, social facilities, religious institutions, and local economic activities within portions of the proposed excision areas over several decades.

6.5.2 EXISTING LAND USE CHARACTERISTICS

The proposed excision areas currently support a mixture of settlement, pastoral, institutional, commercial, and infrastructural land uses. While pastoralism remains the dominant livelihood system within the wider landscape, increasing settlement permanence has gradually transformed sections of Karare II, Kamboe, Kambinye, and Parkishon from predominantly open grazing landscapes into mixed settlement and socio-economic development zones.

Figure 6-9: Dominant Land Use Activities within the Proposed Excision Areas

LAND USE CATEGORY	DESCRIPTION
Residential Settlement	Permanent and semi-permanent homesteads
Grazing Areas	Communal livestock grazing lands
Social Infrastructure	Schools, health centres, churches and mosques
Commercial Activities	Shops, kiosks, markets and transport services
Administrative Facilities	Chiefs' offices and security installations
Transport Infrastructure	Roads, tracks and access routes

Settlement expansion within the project area is mainly concentrated along the A2 highway corridor, water points, administrative centres, and areas surrounding existing social infrastructure. The availability of transport accessibility, public facilities, and water resources has encouraged increasing population concentration and physical expansion of settlement areas over time.

6.5.3 SITE-SPECIFIC LAND USE CHARACTERISTICS

A. KARARE II

Karare II exhibits relatively higher settlement concentration and infrastructure development compared to the other proposed excision areas. The area contains permanent and semi-permanent residential settlements, schools, administrative facilities, religious institutions, commercial centres, and livestock holding areas. Settlement expansion within Karare II is closely associated with proximity to transport corridors, institutional centres, and water access points. The area also continues to support communal grazing activities within surrounding rangelands.

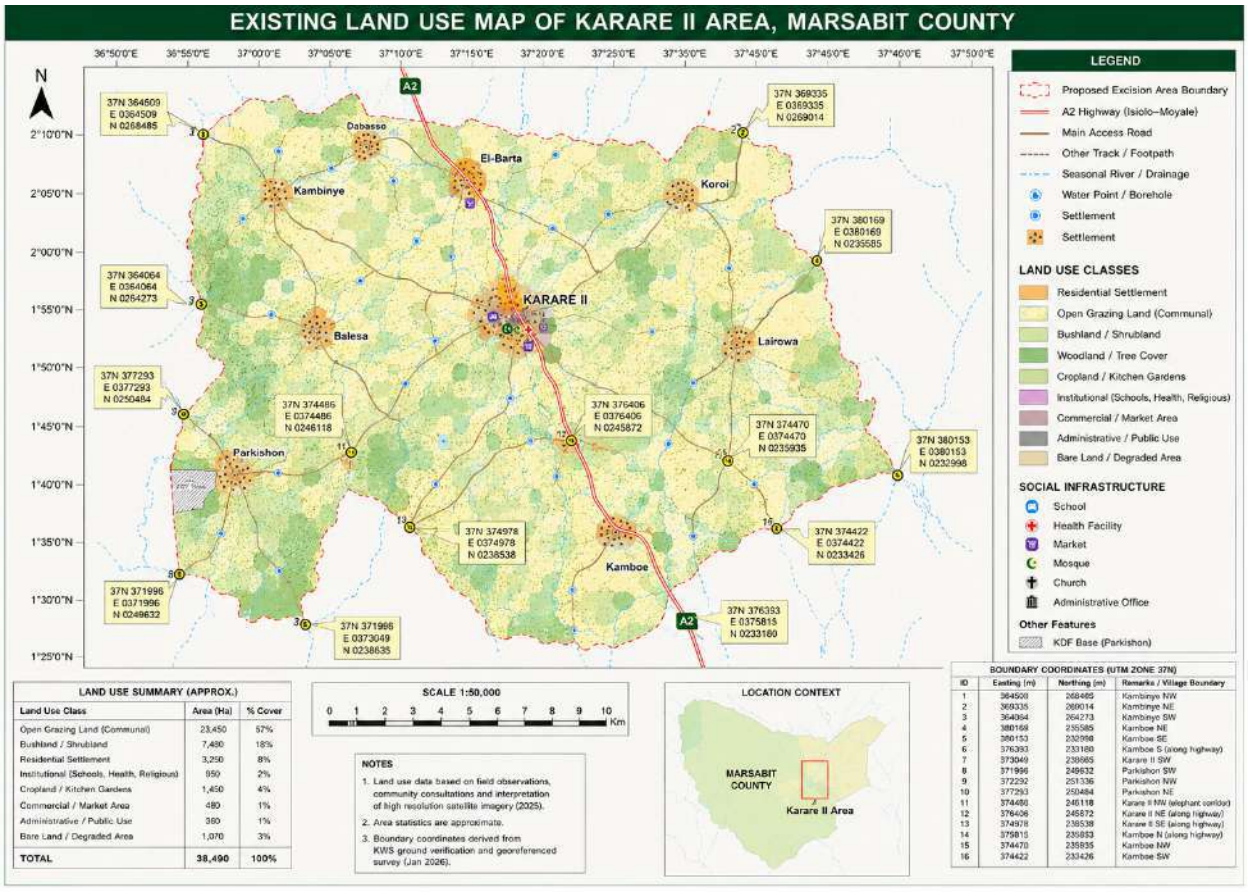


Figure 6-10: Existing land use map of Karare II Village

B. KAMBOE

Kamboe is characterized by mixed settlement and grazing land use systems occurring alongside the Marsabit–Isiolo highway corridor. The area contains permanent and semi-permanent residential homesteads, roadside commercial activities, livestock grazing areas, water access points, and transport-related infrastructure supporting the surrounding pastoral communities. Settlement development within the area is largely concentrated along the highway and associated access routes, reflecting the importance of transport connectivity in influencing land use patterns and socio-economic activities.

Pastoralism remains the dominant livelihood system within Kamboe, with communal grazing lands extending across significant portions of the surrounding landscape. However, increasing accessibility along the transport corridor has contributed to gradual settlement expansion, infrastructure development, and localized transformation of land use characteristics within parts of the area. The presence of roads and improved accessibility has further stimulated growth of small-scale

businesses, market activities, and service-related enterprises serving both local residents and highway users.

Field observations established that portions of Kamboe continue to retain important grazing functions and ecological connectivity within the wider Marsabit ecosystem, although increasing settlement concentration and infrastructure development are gradually altering sections of the landscape. The area therefore reflects the ongoing transition from predominantly open pastoral grazing systems towards more permanent mixed settlement and socio-economic land use patterns.

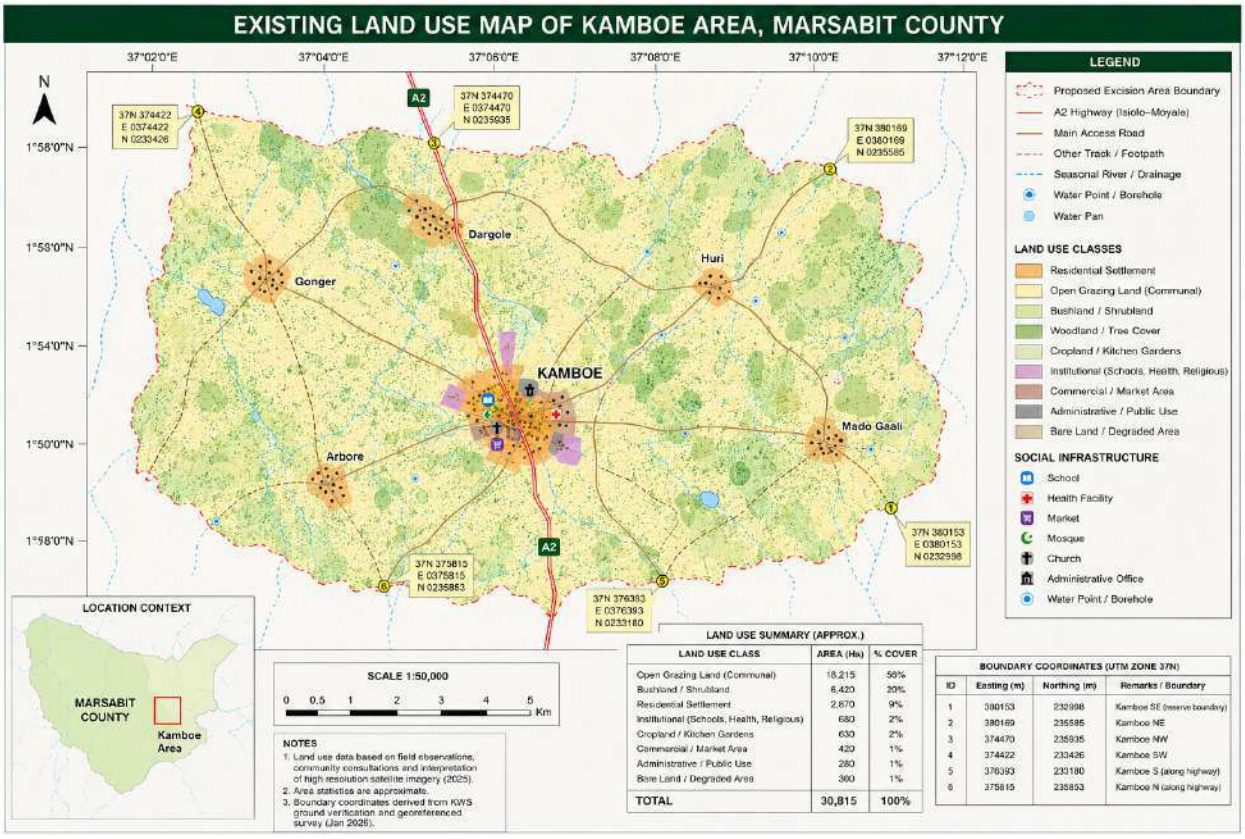


Figure 6-11:Existing land use map of Kamboe Village

C. KAMBINYE

The Kambinye area remains relatively more pastoral in character compared to Karare II and Kamboe, with communal grazing forming the dominant land use activity within much of the surrounding landscape. Settlement development within Kambinye is relatively dispersed and concentrated

around water access points and local settlement clusters. The area supports seasonal livestock mobility and communal resource utilization systems typical of ASAL pastoral environments.

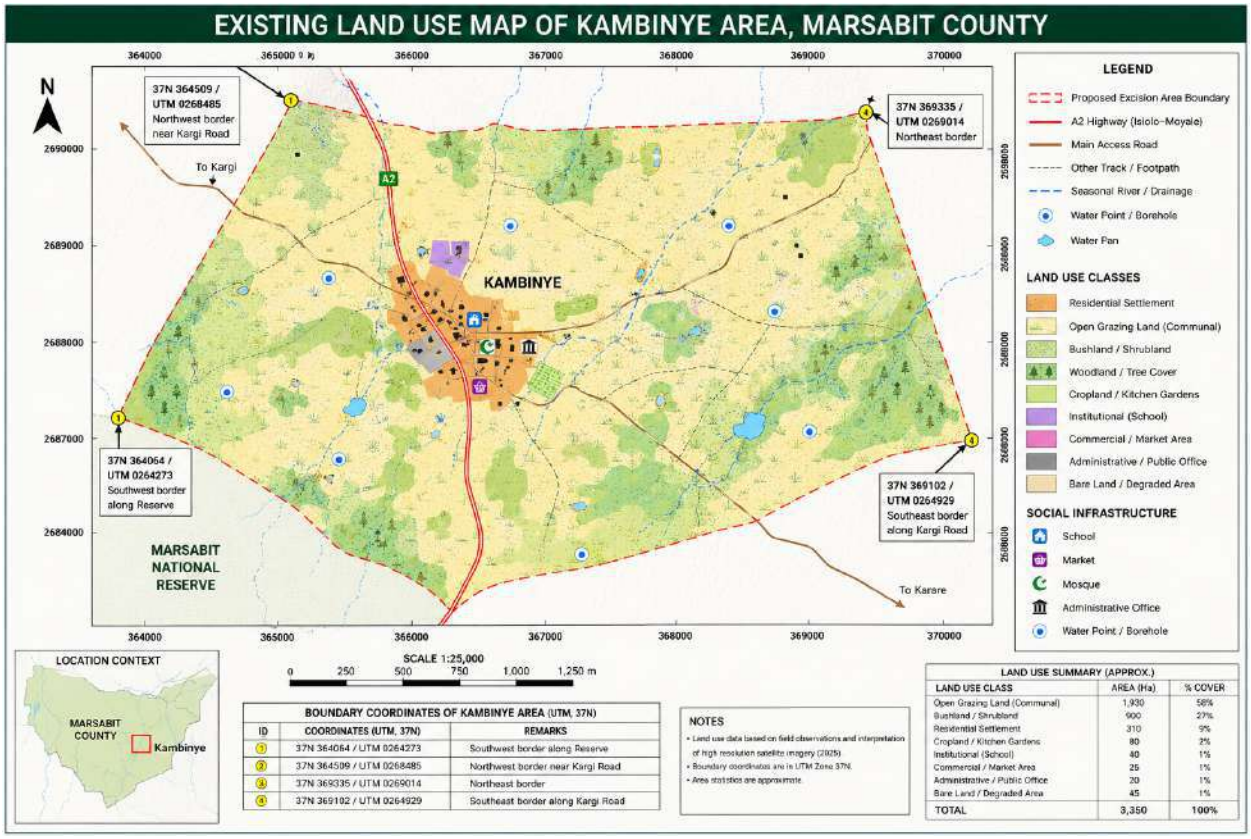


Figure 6-12:Existing land use map of Kambinye Village

D. PARKISHON

Parkishon contains a combination of residential settlement areas, grazing zones, institutional land uses, and security-related infrastructure associated with the KDF installation within the area. The rocky terrain and localized infrastructure development influence settlement distribution and land use patterns within the landscape. Open rangeland and grazing activities continue to occur within surrounding sections of the area.

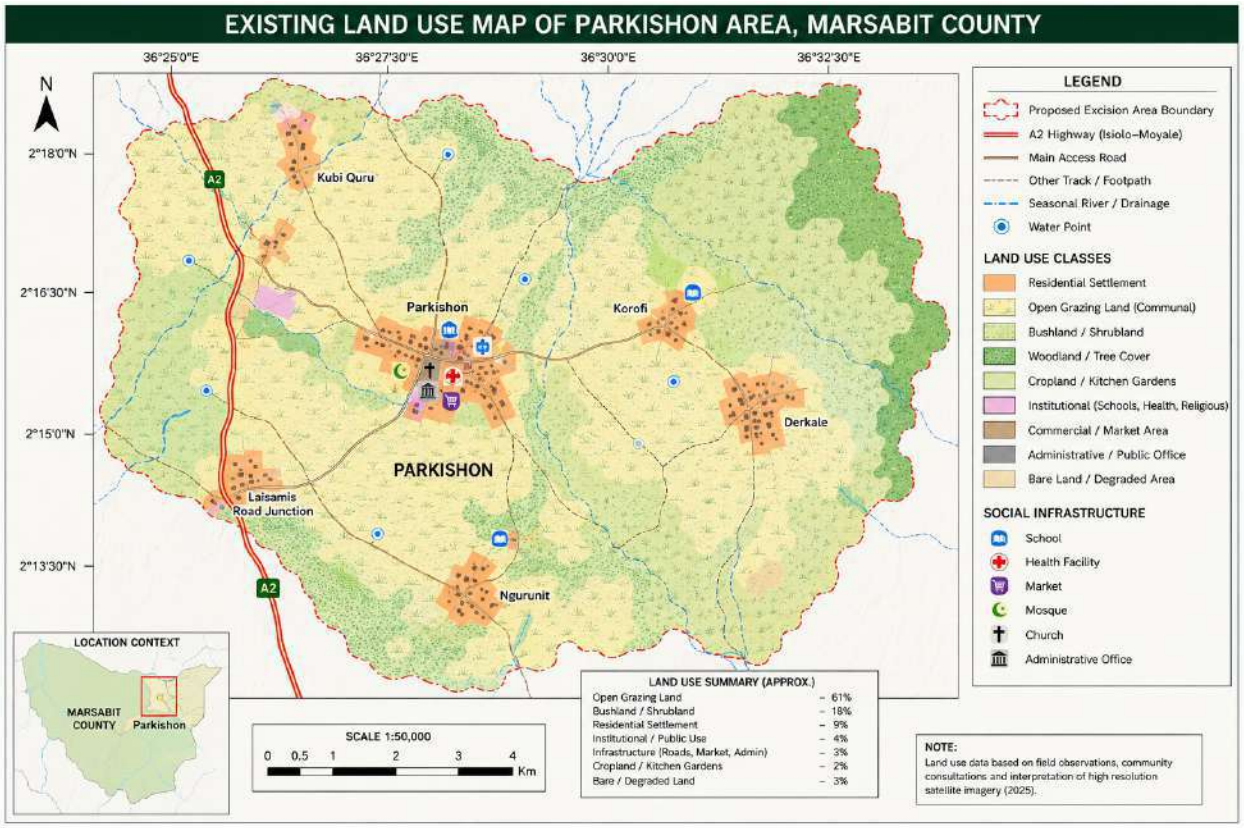


Figure 6-13:Existing land use map of Parkishon Village

6.5.4 DOMINANT LIVELIHOOD AND LAND USE ACTIVITIES

Pastoralism remains the dominant land use and livelihood system within the wider project area, with communal grazing continuing to occupy substantial portions of the surrounding rangeland landscape. Livestock production systems remain central to household livelihoods, socio-economic stability, and traditional resource utilization practices within the affected communities.

However, increasing sedentarization and infrastructure development have introduced more permanent land use characteristics within settlement zones. The transition toward permanent settlement systems has increased demand for:

- land administration;
- spatial planning;
- infrastructure development;
- public service delivery;
- and environmental management systems.

6.5.5 LAND USE CHANGE AND EMERGING PRESSURE

Field observations established that settlement expansion and infrastructure development within portions of the project area have contributed to gradual reduction of open grazing areas and increased pressure on natural resources within the surrounding landscape. Increased concentration of settlements around roads, schools, water points, and trading centres has accelerated localized land use change in some sections of the proposed excision areas.

The assessment further established that future settlement growth following formal excision may increase pressure on:

- grazing systems;
- wildlife corridors;
- drainage ecosystems;
- water resources;
- and ecologically sensitive habitats

if appropriate land use planning and environmental management measures are not implemented.

6.5.6 LEGAL AND ADMINISTRATIVE LAND USE CHALLENGES

The current land tenure situation presents a significant legal and administrative inconsistency whereby areas occupied by permanent settlements, public institutions, and socio-economic infrastructure remain legally categorized as protected land under the Marsabit National Reserve. This overlap between existing settlement realities and protected area status has constrained formal land administration processes, infrastructure investment, settlement planning, and long-term socio-economic development within the affected communities.

Figure 6-14: Key Land Tenure Characteristics within the Project Area

PARAMETER	DESCRIPTION
Current Legal Status	Part of Marsabit National Reserve
Existing Occupation System	Long-term community settlement
Dominant Tenure Practice	Customary communal land management
Main Land Use Activity	Pastoralism and settlement
Key Land Use Change Driver	Settlement expansion and infrastructure development
Major Land Management Challenge	Overlap between protected area status and settlement use

The lack of formalized land tenure arrangements has also contributed to uncertainty regarding land ownership, settlement planning, and future development control within the project area. Community consultations indicated strong local support for the proposed excision process as a mechanism for improving tenure security, supporting infrastructure development, enhancing service delivery, and reducing long-standing uncertainty associated with settlement within a protected area.

6.5.7 FUTURE LAND USE PLANNING CONSIDERATIONS

The proposed excision is expected to formally align the legal land status with the existing land use realities on the ground while supporting improved land governance, settlement planning, infrastructure development, and socio-economic stability within the affected communities. However, future land use planning and environmental management will remain critically important in preventing:

- uncontrolled settlement expansion;
- encroachment into ecologically sensitive areas;
- blockage of wildlife movement corridors;
- degradation of grazing systems;
- and increased pressure on natural resources within the wider Marsabit ecosystem.

Stakeholder consultations further emphasized the need for future spatial planning frameworks capable of balancing settlement development needs with ecological conservation objectives, particularly in areas intersecting wildlife corridors and environmentally sensitive landscapes.

The presence of roads and public facilities has encouraged increasing population concentration and physical expansion of settlement areas over time. In some locations, land use change has resulted in gradual reduction of open grazing areas and increased pressure on natural resources within the surrounding landscape.

The dominant land use system within the wider project area remains pastoralism, with communal grazing continuing to occupy significant portions of the surrounding landscape. However, increased sedentarization and infrastructure development have introduced more permanent land use characteristics within the settlement zones. The transition toward permanent settlement systems has also increased demand for:

- land administration;

- spatial planning;
- infrastructure development;
- public service delivery;
- and environmental management.

The current land tenure situation presents a legal and administrative inconsistency whereby areas occupied by permanent settlements and public infrastructure remain legally categorized as protected land under the Marsabit National Reserve. This situation has limited formal land administration processes and constrained long-term planning and investment within the affected settlements.

Stakeholder consultations indicated that local communities strongly support the proposed excision process as a mechanism for improving tenure security, supporting infrastructure development, enhancing service delivery, and reducing uncertainty associated with settlement within a protected area. Community members further expressed the need for future land use planning frameworks to ensure orderly settlement development while safeguarding environmentally sensitive areas and wildlife movement corridors.

Figure 6-15: Key Land Tenure Characteristics within the Project Area

PARAMETER	DESCRIPTION
Current Legal Status	Part of Marsabit National Reserve
Existing Occupation System	Long-term Community Settlement
Dominant Tenure Practice	Customary Communal Land Management
Main Land Use Activity	Pastoralism and Settlement
Key Land Use Change Driver	Settlement Expansion and Infrastructure Development
Major Land Management Challenge	Overlap between Protected Area Status and Settlement Use

The proposed excision is expected to formally align the legal land status with existing land use realities on the ground while supporting improved land governance, settlement planning, infrastructure development, and socio-economic stability within the affected communities. However, future land use planning and environmental management will remain critical to prevent uncontrolled settlement expansion, encroachment into ecologically sensitive areas, and increased pressure on natural resources within the wider Marsabit ecosystem.

6.6 EDUCATION FACILITIES

Education infrastructure within the proposed excision areas forms an important component of the existing social development framework and reflects the long-term permanence of settlement within Karare II, Kamboe, Kambinye, and Parkishon areas. The settlements host a number of educational institutions including Early Childhood Development Education (ECDE) centres, primary schools, secondary schools, religious learning centres, and community-supported educational facilities serving both resident populations and surrounding pastoral communities.

The existence and gradual expansion of educational infrastructure within the project area demonstrates increasing community investment in formal education despite the legal and administrative limitations associated with the area's classification as part of the Marsabit National Reserve. Community consultations established that education is increasingly viewed as an important pathway towards poverty reduction, improved employment opportunities, social mobility, and long-term socio-economic transformation within the wider Marsabit region.

6.6.1 DISTRIBUTION OF EDUCATIONAL INSTITUTIONS

Field surveys and stakeholder consultations established that educational facilities within the proposed excision areas are distributed across the major settlement centres, with relatively larger and more developed institutions occurring within Karare II and Parkishon due to higher settlement concentration and population density. The educational institutions identified during the assessment include public primary schools, secondary schools, ECDE facilities, and privately supported learning centres.

The main educational institutions identified within the project area include Karare Primary School, Hula-Hula Primary School, Parkishon Primary School, Kamboe Primary School, Karare Mixed Day Secondary School, Bisha Covalero Girls Secondary School, and Murlo Primary School in Kambinye area. In addition, the area hosts specialized educational support facilities such as the AIC Karare Compassion Child Development Centre, which supports child education and welfare programmes within Karare settlement.

Table 6-7 presents the main educational institutions identified within the proposed excision areas.

Figure 6-16: Main Educational Institutions within the Proposed Excision Areas

SCHOOL NAME	LEVEL	CATEGORY	TYPE	LOCATION
Karare Primary School	Primary	Public	Day & Boarding	Karare
Hula-Hula Primary School	Primary	Public	Day	Karare
Parkishon Primary School	Primary	Public	Day	Parkishon
Kamboe Primary School	Primary	Public	Day	Kamboe
Karare Mixed Day Secondary School	Secondary	Public	Day	Karare
Bisha Covalero Girls Secondary School	Secondary	Private/Mission	Boarding (Girls)	Karare
AIC Karare Compassion Child Development Centre (CDC)	ECDE / Child Development	Church-based NGO	Support Centre & School	Karare
Murlo Primary School	Primary	Public	Day	Kambinye

These institutions provide educational services not only to residents within the excision areas but also to children from neighbouring grazing zones and remote pastoral settlements where access to formal education infrastructure remains limited. In some cases, pupils travel considerable distances on foot to access schools, particularly from sparsely populated grazing areas and dispersed settlement clusters.







Plate 6-2: Some of the Existing Educational Facilities within Karare II, Parkishon, Kambinye and Kamboe Areas

6.6.2 EXISTING EDUCATIONAL INFRASTRUCTURE CONDITIONS

The educational facilities within the project area generally consist of permanent and semi-permanent classroom blocks, administration offices, sanitation facilities, staff housing units, playgrounds, and limited supporting infrastructure. However, field observations established that the condition, adequacy, and quality of educational infrastructure vary considerably across the settlements.

Some schools have benefited from county government support, donor-funded initiatives, and community self-help programmes, while others continue to operate under constrained infrastructural conditions. Common challenges identified during field assessments include inadequate classroom space, shortage of desks and learning materials, limited laboratory and library facilities, unreliable water supply, inadequate sanitation infrastructure, and insufficient teacher housing facilities.

In some schools, overcrowding within classrooms was observed due to increasing settlement populations and rising school enrolment levels. A number of institutions continue to rely on temporary learning structures constructed using locally available materials because of inadequate funding for permanent infrastructure expansion.

6.6.3 ACCESS TO EDUCATION AND ENROLMENT TRENDS

Field consultations conducted with education stakeholders within the proposed excision areas provided important insights into the current condition of educational infrastructure, enrolment trends, staffing levels, and challenges affecting the education sector. Key informant interviews

undertaken at Kamboe Primary and Junior School established that the institution has been operational for approximately seven years and currently serves both boys and girls within the surrounding settlements and pastoral communities.

The school was reported to have approximately nine teachers serving a total student population of about 301 learners, comprising approximately 192 female students and 109 male students. The institution further operates a boarding wing that supports learners from distant pastoral areas where access to daily transport and educational facilities remains limited. School attendance and completion rates were reported to be relatively high, with attendance levels estimated at approximately 97% for male learners and 96% for female learners, while completion rates were estimated at approximately 99% for boys and 90% for girls.

Field observations established that the educational facilities within the project area generally comprise permanent and semi-permanent classroom blocks, administration offices, sanitation facilities, staff housing units, playgrounds, and limited support infrastructure. However, the adequacy and condition of infrastructure vary significantly across the settlements. Some institutions have benefited from county government support, donor-funded programmes, and community self-help initiatives, while others continue to experience infrastructural limitations associated with inadequate funding and limited investment.

Stakeholder consultations further established that one of the major infrastructural challenges affecting schools within the area is inadequate water supply. At Kamboe Primary and Junior School, school management identified shortage of water caused by faulty pipeline systems as one of the major operational challenges affecting both learners and staff. Limited sanitation facilities, inadequate classroom space, insufficient learning materials, and shortage of teaching staff were also identified as recurring challenges affecting educational service delivery within parts of the proposed excision areas.

Despite the infrastructural challenges, consultations revealed that schools within the project area continue to play an important role in promoting educational development, social cohesion, and long-term socio-economic transformation within the settlements. School administrators indicated that the institutions currently offer a range of subjects aligned with the national curriculum including Mathematics, English, Kiswahili, Science, Agriculture, Christian Religious Education (CRE), and Social Studies.



Plate 6-3: Existing Classroom and School Infrastructure Conditions within the Proposed Excision Areas

Stakeholders further noted that learners generally perform well in Agriculture and Social Studies, while Mathematics and English remain relatively challenging subjects for many students. The respondents attributed some of the educational barriers within the area to poverty, illiteracy among some parents, and limited household income levels, particularly among vulnerable pastoral households. School administrators also observed that boys generally achieve slightly higher performance levels than girls due to domestic responsibilities that occasionally affect attendance and study time for female learners.

Community consultations further established that educational aspirations among learners within the proposed excision areas continue to improve, with many students expressing interest in pursuing higher education and professional careers. The respondents indicated that approximately 33 learners had recently progressed to Grade 10 in Kamboe Primary School while common career aspirations among students included medical-related professions and other skilled occupations.

Religious studies and moral education programmes were also identified as important components supporting discipline, social values, and behavioural development among learners.

The education stakeholders interviewed during the assessment strongly supported the proposed excision process and indicated that formalization of land tenure and settlement status would significantly improve opportunities for expansion of educational infrastructure, increased government investment, staffing improvement, and long-term educational planning within the settlements. School administrators further emphasized the need for improved water infrastructure, additional classrooms, enhanced sanitation facilities, teacher recruitment, and increased support for boarding facilities to accommodate the growing student population within the proposed excision areas.

6.6.4 CHALLENGES AFFECTING EDUCATIONAL DEVELOPMENT

The education sector within the proposed excision areas continues to face several institutional, infrastructural, and socio-economic challenges affecting both access and quality of education. Key challenges identified during field assessments include:

- inadequate educational infrastructure;
- shortage of teachers;
- limited boarding facilities;
- inadequate water and sanitation infrastructure;
- insufficient learning materials;
- long travel distances to schools;
- and limited access to electricity and digital learning facilities.

The harsh climatic conditions within the region, including prolonged drought periods, dust exposure, and high temperatures, further affect learning conditions and maintenance of educational infrastructure.

The unresolved legal status of the project area as part of the Marsabit National Reserve also continues to constrain formal investment in educational infrastructure development. Stakeholder consultations established that the protected area designation has historically limited long-term government investment, school expansion, and integration of the settlements into official county spatial planning and development frameworks.

6.7 HEALTH INFRASTRUCTURE

Health infrastructure within the proposed excision areas forms an important component of the existing social service framework supporting the resident population across Karare II, Kamboe, Kambinye, and Parkishon settlements. The project area hosts a number of health facilities providing basic medical services to local communities and surrounding pastoral populations. These facilities include health centres, dispensaries, community health units, maternal and child healthcare services, immunization programmes, and community-based health outreach initiatives.

The presence of health infrastructure within the proposed excision areas reflects the long-term permanence of settlement within the landscape and demonstrates increasing demand for public health services associated with population growth, settlement expansion, and socio-economic transformation. Despite the existence of these facilities, the health sector within the area continues to face infrastructural, staffing, logistical, and resource-related challenges that affect the quality and accessibility of healthcare services.

6.7.1 DISTRIBUTION OF HEALTH FACILITIES

Field surveys and stakeholder consultations established that health facilities within the proposed excision areas are concentrated within the larger settlement centres where population density and accessibility are relatively higher. The main health facilities identified during the assessment include Karare Health Centre, Parkishon Community Health Unit (CHU), Kamboe Dispensary, and smaller community-supported health service points distributed across the settlements.

Karare Health Centre serves as one of the major healthcare facilities within the project area and provides outpatient services, maternal and child healthcare, immunization services, minor emergency care, and treatment for common illnesses affecting the local population. Parkishon Community Health Unit and Kamboe Dispensary similarly provide primary healthcare services to surrounding communities, particularly within the pastoral settlements where access to larger medical facilities remains limited.

In addition to the formal health facilities, community health volunteers (CHVs) and outreach health programmes play an important role in supporting healthcare delivery, awareness creation, disease surveillance, maternal healthcare, and immunization campaigns within the more remote and dispersed pastoral settlements.



Plate 6-4: Existing Health Facilities within Karare II, Parkishon and Kamboe Areas

6.7.2 EXISTING HEALTH INFRASTRUCTURE CONDITIONS

Field observations established that most health facilities within the proposed excision areas consist of permanent and semi-permanent buildings accommodating consultation rooms, maternity sections, immunization units, outpatient treatment areas, drug storage facilities, waiting areas, and limited administrative offices. However, the adequacy and condition of healthcare infrastructure varies significantly across the settlements.

Some facilities have benefited from support by county government programmes, donor-funded interventions, NGOs, and faith-based organizations, while others continue to operate under constrained infrastructural conditions. Common challenges identified during field assessments include inadequate medical equipment, insufficient drug supplies, unreliable water supply, limited electricity access, inadequate staffing levels, insufficient maternity facilities, and shortage of specialized healthcare personnel.

Stakeholder consultations further established that some facilities experience overcrowding due to increasing population growth and expanding settlement coverage within the proposed excision areas. In remote pastoral sections of the landscape, long travel distances to healthcare facilities continue to limit timely access to medical services, particularly for vulnerable populations such as pregnant women, children, and the elderly.



Plate 6-5: Existing Healthcare Infrastructure and Service Delivery Conditions within the Proposed Excision Areas

6.7.3 MATERNAL, CHILD AND ADOLESCENT HEALTH INDICATORS

The proposed excision areas collectively support an estimated population of approximately 9,520 persons distributed across Kamboe, Karare II, Kambinye, and Parkishon settlements. Official settlement records indicate that Kamboe hosts the largest population with approximately 3,205 persons, followed by Karare II with approximately 2,334 persons, Kambinye with approximately 2,062 persons, and Parkishon with approximately 1,919 persons. These demographic patterns demonstrate the existence of substantial and well-established settlement populations within the proposed excision areas.

Baseline healthcare records collected during field assessments further indicate the presence of a relatively young and rapidly growing population structure characterized by significant maternal, child, and adolescent population groups requiring continuous healthcare support services.

Within Kamboe area, healthcare baseline indicators recorded approximately 430 women aged between 15–49 years, 68 pregnant women, 30 children aged between 0–6 months, 46 children below one year, 320 children aged between 0–59 months, 100 adolescent girls aged between 10–19 years, and 51 adolescent boys within the same age category. Similarly, Parkishon area recorded approximately 247 women aged between 15–49 years, 41 pregnant women, 35 children aged between 0–6 months, 52 children below one year, 212 children aged between 0–59 months, 73 adolescent girls aged between 10–19 years, and 177 adolescent boys within the same age category.

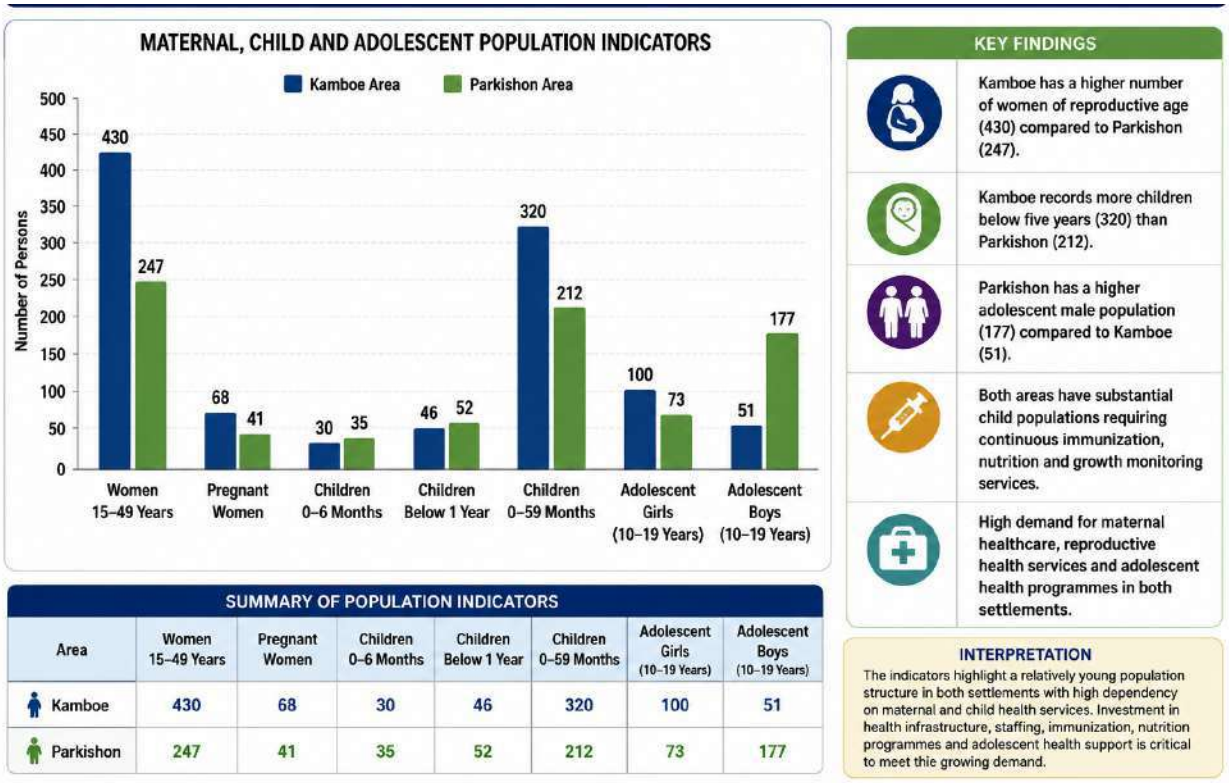


Figure 6-17: Maternal, Child and Adolescent Population Statistics within Kamboe and Parkishon Areas

The relatively high number of women within reproductive age categories further indicates increasing pressure on antenatal, postnatal, maternity, and reproductive healthcare services within the proposed excision areas. The data therefore demonstrates that healthcare infrastructure within the settlements serves populations with substantial maternal and child healthcare requirements.

The demographic indicators reveal that children below five years constitute a significant proportion of the population within both settlements, demonstrating increasing demand for maternal healthcare services, immunization programmes, nutritional support interventions, reproductive healthcare, sanitation and hygiene programmes, and child growth monitoring systems.

The baseline indicators additionally reveal disparities in sanitation and preventive healthcare conditions between the settlements. Within Kamboe area, only approximately 36 households were reported to possess functional latrines, while household handwashing facilities remained limited. In contrast, Parkishon area demonstrated relatively improved hygiene indicators, including approximately 172 households with handwashing facilities and relatively improved uptake of preventive healthcare interventions.

Table 6-1: Summary of Key Maternal and Child Health Indicators within the Proposed Excision Areas

INDICATOR	KAMBOE	PARKISHON
Estimated Settlement Population	3,205	1,919
Women Aged 15–49 Years	430	247
Pregnant Women	68	41
Children 0–6 Months	30	35
Children Below 1 Year	46	52
Children 0–59 Months	320	212
Adolescent Girls (10–19 Years)	100	73
Adolescent Boys (10–19 Years)	51	177
Households with Functional Latrines	36	-
Households with Handwashing Facilities	0	172
Children Fully Immunized	60	35

The collected demographic and healthcare indicators demonstrate increasing pressure on existing healthcare infrastructure and highlight the need for continued investment in maternal and child healthcare services, sanitation infrastructure, healthcare staffing, immunization programmes, water supply systems, and disease prevention interventions within the proposed excision areas.

6.7.4 ANALYSIS OF HEALTHCARE SERVICE DEMAND

The demographic indicators collected during the assessment reveal that maternal and child healthcare services represent one of the most critical healthcare needs within the proposed excision areas. The relatively high number of children below five years and women within reproductive age categories demonstrates increasing pressure on existing healthcare infrastructure and personnel.

Healthcare facilities within the settlements are therefore required to support antenatal and postnatal care services, immunization programmes, child growth monitoring, nutritional assessments, reproductive healthcare, treatment of common childhood illnesses, and community health outreach programmes.

The observed population structure further suggests that demand for healthcare services is likely to continue increasing as settlement expansion and population growth intensify within the excision areas. Without corresponding expansion of healthcare infrastructure, staffing levels, sanitation

systems, and medical supply capacity, the existing facilities may experience increasing operational pressure and reduced service efficiency over time.

Field consultations additionally established that inadequate staffing levels, water shortages, limited sanitation infrastructure, insufficient medical supplies, and limited healthcare equipment remain important operational challenges affecting healthcare service delivery within portions of the project area.

6.7.5 INFLUENCE OF LAND TENURE STATUS ON HEALTH INFRASTRUCTURE DEVELOPMENT

The unresolved legal status of the proposed excision areas as part of the Marsabit National Reserve continues to constrain long-term healthcare infrastructure planning and investment within the settlements. Stakeholder consultations established that the protected area designation has historically limited formal public investment in health facility expansion, allocation of development funds, staffing improvement, and implementation of large-scale healthcare infrastructure projects.

Consequently, many healthcare interventions within the project area have relied heavily on county government support, NGOs, donor-funded programmes, faith-based organizations, and community self-help initiatives rather than structured long-term government investment frameworks.

Community members expressed the view that the proposed excision process would significantly improve opportunities for healthcare infrastructure expansion, improved staffing, increased medical supplies, enhanced water and sanitation systems, and better integration of the settlements into official county health planning frameworks.

6.7.6 COMMUNITY PERSPECTIVES ON HEALTHCARE DEVELOPMENT

Community consultations revealed strong support for continued improvement and expansion of healthcare services within the proposed excision areas. Residents emphasized the importance of strengthening maternal healthcare services, improving water supply systems, increasing healthcare staffing levels, expanding facility infrastructure, and enhancing access to emergency medical services within the settlements.

Stakeholders further recommended increased investment in maternity and child healthcare facilities, sanitation infrastructure, medical equipment and drug supplies, community health outreach

programmes, ambulance and emergency response services, and adolescent reproductive health programmes.

Health infrastructure remains a critical social service component within the proposed excision areas and is expected to play an important role in supporting long-term socio-economic wellbeing, community resilience, and sustainable settlement development within the wider Marsabit ecosystem.

6.8 WATER SUPPLY AND SANITATION

Water, sanitation, and hygiene conditions within the proposed excision areas remain relatively constrained despite ongoing efforts by communities, county government agencies, NGOs, and donor-supported programmes. Access to water is primarily supported through boreholes, water kiosks, water pans, and community-managed supply systems distributed across the settlements.

However, field investigations established that water supply remains insufficient relative to increasing population and livestock demand, particularly during prolonged dry periods. Some healthcare facilities reported operational challenges associated with unreliable water supply systems, which affect sanitation management, healthcare delivery, and maintenance of hygienic conditions within the facilities.

Sanitation infrastructure within the settlements remains relatively underdeveloped, with many households relying on basic pit latrines and informal waste disposal practices. The absence of organized sewerage systems and structured solid waste management frameworks presents potential public health and environmental concerns within the growing settlement centres.

The healthcare baseline indicators further demonstrated disparities in sanitation infrastructure between the settlements, with some areas reporting limited household access to functional latrines and handwashing facilities. These conditions increase vulnerability to waterborne diseases, sanitation-related illnesses, and communicable disease outbreaks, particularly among children and vulnerable populations.

6.8.1 SOURCES OF WATER SUPPLY

Field assessments established that groundwater extracted through boreholes represents the primary source of water for most settlements within the proposed excision areas. Community boreholes,

water kiosks, storage tanks, shallow wells, and water trucking systems provide the main domestic water supply for households, schools, healthcare facilities, administrative centres, and commercial establishments.

Water pans and seasonal surface runoff harvesting structures also provide supplementary water sources during rainy seasons, particularly for livestock watering and limited domestic use. However, many of these sources are seasonal and experience significant reduction in water availability during prolonged dry periods.

Within the larger settlement centres such as Karare II and Kamboe, some localized piped water distribution systems and community-managed water supply schemes were observed. However, stakeholder consultations established that many of these systems experience operational challenges associated with:

- inadequate infrastructure capacity;
- frequent pipeline breakdowns;
- unreliable pumping systems;
- high operational costs;
- and increasing population demand.

6.8.2 WATER ACCESSIBILITY AND RELIABILITY

Access to reliable water supply remains one of the major socio-economic and public health challenges affecting the proposed excision areas. Community consultations indicated that water availability varies considerably across the settlements depending on proximity to boreholes, storage facilities, and distribution infrastructure.

During prolonged drought periods, water shortages become more severe as demand increases while water availability declines. In some settlements, households and livestock owners are forced to travel considerable distances in search of water, particularly within remote grazing zones and dispersed pastoral settlements.

Field investigations further established that institutions such as schools and healthcare facilities occasionally experience operational difficulties associated with inadequate and unreliable water supply systems. Stakeholders reported that faulty pipelines, inadequate storage infrastructure, and

limited water distribution coverage continue to affect service delivery and sanitation management within some institutions.

The increasing settlement population within the proposed excision areas is also contributing to rising pressure on existing water infrastructure and groundwater resources. Without corresponding investment in water supply expansion and infrastructure improvement, future demand is likely to exceed the capacity of the existing systems.

6.8.3 WATER QUALITY AND PUBLIC HEALTH CONCERNS

Although borehole water remains the dominant source of domestic water supply within the project area, concerns regarding water quality, treatment, and safety were raised during stakeholder consultations. In some areas, communities reported challenges associated with:

- water salinity;
- turbidity during rainy seasons;
- inadequate treatment systems;
- and contamination risks linked to poor sanitation conditions.

Table 6-2: Summary of Water Supply and Sanitation Characteristics within the Proposed Excision Areas

PARAMETER	OBSERVED CONDITION
Main Water Source	Boreholes and community water supply systems
Supplementary Sources	Water pans, shallow wells and seasonal runoff
Water Reliability	Variable and seasonally constrained
Main Water Challenges	Shortages, pipeline failures and increasing demand
Sanitation Coverage	Relatively limited in some settlements
Main Sanitation System	Pit latrines
Key Public Health Risk	Waterborne and sanitation-related diseases

Limited water treatment infrastructure and inadequate household-level water purification practices may increase vulnerability to waterborne diseases within sections of the settlements. The combination of unreliable water supply, inadequate sanitation infrastructure, and limited hygiene facilities presents potential public health risks, particularly among children and vulnerable populations.

The health baseline indicators collected during the assessment further demonstrated the importance of improving sanitation and hygiene conditions within the settlements. In some areas, household

access to functional latrines and handwashing facilities remained limited, increasing exposure to sanitation-related illnesses and communicable diseases.

6.8.4 SANITATION INFRASTRUCTURE AND HYGIENE CONDITIONS

Sanitation infrastructure within the proposed excision areas remains relatively basic and unevenly distributed across the settlements. Most households rely on traditional pit latrines for sanitation, while some remote pastoral households continue to practice open defecation due to limited sanitation facilities and dispersed settlement patterns.

The absence of organized sewerage systems and structured solid waste management infrastructure presents potential environmental and public health concerns within the growing settlement centres. Inadequate drainage systems, poor waste disposal practices, and limited sanitation awareness further contribute to localized environmental health risks within portions of the project area.

Field assessments established that sanitation conditions vary considerably between settlements. Some areas demonstrated relatively improved household hygiene practices and presence of handwashing facilities, while others exhibited limited sanitation infrastructure coverage and inadequate hygiene support facilities.

Schools and healthcare facilities were also observed to experience sanitation-related challenges including:

- inadequate latrine coverage;
- insufficient water supply for hygiene purposes;
- limited waste disposal infrastructure;
- and inadequate gender-sensitive sanitation facilities.

These conditions may affect institutional operations, public health outcomes, and educational attendance, particularly among girls and younger children.



Figure 6-18: Existing Water and Sanitation Conditions within the Proposed Excision Areas

6.8.5 INFLUENCE OF CLIMATE VARIABILITY ON WATER SUPPLY

The proposed excision areas fall within an arid and semi-arid climatic zone characterized by low and highly variable rainfall patterns, prolonged dry seasons, and recurrent drought conditions. Climatic variability therefore plays a major role in influencing water availability, groundwater recharge, pasture conditions, and overall water security within the settlements.

During drought periods, pressure on boreholes and water supply systems increases substantially due to rising domestic and livestock water demand. Water shortages during these periods often contribute to increased operational costs, competition over water resources, and reduced reliability of community water supply systems.

Climate variability is also expected to continue affecting long-term water security within the project area, particularly in the context of increasing settlement expansion, population growth, and changing land use patterns. Sustainable water resource planning and climate-resilient infrastructure development will therefore remain important for long-term settlement sustainability within the proposed excision areas.

6.8.6 INFLUENCE OF LAND TENURE STATUS ON WATER AND SANITATION DEVELOPMENT

The unresolved legal status of the proposed excision areas as part of the Marsabit National Reserve continues to constrain long-term investment in water supply and sanitation infrastructure development within the settlements. Stakeholder consultations established that the protected area

designation has historically limited formal government investment in large-scale water infrastructure expansion, sanitation improvement projects, and integrated settlement planning.

As a result, many existing water and sanitation initiatives within the project area have relied heavily on community self-help efforts, NGO support, donor-funded interventions, and localized county government programmes rather than structured long-term infrastructure investment frameworks.

Community members indicated that the proposed excision process would improve opportunities for:

- expansion of water supply infrastructure;
- improved sanitation planning;
- enhanced drainage systems;
- increased public investment;
- and integration of the settlements into formal county water and sanitation development frameworks.

6.9 ROADS AND ACCESSIBILITY

Road infrastructure and accessibility within the proposed excision areas play a critical role in supporting settlement connectivity, socio-economic activities, public service delivery, livestock mobility, trade, and access to social infrastructure within the wider Marsabit region. The proposed excision areas of Karare II, Kamboe, Kambinye, and Parkishon are primarily accessed through the Isiolo–Moyale Highway (A2), which serves as the principal transport corridor traversing the project area and connecting the settlements to Marsabit Town and other regional centres.

In addition to the A2 highway, the project area is served by a network of secondary access roads, earth tracks, seasonal roads, livestock routes, and informal footpaths that facilitate movement between settlements, grazing areas, markets, schools, healthcare facilities, water points, and administrative centres. These access routes form an important component of the local transport and mobility system supporting both human and livestock movement within the predominantly pastoral landscape.

Despite the existence of the main highway corridor, road infrastructure within portions of the proposed excision areas remains relatively underdeveloped, with many secondary roads and access tracks experiencing poor conditions, limited maintenance, and seasonal accessibility challenges.

6.9.1 MAIN TRANSPORT CORRIDORS

The Isiolo–Moyale Highway (A2) represents the most important transport infrastructure within the project area and serves as the primary regional connectivity corridor linking the settlements to Marsabit Town, Isiolo, Moyale, and other national transport networks. The highway has significantly improved accessibility within the area and contributed to increasing settlement concentration, trade activities, service delivery, and socio-economic development along the corridor.

The presence of the highway has also influenced settlement growth patterns within Karare II and Kamboe areas, where residential development, commercial activities, institutions, and transport-related services have increasingly concentrated near the road corridor due to improved accessibility and connectivity.

Secondary access roads branching from the highway further connect the main settlements to grazing areas, remote villages, administrative facilities, schools, healthcare centres, and water points distributed within the wider landscape.

FIGURE 6-14: MAIN ROAD NETWORK AND ACCESSIBILITY WITHIN THE PROPOSED EXCISION AREAS

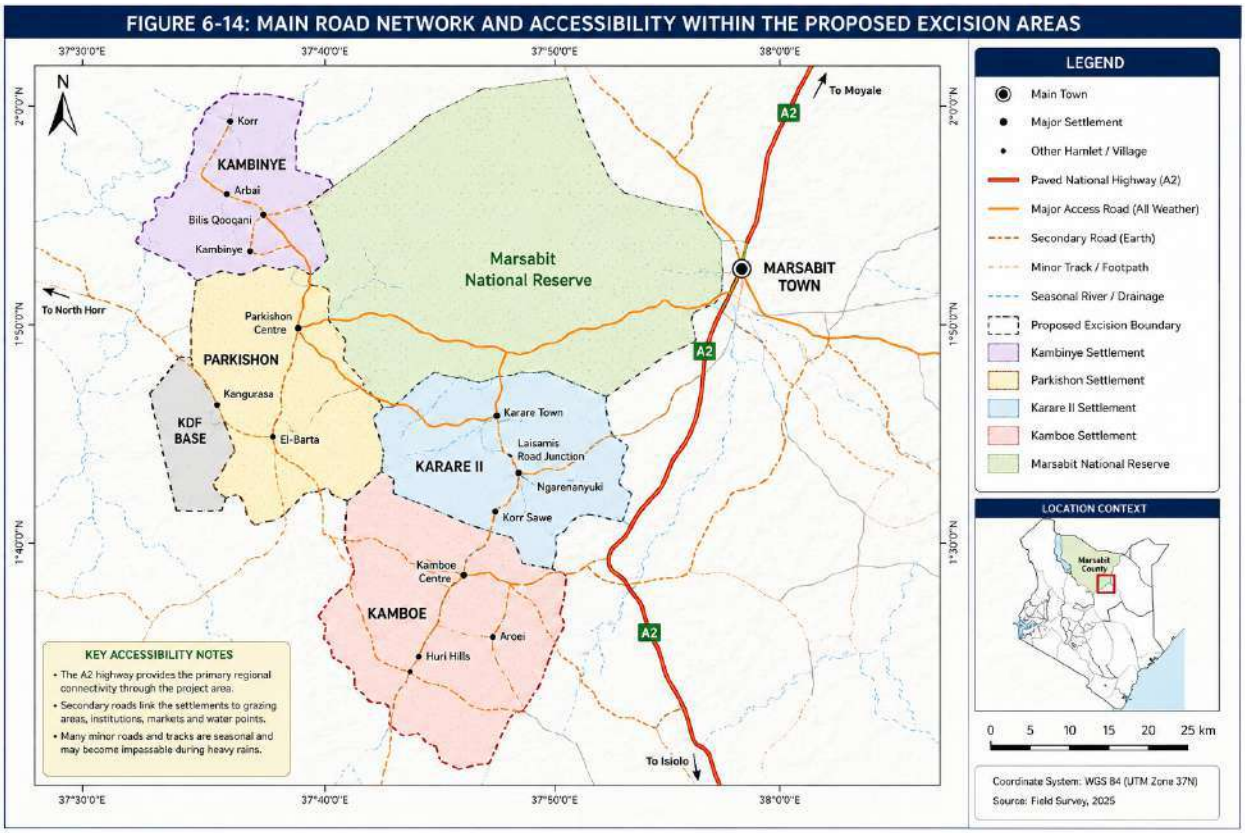


Figure 6-19: Main Road Network and Accessibility within the Proposed Excision Areas

6.9.2 EXISTING ROAD CONDITIONS

Field observations established that road conditions within the proposed excision areas vary considerably depending on road classification, maintenance levels, terrain conditions, and seasonal weather patterns. The A2 highway remains the most reliable all-weather road within the area and provides relatively efficient transport connectivity throughout the year.

However, many secondary roads and feeder tracks within the settlements are unpaved earth roads characterized by:

- poor surface conditions;
- erosion features;
- dust generation during dry periods;
- inadequate drainage systems;
- and occasional seasonal inaccessibility during heavy rainfall events.

Some sections of the access roads were observed to experience deterioration due to surface runoff, inadequate maintenance, increased vehicle movement, and harsh climatic conditions. Seasonal drainage crossings and low-lying sections of earth roads become particularly difficult to access during rainy periods, limiting mobility and transport reliability within portions of the project area.



Plate 6-6: Existing Road Conditions and Access Tracks within the Proposed Excision Areas

6.9.3 6.9.4 ACCESSIBILITY TO SOCIAL AND ECONOMIC SERVICES

Road infrastructure within the project area plays an important role in facilitating access to social and economic services including schools, healthcare facilities, markets, administrative centres, water

supply infrastructure, and security installations. Improved accessibility along the highway corridor has contributed significantly to expansion of trade activities, increased institutional development, and improved movement of people and goods within the settlements.

Community consultations established that accessibility to healthcare facilities and schools remains relatively better within settlements located near the highway corridor compared to more remote pastoral areas where transport infrastructure remains limited. In some remote grazing zones, communities continue to experience difficulties accessing essential services during periods of poor weather conditions or prolonged drought.

Transport accessibility also remains important for livestock mobility, livestock marketing, emergency response services, water supply operations, and distribution of humanitarian and development support programmes within the settlements.

6.9.4 INFLUENCE OF ROADS ON SETTLEMENT EXPANSION AND LAND USE CHANGE

The improvement of regional transport connectivity through the A2 highway has significantly influenced settlement growth and land use transformation within the proposed excision areas. Field assessments established that many settlements have gradually expanded along road corridors due to improved accessibility, increased commercial opportunities, and concentration of social infrastructure near transport routes.

Karare II and Kamboe areas in particular exhibit relatively higher settlement concentration and commercial activity along the highway corridor compared to more remote settlement zones. Road accessibility has therefore contributed to gradual transformation of portions of the landscape from predominantly open grazing systems towards mixed settlement and socio-economic development zones.

While improved road infrastructure has enhanced connectivity and socio-economic opportunities, increasing settlement concentration along transport corridors may also contribute to:

- expansion of built-up areas;
- increased pressure on natural resources;
- habitat fragmentation;
- dust pollution;

- and increased human-wildlife interactions within sections of the landscape if not properly planned and managed.

6.9.5 TRANSPORT CHALLENGES WITHIN THE PROJECT AREA

Despite the importance of road infrastructure within the proposed excision areas, several transport and accessibility challenges continue to affect local communities. The most commonly reported challenges during stakeholder consultations included:

- poor condition of feeder roads;
- inadequate maintenance of access tracks;
- seasonal inaccessibility during heavy rainfall;
- dust generation along earth roads;
- inadequate drainage structures;
- and limited transport services within remote pastoral settlements.



Plate 6-7: Accessibility Challenges and Seasonal Road Conditions within the Proposed Excision Areas

The harsh climatic conditions within the region further accelerate road deterioration, particularly on unpaved sections exposed to runoff erosion and prolonged dry conditions. In some areas, road accessibility challenges affect timely access to healthcare services, school attendance, water supply operations, livestock transport, and emergency response activities.

Stakeholders further emphasized the need for improvement and maintenance of secondary roads, installation of drainage structures, rehabilitation of eroded sections, and upgrading of critical access routes connecting remote settlements to the main highway corridor.

6.9.6 INFLUENCE OF LAND TENURE STATUS ON ROAD INFRASTRUCTURE DEVELOPMENT

The unresolved legal status of the proposed excision areas as part of the Marsabit National Reserve has historically constrained long-term infrastructure planning and investment within portions of the project area. Stakeholder consultations established that the protected area designation has limited formal government investment in road upgrading, settlement infrastructure expansion, and integrated transport planning within the settlements.

Consequently, many access roads and transport improvements within the project area have relied on limited county government interventions, community initiatives, donor-supported programmes, and periodic maintenance efforts rather than structured long-term infrastructure investment frameworks.

Community members indicated that the proposed excision process would improve opportunities for:

- road upgrading and maintenance;
- improved settlement accessibility;
- expansion of transport infrastructure;
- increased government investment;
- and integration of the settlements into formal county infrastructure development plans.

6.9.7 COMMUNITY PERSPECTIVES ON ROADS AND ACCESSIBILITY

Community consultations revealed strong support for improvement of road infrastructure and transport accessibility within the proposed excision areas. Residents emphasized the importance of upgrading feeder roads, improving drainage systems, rehabilitating eroded road sections, and strengthening accessibility to schools, healthcare facilities, markets, and water infrastructure.

Stakeholders further indicated that improved transport infrastructure would support:

- socio-economic development;

- emergency response services;
- livestock trade;
- educational accessibility;
- healthcare access;
- and overall settlement integration within the wider Marsabit region.

The roads and accessibility infrastructure remain critical components of the socio-economic and spatial development framework within the proposed excision areas and will continue to play an important role in supporting settlement growth, service delivery, livelihood systems, and regional connectivity within the wider Marsabit ecosystem.

6.10 SECURITY AND ADMINISTRATIVE INFRASTRUCTURE

Security and administrative infrastructure within the proposed excision areas forms an important component of the institutional framework supporting governance, public administration, conflict management, law enforcement, and delivery of government services within Karare II, Kamboe, Kambinye, and Parkishon settlements. The presence of administrative and security facilities within the project area reflects the long-standing nature of settlement and demonstrates the progressive establishment of formal governance structures within the landscape despite the area's legal status as part of the Marsabit National Reserve.

The proposed excision areas host several government administrative offices, local leadership structures, community policing units, and security installations that facilitate coordination of public services, maintenance of law and order, resource conflict management, and community mobilization. These institutions play a particularly important role within the predominantly pastoral environment where competition over natural resources, livestock mobility, drought conditions, and inter-community interactions occasionally create security and governance challenges.

6.10.1 EXISTING ADMINISTRATIVE INFRASTRUCTURE

Field surveys and stakeholder consultations established that the proposed excision areas contain several local administrative facilities including chiefs' offices, assistant chiefs' offices, village administration centres, and community meeting areas used for public engagement, coordination of government programmes, and dispute resolution activities.

Karare II serves as one of the main administrative centres within the project area due to its relatively larger population concentration and strategic location along the Isiolo–Moyale highway corridor. Administrative facilities within the settlements support implementation of government programmes, coordination of development activities, mobilization of communities during public participation processes, and management of local governance matters.

Community consultations established that local administration structures remain important in:

- conflict mediation;
- coordination of drought response interventions;
- community mobilization;
- disaster response;
- land-related dispute resolution;
- and dissemination of government information within the settlements.

Village elders, community leaders, and traditional governance systems also continue to play an important complementary role in supporting local administration, particularly within pastoral communities where customary systems remain influential in community decision-making processes.



Plate 6-8: Existing Administrative Facilities within the Proposed Excision Areas

6.10.2 SECURITY INFRASTRUCTURE AND LAW ENFORCEMENT

Security infrastructure within the proposed excision areas primarily consists of police posts, community policing units, local security offices, and informal community security coordination systems. Karare area hosts one of the key security installations within the project area and serves surrounding settlements through provision of basic law enforcement and security services.

Stakeholder consultations established that security agencies within the area support:

- maintenance of law and order;
- conflict prevention and management;
- livestock theft control;
- management of inter-community disputes;
- protection of public institutions;
- and coordination of emergency response activities.

Community policing initiatives were also reported to play an important role in supporting local security management and strengthening collaboration between communities and formal security institutions. Local security coordination structures involving chiefs, elders, youth representatives, and security officers were identified as important mechanisms for addressing localized disputes and promoting social cohesion within the settlements.

Despite the existence of security infrastructure, stakeholders indicated that some facilities continue to face operational challenges associated with:

- inadequate staffing levels;
- limited transport equipment;
- inadequate office infrastructure;
- communication constraints;
- and limited logistical support for patrol and emergency response operations.

6.10.3 SECURITY DYNAMICS WITHIN THE PROJECT AREA

The proposed excision areas occur within a predominantly pastoral and agro-pastoral landscape where mobility of livestock and communities remains an important component of local livelihood systems. As a result, resource competition associated with pasture availability, water access, drought conditions, and livestock movement occasionally contributes to localized conflicts and security

concerns. Stakeholder consultations established that the area generally remains relatively stable, although periodic tensions may arise due to:

- livestock theft;
- competition over grazing resources;
- boundary disputes;
- and movement of pastoral groups during drought periods.

The presence of administrative and security institutions therefore remains important in supporting peaceful coexistence, conflict management, and maintenance of social stability within the settlements. Community leaders further indicated that improved settlement formalization and infrastructure development associated with the proposed excision process could contribute positively towards strengthening governance systems and reducing land-related uncertainty within the area.

Field investigations established that accessibility constraints, poor feeder road conditions, and long travel distances continue to affect effective administration and security operations within portions of the project area, particularly within remote grazing zones and dispersed settlements.

Security and administrative personnel occasionally experience difficulties accessing remote sections of the landscape during rainy periods due to poor road conditions and seasonal inaccessibility. Limited transport infrastructure and communication systems further constrain emergency response capabilities, coordination of security operations, and delivery of administrative services within some areas.

Stakeholders additionally reported that increasing settlement populations and expanding socio-economic activities are gradually increasing pressure on existing administrative and security infrastructure within the settlements.

6.10.4 INFLUENCE OF LAND TENURE STATUS ON INSTITUTIONAL DEVELOPMENT

The unresolved legal status of the proposed excision areas as part of the Marsabit National Reserve has historically constrained long-term investment in administrative and security infrastructure development within the settlements. Stakeholder consultations established that the protected area designation has limited formal infrastructure expansion, institutional planning, and allocation of public development resources within portions of the project area.

Consequently, some administrative and security facilities continue to operate with limited infrastructure, staffing, and logistical capacity relative to the growing settlement populations and service demand. Community members indicated that the proposed excision process would improve opportunities for:

- expansion of administrative facilities;
- strengthening of security infrastructure;
- improved government service delivery;
- increased staffing levels;
- and integration of the settlements into formal county development and governance frameworks.

6.11 VULNERABLE GROUPS

The proposed excision areas of Karare II, Kamboe, Kambinye, and Parkishon host various vulnerable population groups whose socio-economic conditions are influenced by poverty, climatic variability, limited access to services, insecure land tenure, and dependence on pastoral livelihoods. The main vulnerable groups identified during field assessments and stakeholder consultations include women, children, elderly persons, persons living with disabilities, widows, orphaned children, and economically disadvantaged households.

6.11.1 WOMEN AND FEMALE-HEADED HOUSEHOLDS

Women within the project area play a central role in household management, childcare, water collection, livestock management, and small-scale trade activities that support household livelihoods and community welfare. In many households, women are primarily responsible for ensuring food preparation, caring for children and elderly family members, managing domestic water needs, and participating in informal income-generating activities such as sale of livestock products and petty trade. Despite their important socio-economic contributions, women continue to face several challenges associated with limited economic opportunities, inadequate access to land ownership and financial resources, heavy domestic responsibilities, and reduced participation in formal decision-making processes.

Women were also identified as being particularly vulnerable to the impacts of prolonged droughts and water shortages due to their primary role in household water collection and food security management. During drought periods, women often travel longer distances in search of water and household resources, increasing their physical and economic burden. Female-headed households were further identified as being especially vulnerable to economic hardship, food insecurity, and reduced livelihood resilience due to limited income opportunities, dependence on unstable pastoral production systems, and inadequate access to social and financial support mechanisms.



Plate 6-9: Women Participating in Community Activities within the Proposed Excision Areas

6.11.2 CHILDREN AND ADOLESCENTS

Children and adolescents constitute a significant proportion of the population within the proposed excision areas and remain vulnerable to malnutrition, limited healthcare access, inadequate sanitation, and disruptions in education associated with pastoral mobility and poverty. Adolescent

girls were specifically identified as vulnerable to early marriages, school dropout, and limited reproductive health awareness. Community consultations nevertheless indicated increasing support for formal education and youth development within the settlements.

6.11.3 ELDERLY PERSONS AND PERSONS LIVING WITH DISABILITIES

Elderly persons within the project area experience vulnerability associated with declining mobility, limited income opportunities, dependence on family support systems, and difficulties accessing healthcare and water supply services. Similarly, persons living with disabilities face challenges related to limited accessibility to infrastructure, educational facilities, healthcare services, and livelihood opportunities within the settlements.

6.11.4 ECONOMICALLY VULNERABLE HOUSEHOLDS

A significant proportion of households within the proposed excision areas also remain economically vulnerable due to recurrent drought conditions, livestock losses, limited livelihood diversification, and fluctuating pastoral production systems. During prolonged drought periods, vulnerable households experience increased food insecurity, water shortages, and reduced resilience to environmental and economic shocks.

6.11.5 INFLUENCE OF LAND TENURE STATUS ON VULNERABILITY

The unresolved legal status of the proposed excision areas as part of the Marsabit National Reserve has further contributed to social and economic vulnerability by limiting public investment, infrastructure development, and access to formal development programmes within the settlements. Community members expressed the view that the proposed excision process would improve livelihood security, access to public services, infrastructure development, and inclusion of vulnerable populations within future development planning.

Stakeholder consultations emphasized the need for targeted support programmes focusing on education, healthcare, water supply, sanitation infrastructure, youth empowerment, and livelihood diversification to strengthen resilience among vulnerable populations within the proposed excision areas. Community members further recommended improved inclusion of vulnerable groups within decision-making processes and future settlement planning initiatives.

The vulnerable groups remain an important component of the social baseline within the proposed excision areas and require consideration in future development planning, service delivery, and infrastructure improvement interventions to support equitable and sustainable socio-economic development within the settlements.

6.12 INDIGENOUS KNOWLEDGE AND CULTURAL HERITAGE

The proposed excision areas of Karare II, Kamboe, Kambinye, and Parkishon are inhabited predominantly by pastoral communities with strong cultural traditions, indigenous knowledge systems, and long-standing historical connections to the surrounding landscape. Indigenous knowledge remains an important component of local livelihood systems, natural resource management, conflict resolution, climate adaptation, and cultural identity within the wider Marsabit ecosystem.

Community consultations established that local communities possess extensive traditional knowledge relating to livestock management, seasonal grazing patterns, drought coping strategies, water resource identification, weather forecasting, and environmental conservation practices. These indigenous systems have historically enabled pastoral communities to survive within the arid and semi-arid environment characterized by recurrent droughts, limited water availability, and highly variable climatic conditions. This section has also been covered in detailed in the annexes.

6.12.1 TRADITIONAL PASTORAL KNOWLEDGE SYSTEMS

Pastoralism remains the dominant livelihood system within the proposed excision areas, and traditional knowledge continues to play an important role in livestock production and rangeland management. Local communities possess indigenous knowledge relating to seasonal livestock mobility, pasture selection, traditional grazing management systems, livestock health management, and identification of drought-resilient grazing areas.

Community elders and traditional leaders continue to guide decisions relating to grazing access, migration routes, livestock movement, and communal resource utilization. Traditional grazing systems historically supported sustainable utilization of pasture resources through seasonal mobility and communal management arrangements that minimized overgrazing within portions of the landscape.

Indigenous drought coping mechanisms such as herd diversification, temporary migration, livestock sharing systems, and traditional resource-sharing practices were also identified during stakeholder consultations as important resilience strategies within the pastoral communities.

6.12.2 TRADITIONAL ENVIRONMENTAL KNOWLEDGE

Community consultations established that local residents possess considerable indigenous environmental knowledge regarding seasonal weather patterns, drought indicators, water source locations, vegetation conditions, and ecological changes within the wider Marsabit landscape. Elders and experienced pastoralists traditionally rely on environmental observations such as vegetation response, animal behaviour, cloud patterns, wind direction, and seasonal changes to predict rainfall conditions and guide grazing decisions.

Traditional environmental knowledge also contributes to identification of:

- dry-season grazing areas;
- livestock migration routes;
- water access points;
- medicinal plants;
- and ecologically sensitive zones within the landscape.

Some community members further indicated that certain tree species, hills, seasonal watercourses, and grazing zones possess cultural and environmental significance within traditional pastoral systems.

6.12.3 CULTURAL HERITAGE AND COMMUNITY IDENTITY

The proposed excision areas contain important cultural landscapes associated with long-term pastoral occupation, settlement history, and traditional community identity. Community consultations established that the settlements host culturally significant spaces used for traditional meetings, conflict resolution, community gatherings, and cultural ceremonies.

Traditional leadership structures involving elders and clan representatives continue to play an important role in governance, social regulation, dispute resolution, and maintenance of community cohesion within the settlements. Indigenous cultural practices also contribute to social support systems, peacebuilding, and inter-community relations within the wider Marsabit region.

Although no major formally gazetted archaeological or historical heritage sites were identified during the field assessment, stakeholders emphasized the importance of preserving cultural identity, traditional knowledge systems, and socially significant cultural spaces during future settlement planning and development processes.

6.12.4 INDIGENOUS CONFLICT RESOLUTION MECHANISMS

Traditional conflict resolution systems remain important within the predominantly pastoral communities inhabiting the proposed excision areas. Elders and community leaders play a significant role in mediation of disputes related to grazing access, livestock movement, water resources, family matters, and inter-community relations.

These indigenous governance mechanisms complement formal administrative and security systems within the settlements and contribute significantly to maintenance of peace, social cohesion, and resource-sharing arrangements within the landscape.

Stakeholder consultations further indicated that traditional peacebuilding mechanisms remain particularly important during drought periods when competition over water and grazing resources intensifies within parts of the wider pastoral ecosystem.

6.12.5 6.THREATS TO INDIGENOUS KNOWLEDGE AND CULTURAL SYSTEMS

Community members expressed concern that gradual settlement transformation, changing livelihood systems, modernization, increasing formal education, and socio-economic changes are contributing to gradual erosion of some indigenous knowledge systems and traditional cultural practices within the settlements.

Younger generations were reported to be increasingly shifting towards modern livelihood aspirations and reduced dependence on traditional pastoral systems, potentially affecting intergenerational transfer of indigenous knowledge. Climate change, recurrent droughts, and increasing pressure on grazing lands were also identified as factors affecting traditional pastoral systems and associated cultural practices.

Stakeholders emphasized the importance of integrating indigenous knowledge into future environmental management, climate adaptation planning, and community development initiatives within the proposed excision areas.

6.13 HUMAN-WILDLIFE INTERACTIONS

The proposed excision areas of Karare II, Kamboe, Kambinye, and Parkishon occur within the broader Marsabit ecosystem, which supports a range of wildlife species associated with the Marsabit National Reserve and surrounding rangelands. Due to the close proximity between human settlements, grazing lands, wildlife habitats, and movement corridors, interactions between local communities and wildlife remain a significant socio-environmental issue within the project area.

Field assessments and stakeholder consultations established that human-wildlife interactions within the proposed excision areas are influenced by settlement expansion, livestock grazing patterns, water resource distribution, seasonal wildlife movement, and increasing overlap between human activities and wildlife habitats. Community members indicated that wildlife sightings remain relatively common within portions of the landscape, particularly near grazing areas, seasonal drainage systems, and ecological connectivity zones linking the reserve with surrounding rangelands.

The most commonly reported wildlife species within and around the project area include elephants, buffaloes, hyenas, baboons, monkeys, antelopes, warthogs, and smaller wild herbivores. Some wildlife species occasionally move through portions of the settlement landscape while accessing grazing areas, water sources, and migratory routes within the wider Marsabit ecosystem.

6.13.1 WILDLIFE MOVEMENT AND ECOLOGICAL CONNECTIVITY

The proposed excision areas form part of a wider landscape characterized by ecological connectivity between Marsabit National Reserve and surrounding grazing lands. Field observations and stakeholder consultations established that certain sections of the project area continue to support seasonal wildlife movement corridors and dispersal areas used by wildlife species moving between the reserve and adjacent rangelands.

Particular ecological sensitivity was identified within:

- wildlife movement corridors in Karare II;
- seasonal drainage systems;
- grazing dispersal areas;
- and ecological connectivity zones traversing portions of the landscape.

These ecological zones continue to provide important movement pathways for wildlife, particularly during dry periods when access to water and pasture resources becomes limited within parts of the ecosystem.

However, increasing settlement expansion, infrastructure development, and concentration of human activities within sections of the proposed excision areas are gradually altering portions of the landscape and narrowing some wildlife movement pathways. Community consultations indicated that wildlife movement patterns have reduced within some heavily settled areas due to increasing human presence and infrastructure development.



Plate 6-10: Wildlife Movement Corridors and Ecological Connectivity within the Proposed Excision Areas

6.13.2 HUMAN-WILDLIFE CONFLICT INCIDENCES

Stakeholder consultations established that human-wildlife conflict remains one of the major environmental and socio-economic concerns affecting portions of the proposed excision areas. The most commonly reported forms of conflict include:

- crop destruction by wildlife;
- livestock predation;
- destruction of water infrastructure;
- competition over water resources;
- and threats to human safety.

Elephants were identified as one of the main conflict-causing species within parts of the project area due to occasional destruction of vegetation, water facilities, fences, and movement through settlement areas. Hyenas and other predators were reported to occasionally attack livestock, particularly goats and sheep grazing near wildlife movement zones and reserve boundaries.

Baboons and monkeys were also reported to interfere with household food storage areas and small-scale cultivation activities within portions of the settlements. Community members indicated that conflict incidences tend to increase during prolonged dry periods when wildlife increasingly move outside protected habitats in search of water and forage resources.

Although large-scale crop farming is relatively limited within the predominantly pastoral landscape, localized destruction of household gardens and small cultivation areas by wildlife was reported within some settlement sections.

6.13.3 IMPACTS OF HUMAN-WILDLIFE INTERACTIONS ON LOCAL COMMUNITIES

Human-wildlife interactions within the proposed excision areas continue to affect local livelihoods, household safety, and socio-economic wellbeing. Livestock predation contributes to economic losses among pastoral households that depend heavily on livestock production for household income and food security. Wildlife-related destruction of water infrastructure and household property also imposes additional financial burdens on affected communities.

Community consultations further established that fear of wildlife encounters occasionally affects movement patterns within some grazing areas and influences settlement expansion patterns near

wildlife movement corridors. Children and women collecting water or firewood within remote areas were identified as particularly vulnerable to potential wildlife encounters.

Despite the conflict challenges, many community members acknowledged the ecological importance of wildlife within the wider Marsabit ecosystem and recognized the role of conservation in supporting biodiversity and ecological stability. Stakeholders emphasized the need for balanced approaches capable of promoting both community livelihoods and wildlife conservation objectives.

6.13.4 DRIVERS OF INCREASING HUMAN-WILDLIFE INTERACTIONS

Field investigations established that several factors are contributing to increasing human-wildlife interactions within the proposed excision areas. These include:

- infrastructure development along ecological corridors;
- pressure on grazing lands;
- climate variability and drought;
- settlement expansion into wildlife dispersal areas;
- increasing human population growth;
- and declining availability of water and forage resources within some wildlife habitats.

The gradual transformation of portions of the landscape from open grazing systems into more permanent settlement zones has reduced available wildlife dispersal space within some sections of the ecosystem. During drought periods, both livestock and wildlife increasingly concentrate around limited water sources and remaining pasture areas, intensifying interaction and competition within parts of the landscape.

The expansion of roads, settlements, fencing, and institutional infrastructure may also contribute to fragmentation of wildlife habitats and obstruction of movement pathways if future land use planning is not properly managed.

6.13.5 EXISTING CONFLICT MITIGATION MEASURES

Communities within the proposed excision areas currently apply a range of local mitigation measures aimed at reducing human-wildlife conflict incidences. These include:

- herding livestock in groups;

- avoiding grazing within known wildlife movement areas during high-risk periods;
- use of traditional deterrent methods;
- community surveillance;
- and coordination with local administration and wildlife authorities during conflict incidents.

Stakeholder consultations established that local communities occasionally report serious wildlife conflict incidents to Kenya Wildlife Service (KWS) and local administrative authorities for intervention and response support. However, limited institutional capacity, delayed response times, and inadequate conflict mitigation infrastructure continue to affect effectiveness of some interventions.

Community members further recommended strengthening wildlife monitoring systems, improving early warning mechanisms, and enhancing collaboration between local communities, KWS, and administrative institutions to improve management of human-wildlife interactions within the settlements.

6.13.6 IMPLICATIONS OF THE PROPOSED EXCISION ON HUMAN-WILDLIFE INTERACTIONS

The proposed excision process has important implications for future human-wildlife interactions within the wider Marsabit ecosystem. Formalization of settlement areas and expansion of socio-economic infrastructure may contribute to increased settlement density and land use transformation within portions of the proposed excision zones.

Without proper land use planning and environmental management measures, future settlement expansion could potentially contribute to:

- habitat fragmentation;
- narrowing of wildlife movement corridors;
- increased pressure on ecological connectivity zones;
- escalation of human-wildlife conflict incidences;
- and increased disturbance of wildlife habitats.

However, the excision process also presents opportunities for development of more structured land use planning systems capable of clearly defining settlement zones, ecological protection areas, grazing zones, and wildlife movement corridors within the landscape. Stakeholders emphasized the

importance of integrating wildlife conservation considerations into future spatial planning frameworks to minimize ecological disruption and support coexistence between communities and wildlife.

6.13.7 COMMUNITY PERSPECTIVES ON HUMAN-WILDLIFE COEXISTENCE

Community consultations revealed mixed perceptions regarding wildlife conservation and human-wildlife interactions within the proposed excision areas. While communities expressed concern regarding livestock losses, safety risks, and destruction caused by wildlife, many respondents also acknowledged the ecological and conservation importance of wildlife within the wider Marsabit ecosystem.

Stakeholders emphasized the need for:

- improved human-wildlife conflict mitigation measures;
- protection of key wildlife corridors;
- improved compensation and response mechanisms;
- community awareness programmes;
- and participatory land use planning approaches that balance settlement development and biodiversity conservation.

Community members further recommended increased collaboration between local communities, county government agencies, Kenya Wildlife Service (KWS), and conservation stakeholders to strengthen coexistence strategies and minimize future conflict risks within the proposed excision areas.

The human-wildlife interactions remain an important environmental and socio-economic issue within the project area and require careful consideration within future settlement planning, environmental management, and biodiversity conservation strategies associated with the proposed excision process.

6.14 EXISTING SOCIAL CHALLENGES

The proposed excision areas of Karare II, Kamboe, Kambinye, and Parkishon experience a range of social challenges associated with poverty, climatic variability, inadequate infrastructure, insecure land tenure, limited access to public services, and dependence on pastoral livelihood systems. These

challenges continue to affect socio-economic wellbeing, livelihood resilience, and overall quality of life within the settlements.

Field assessments and stakeholder consultations established that many of the existing social challenges are closely interconnected and are influenced by the arid and semi-arid environmental conditions characterizing the wider Marsabit region. Recurrent droughts, limited livelihood diversification opportunities, inadequate social infrastructure, and population growth further contribute to increasing socio-economic pressure within the project area.

6.14.1 POVERTY AND LIVELIHOOD VULNERABILITY

A significant proportion of households within the proposed excision areas depend primarily on pastoralism, small-scale trade, casual labour, and limited subsistence activities for household income and food security. Recurrent drought conditions, livestock diseases, fluctuating livestock markets, and declining pasture availability continue to affect household livelihoods and economic stability.

Community consultations established that prolonged drought periods frequently result in:

- livestock losses;
- reduced household income;
- food insecurity;
- increased dependency on relief support;
- and reduced ability to access education and healthcare services especially in Kambinye .

Economically vulnerable households, particularly female-headed households and households with limited livestock ownership, were identified as being especially affected by climatic and economic shocks.

6.14.2 WATER SCARCITY AND SANITATION CHALLENGES

Water shortages remain one of the most significant social challenges affecting the proposed excision areas. Most settlements depend on boreholes, water pans, and limited community water supply systems that are often insufficient to meet increasing domestic and livestock demand, particularly during prolonged dry periods.

Community members reported that some households travel long distances in search of water during drought seasons, increasing the burden on women and children who are primarily responsible for

household water collection. Inadequate water availability further affects sanitation conditions, hygiene practices, institutional operations, and overall public health within the settlements.

Sanitation infrastructure within portions of the project area also remains relatively underdeveloped, with some households lacking adequate latrine facilities and organized waste management systems. These conditions increase vulnerability to waterborne and sanitation-related diseases, particularly among children and vulnerable populations.

6.14.3 LIMITED ACCESS TO SOCIAL INFRASTRUCTURE AND SERVICES

Although the proposed excision areas host schools, healthcare facilities, administrative offices, and water infrastructure, stakeholder consultations established that many facilities remain inadequate relative to the growing population demand. Educational institutions continue to experience shortages of classrooms, teachers, learning materials, sanitation facilities, and boarding infrastructure.

Similarly, healthcare facilities within the settlements experience challenges associated with inadequate staffing levels, limited medical equipment, insufficient drug supplies, unreliable water supply, and limited emergency response capacity. Remote pastoral settlements also continue to face difficulties accessing healthcare and educational services due to poor transport infrastructure and long travel distances.

Road infrastructure within portions of the project area remains underdeveloped, with some feeder roads becoming difficult to access during rainy periods. Poor transport connectivity affects movement of people, access to markets, delivery of services, and emergency response operations within some sections of the settlements.

6.14.4 HUMAN-WILDLIFE CONFLICT

Human-wildlife conflict remains an important social and environmental challenge affecting portions of the proposed excision areas due to the close proximity between settlements and wildlife habitats associated with Marsabit National Reserve. Community members reported incidences of livestock predation, destruction of property, and occasional threats to human safety caused by wildlife movement through settlement and grazing areas.

Elephants, hyenas, baboons, and other wildlife species were identified as some of the major causes of conflict within sections of the landscape. During drought periods, wildlife movement outside protected habitats increases due to competition over water and forage resources, intensifying interactions between wildlife and local communities.

Human-wildlife conflict contributes to economic losses, fear among residents, and pressure on local livelihoods, particularly among pastoral households dependent on livestock production.

6.14.5 LAND TENURE INSECURITY AND SETTLEMENT PLANNING CHALLENGES

The continued classification of the proposed excision areas as part of the Marsabit National Reserve remains one of the major social and administrative challenges affecting local communities. Stakeholder consultations established that the unresolved land tenure situation has historically limited public investment, infrastructure development, formal settlement planning, and access to government development programmes within the settlements.

Community members expressed concerns regarding:

- insecurity of tenure;
- uncertainty over future settlement status;
- limited access to formal land ownership systems;
- and restrictions on infrastructure development within gazetted conservation land.

The absence of structured land use planning frameworks within portions of the settlements has also contributed to unplanned settlement expansion and increasing pressure on natural resources and ecologically sensitive areas.

6.14.6 CLIMATE VARIABILITY AND DROUGHT IMPACTS

The proposed excision areas occur within an arid and semi-arid climatic zone characterized by low and highly variable rainfall patterns, prolonged dry seasons, and recurrent drought conditions. Climate variability therefore remains a major driver of social vulnerability within the settlements.

Drought periods contribute significantly to:

- livestock losses;
- water shortages;

- food insecurity;
- reduced household income;
- increased school dropout;
- and heightened dependence on relief support programmes.

The impacts of climate variability disproportionately affect vulnerable groups such as women, children, elderly persons, persons living with disabilities, and economically disadvantaged households due to their reduced adaptive capacity and dependence on already constrained livelihood systems.

6.14.7 YOUTH UNEMPLOYMENT AND LIMITED ECONOMIC OPPORTUNITIES

Community consultations established that limited livelihood diversification and inadequate employment opportunities remain important social challenges within the proposed excision areas. Many youth within the settlements depend on informal economic activities, livestock-related livelihoods, casual labour, and small-scale trade due to limited formal employment opportunities.

Stakeholders expressed concern regarding increasing youth unemployment and inadequate vocational training opportunities within the settlements. Limited access to technical training institutions, business support services, and economic investment opportunities further constrains socio-economic advancement among younger populations.

Community members emphasized the importance of strengthening youth empowerment programmes, vocational training, and livelihood diversification initiatives to improve economic resilience and reduce social vulnerability within the settlements.



CHAPTER 07

PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT

INFORM · CONSULT · INVOLVE · COLLABORATE · EMPOWER

Meaningful participation builds trust, strengthens relationships and ensures that local knowledge, concerns and aspirations are integrated into the EIA process to achieve sustainable and inclusive outcomes.

WHY IT MATTERS

- Enhances transparency and accountability
- Improves decision-making with local knowledge
- Identifies issues, risks and opportunities early
- Builds trust and social acceptance
- Promotes fairness, inclusion and good governance

OBJECTIVES

- Inform stakeholders about the project and EIA process.
- Consult and listen to views, concerns and suggestions.
- Involve stakeholders in decision-making.
- Address concerns and incorporate feedback.
- Build long-term partnerships.

STAKEHOLDER GROUPS

- Local communities and residents
- Traditional leaders and elders
- Government and regulatory authorities
- Civil society organizations (CSOs)
- Private sector and businesses
- Vulnerable and marginalized groups
- Academic and research institutions

PUBLIC PARTICIPATION PROCESS

1. PLAN	2. INFORM	3. CONSULT	4. INVOLVE	5. RESPOND	6. INCORPORATE	7. REPORT
Identify stakeholders and design the engagement plan.	Share information about the project and EIA.	Seek views, concerns and suggestions from stakeholders.	Engage stakeholders in analysis and decision-making.	Address issues raised and provide feedback on how they were considered.	Integrate relevant inputs into the EIA and project design.	Document and communicate engagement results.

METHODS OF ENGAGEMENT

PUBLIC MEETINGS	FOCUS GROUP DISCUSSIONS	HOUSEHOLD CONSULTATIONS	SURVEYS & QUESTIONNAIRES	DIGITAL & MEDIA ENGAGEMENT	INFORMATION MATERIALS
Open forums to share information and gather views.	Targeted discussions with specific groups.	One-on-one or small group interviews.	Collect written or online feedback.	Use of SMS, social media, radio and websites.	Brochures, fact sheets and notice boards.

OUR COMMITMENT

- We are committed to inclusive, transparent and respectful engagement.
- All stakeholders will be treated fairly and given equal opportunity to participate.
- Information shared will be accurate, accessible and timely.
- Concerns will be addressed promptly and decisions communicated.
- Participation contributes to better decisions and sustainable outcomes.

Together we listen, together we decide

CHAPTER 7: PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT

Public participation and stakeholder engagement formed a critical component of the Environmental and Social Impact Assessment (ESIA) process for the proposed excision of settled areas from the Marsabit National Reserve. The stakeholder engagement process was undertaken to ensure that affected communities, government institutions, local leaders, conservation agencies, civil society organizations, and other interested parties were adequately informed and provided with an opportunity to express their views, concerns, expectations, and recommendations regarding the proposed excision process.

The consultations were conducted in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), the Environmental (Impact Assessment and Audit) Regulations, 2003, and other applicable national legal and policy frameworks governing public participation in environmental decision-making processes. The engagement process sought to promote transparency, inclusivity, community ownership, and integration of stakeholder concerns into the ESIA study and subsequent project planning processes.

Stakeholder consultations within Karare II, Kamboe, Kambinye, and Parkishon areas focused on key issues including land tenure security, settlement planning, environmental conservation, human-wildlife interactions, access to public services, livelihood systems, infrastructure development, and anticipated socio-economic implications of the proposed excision. The views obtained during the consultations have been incorporated into the ESIA findings, impact assessment, and proposed mitigation measures presented in this report.

7.1 OBJECTIVES OF PUBLIC PARTICIPATION

The main objective of the public participation and stakeholder engagement process was to ensure that all affected and interested stakeholders were adequately informed and provided with an opportunity to contribute to the ESIA. The consultations sought to enhance transparency, inclusivity, and accountability while ensuring that community concerns, expectations, indigenous knowledge, and recommendations were effectively integrated into the ESIA study.

Specifically, the stakeholder engagement process aimed to:

- create awareness about the proposed excision process and the ESIA study;
- obtain views, concerns, and expectations from local communities and relevant stakeholders;
- identify potential environmental and social impacts associated with the proposed excision;
- gather local and indigenous knowledge relevant to the assessment process;
- promote community ownership and participation in decision-making;
- and strengthen collaboration between communities, government institutions, conservation agencies, and other stakeholders involved in the project area.

The consultation process further aimed at ensuring that the proposed excision process aligns with community priorities, environmental sustainability objectives, and applicable legal and policy requirements governing public participation and environmental management in Kenya.

7.2 STAKEHOLDER IDENTIFICATION

Stakeholder identification formed an important component of the public participation and stakeholder engagement process undertaken during the ESIA. The stakeholder identification process was conducted to ensure that all individuals, groups, institutions, and organizations likely to be affected by, interested in, or capable of influencing the proposed excision process were adequately identified and involved in the consultation process.

The identification of stakeholders was guided by the nature of the proposed excision, the socio-economic characteristics of the project area, the environmental sensitivity of the Marsabit ecosystem, and the legal and institutional requirements governing public participation under the Environmental Management and Coordination Act (EMCA), 1999 (as amended). The process further considered the need to ensure inclusivity, transparency, representation of vulnerable groups, and participation of both primary and secondary stakeholders within the wider project area.

The stakeholder mapping exercise categorized stakeholders based on their level of influence, interest, institutional responsibility, and potential exposure to environmental and social impacts associated with the proposed excision process. The consultations therefore targeted local communities residing within the proposed excision areas, government agencies, conservation institutions, local administration, civil society organizations, community-based organizations, religious institutions, and vulnerable population groups.

7.2.1 LOCAL COMMUNITIES AND SETTLEMENT RESIDENTS

Local communities residing within Karare II, Kamboe, Kambinye, and Parkishon settlements represented the primary stakeholders in the ESIA process due to their direct interaction with the proposed excision area and anticipated exposure to both positive and negative impacts associated with the project. These communities largely depend on pastoralism, small-scale trade, wage labour, and limited subsistence activities for their livelihoods.

Community consultations targeted:



The local communities were consulted to obtain views relating to:

- land tenure security;
- settlement planning;
- infrastructure development;
- environmental conservation;
- human-wildlife interactions;
- access to public services;
- and socio-economic expectations associated with the proposed excision process.

7.2.2 GOVERNMENT INSTITUTIONS AND REGULATORY AGENCIES

Relevant national and county government institutions were identified as key stakeholders due to their regulatory mandates, administrative responsibilities, and involvement in environmental management, land administration, infrastructure development, public service delivery, and conservation management within the project area.

The identified government institutions included:

- National Environment Management Authority (NEMA);
- Kenya Wildlife Service (KWS);
- Marsabit County Government;
- Ministry of Lands and Physical Planning;
- Ministry of Environment, Climate Change and Forestry;
- Ministry of Water, Sanitation and Irrigation;
- Ministry of Health;
- Ministry of Education;
- National Government Administration Officers (NGAO);
- and other relevant sector agencies operating within the area.

These institutions were engaged to provide technical information, regulatory guidance, institutional perspectives, and recommendations relevant to the ESIA process and the proposed excision.



The ESIA team consultation with the County Secretary for Lands and Physical Planning



The ESIA team consultation with the KWS Senior Warden

7.2.3 LOCAL ADMINISTRATION AND COMMUNITY LEADERSHIP

Local administrative structures and traditional leadership systems were identified as important stakeholders in the consultation process due to their role in governance, conflict management, community mobilization, and coordination of local development activities within the settlements.

The stakeholder engagement process therefore involved:

- chiefs and assistant chiefs;
- village elders;
- clan leaders;
- ward administrators;
- community opinion leaders;
- and members of local peace and security committees.

These leaders provided important information relating to settlement history, social dynamics, resource conflicts, governance challenges, land use patterns, and community perceptions regarding the proposed excision process.



ESIA team consultation with Karare Ward MCA, Hon. Leruk

7.2.4 CONSERVATION AND ENVIRONMENTAL STAKEHOLDERS

Given the ecological sensitivity of the Marsabit ecosystem and the location of the proposed excision areas within the Marsabit National Reserve, conservation institutions and environmental stakeholders were identified as important participants in the ESIA process. These stakeholders were consulted to provide perspectives relating to biodiversity conservation, wildlife management, ecological connectivity, human-wildlife interactions, and environmental sustainability within the wider landscape.

The conservation-related stakeholders included:

- Kenya Wildlife Service (KWS);
- environmental officers;
- conservation organizations;
- natural resource management groups;
- and community-based environmental initiatives operating within the region.

The consultations focused on understanding potential implications of the proposed excision on:

- wildlife movement corridors;
- habitat connectivity;
- ecological integrity;
- and long-term environmental management within the wider Marsabit ecosystem.



ESIA team consultation with Marsabit County NEMA Director

7.2.5 SOCIAL INSTITUTIONS AND SERVICE PROVIDERS

Institutions involved in provision of social services within the proposed excision areas were also identified as important stakeholders due to their role in supporting education, healthcare, water supply, religious activities, and community welfare.

The identified institutions included:

- schools and educational institutions;
- healthcare facilities;
- water management committees;
- religious institutions;
- non-governmental organizations (NGOs);
- community-based organizations (CBOs);
- and humanitarian support agencies operating within the settlements.

These stakeholders provided information relating to:

- existing social infrastructure;
- service delivery challenges;
- population dynamics;
- vulnerable groups;
- and development priorities within the project area.



ESIA team consultation with REPAL (Rebuilding Pastoralist Livelihoods Organization)

7.2.6 VULNERABLE GROUPS

Special consideration was given to vulnerable groups to ensure inclusivity and equitable participation within the stakeholder engagement process. Vulnerable groups identified during the assessment included:

- women;
- youth;
- elderly persons;
- persons living with disabilities;
- widows;
- orphaned children;
- and economically disadvantaged households.

The consultations sought to capture the specific concerns, vulnerabilities, and expectations of these groups regarding land tenure security, access to services, livelihood resilience, environmental risks, and future settlement development.

Table 7-1: Summary of Key Stakeholder Categories Identified during the ESIA Process

STAKEHOLDER CATEGORY	KEY STAKEHOLDERS	MAIN AREAS OF INTEREST
Local Communities	Residents, pastoralists, elders, women and youth groups	Land tenure, livelihoods, infrastructure, service delivery

Government Institutions	NEMA, KWS, County Government, sector ministries	Regulation, environmental management, development planning
Local Administration	Chiefs, assistant chiefs, village elders	Governance, conflict management, community mobilization
Conservation Stakeholders	KWS, environmental groups, conservation actors	Wildlife conservation, ecological integrity, habitat protection
Social Institutions	Schools, health facilities, religious institutions, NGOs	Social services, welfare, education, healthcare
Vulnerable Groups	Women, youth, elderly, persons with disabilities	Inclusion, livelihood security, access to services

The stakeholder identification process ensured that the ESIA consultation process remained participatory, representative, and responsive to the concerns of all relevant stakeholders within the proposed excision areas. The identified stakeholders subsequently formed the basis for stakeholder consultations, focused discussions, field interviews, and public engagement activities undertaken during the ESIA study.

7.3 PUBLIC PARTICIPATION METHODOLOGY

The public participation process for the proposed excision of settled areas from the Marsabit National Reserve was undertaken in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), the Environmental (Impact Assessment and Audit) Regulations, 2003, the Constitution of Kenya (2010), and the Terms of Reference (ToR) approved by the National Environment Management Authority (NEMA). The consultation process was designed to ensure that all affected and interested stakeholders were adequately informed and provided with an opportunity to contribute to the Environmental and Social Impact Assessment (ESIA) process.

The stakeholder engagement methodology adopted a participatory and inclusive approach aimed at capturing the views, concerns, expectations, indigenous knowledge, and recommendations of communities and institutions within Karare II, Kamboe, Kambinye, and Parkishon settlements. The methodology further sought to promote transparency, accountability, stakeholder ownership, and integration of local concerns into the ESIA findings and recommendations.

7.3.1 STAKEHOLDER MAPPING AND IDENTIFICATION

The first stage of the consultation process involved identification and mapping of stakeholders based on their level of interest, institutional responsibility, influence, and potential exposure to environmental and social impacts associated with the proposed excision process. The stakeholder mapping exercise identified local communities, government agencies, local administration, conservation institutions, educational and healthcare facilities, religious organizations, women and youth groups, vulnerable households, and community-based organizations operating within the project area.

The stakeholder identification process ensured that all relevant groups likely to be affected by or interested in the proposed excision were adequately represented during the consultation process. Special consideration was also given to vulnerable groups to ensure inclusivity and equitable participation throughout the ESIA study.

7.3.2 COMMUNITY PUBLIC MEETINGS (BARAZAS)

Community public meetings (barazas) formed one of the principal methods of consultation during the ESIA study. The meetings were conducted within the major settlement centres to create awareness about the proposed excision process, explain the objectives of the ESIA study, and provide community members with an opportunity to express their views, concerns, expectations, and recommendations regarding the project.

The public meetings were facilitated in a participatory manner involving local administration, community leaders, and the ESIA study team. Discussions focused on issues relating to land tenure security, environmental conservation, human-wildlife interactions, infrastructure development, livelihoods, access to public services, and anticipated socio-economic implications of the proposed excision process.

Attendance registers, consultation notes, stakeholder comments, and photographic evidence were documented as part of the consultation records in compliance with NEMA public participation requirements.



Figure 7-1: Community Public Participation Meeting within the Proposed Excision Areas

7.3.3 KEY INFORMANT INTERVIEWS (KIIS)

Key Informant Interviews (KIIs) were conducted with selected individuals and institutions possessing specialized knowledge, technical expertise, or administrative responsibility relevant to the proposed excision process. The KIIs targeted chiefs and assistant chiefs, village elders, school administrators, healthcare personnel, religious leaders, water management committees, conservation officers, local security personnel, and representatives from relevant government institutions.

Semi-structured interview guides were used during the consultations to obtain information relating to settlement history, infrastructure conditions, governance systems, environmental concerns, social service delivery, land use patterns, and development priorities within the project area. The interviews provided important institutional perspectives and technical insights that complemented information obtained during community public meetings.

7.3.4 HOUSEHOLD AND FIELD CONSULTATIONS

Household consultations and direct field interactions were undertaken across the proposed excision areas to gather localized information regarding livelihoods, environmental conditions, infrastructure access, social challenges, and community perceptions regarding the proposed excision process. The consultations enabled the ESIA team to better understand settlement dynamics, validate field observations, identify vulnerable groups, and assess community development priorities.

The household consultations also provided opportunities for participation by individuals who may not have been adequately represented during larger public meetings, particularly women, elderly persons, and vulnerable households. Information collected during these consultations contributed significantly to the social baseline analysis and impact assessment process.

7.3.5 FOCUS GROUP DISCUSSIONS (FGDS)

Focused discussions were conducted with specific stakeholder groups to obtain detailed information on thematic environmental, social, and livelihood issues affecting different segments of the population. The Focus Group Discussions (FGDs) targeted women groups, youth groups, pastoralists, elders, and vulnerable population groups within the settlements.

The discussions focused on issues relating to livelihoods, gender challenges, youth concerns, climate variability, human-wildlife interactions, water access, social infrastructure, and community development priorities. The FGDs provided an effective platform for detailed dialogue and improved participation among groups that may be less vocal during larger public meetings.



Figure 7-2: Focus Group Discussion with Community Members within the Proposed Excision Areas

7.3.6 FIELD OBSERVATIONS AND TRANSECT WALKS

Field observations and transect walks were undertaken throughout the proposed excision areas to assess settlement patterns, land use conditions, infrastructure distribution, environmental sensitivity, wildlife movement areas, and existing socio-economic conditions. The field assessments enabled the ESIA team to physically verify information obtained during stakeholder consultations and identify areas of environmental and social concern within the landscape.

Photographic documentation, GPS referencing, and direct observations were also undertaken during field visits to support environmental baseline characterization and spatial analysis of the project area.



Figure 7-3The ESIA Team undertaking a transect walk on the project area

7.3.7 DOCUMENTATION AND ANALYSIS OF STAKEHOLDER VIEWS

All stakeholder comments, concerns, recommendations, attendance records, field notes, photographs, and consultation findings were systematically documented and analyzed by the ESIA study team. The views obtained during the consultations were incorporated into the environmental and social baseline analysis, impact assessment, mitigation planning, and development of recommendations within the ESIA report.

Stakeholder concerns relating to land tenure security, infrastructure development, human-wildlife conflict, environmental conservation, public service delivery, and livelihood sustainability were particularly considered during assessment of project impacts and formulation of mitigation measures. The consultation process therefore ensured that stakeholder perspectives and community priorities were adequately integrated into the ESIA process in compliance with NEMA requirements and principles of participatory environmental management.

7.4 PUBLIC NOTICES AND ANNOUNCEMENTS

Public notices and announcements formed an important component of the stakeholder engagement and public participation process undertaken during the ESIA. The notices and announcements were intended to create awareness among affected communities, institutions, local leaders, and other interested stakeholders regarding the proposed excision process, planned consultation activities, and opportunities for public participation.

The notification process was conducted in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), the Environmental (Impact Assessment and Audit) Regulations, 2003, and the Terms of Reference (ToR) approved by the National Environment Management Authority (NEMA). The process aimed at ensuring transparency, inclusivity, and adequate dissemination of information to stakeholders within Karare II, Kamboe, Kambinye, and Parkishon settlements.

7.4.1 COMMUNITY MOBILIZATION AND AWARENESS CREATION

Community mobilization activities were undertaken prior to commencement of the public consultation meetings to ensure adequate stakeholder participation during the ESIA process. The mobilization process involved collaboration with local administration, village elders, community

leaders, and local institutions to inform residents about the proposed excision process and scheduled consultation activities.

Announcements regarding public meetings and stakeholder engagement activities were communicated through:

- local chiefs and assistant chiefs;
- village elders;
- community gatherings;
- public barazas;
- institutional notices;
- and direct community mobilization within the settlements.

The use of local administrative structures was particularly important in ensuring effective communication and participation within the predominantly pastoral communities where local leadership systems remain influential in community coordination and information dissemination.

7.4.2 OFFICIAL NOTIFICATION LETTERS

Formal notification letters were issued to relevant administrative offices, government institutions, and community leaders informing them about the ESIA study and planned stakeholder consultation activities. The letters communicated the objectives of the assessment, proposed consultation schedules, and the need for stakeholder participation during the ESIA process.

The notification letters were particularly directed to:

- chiefs and assistant chiefs;
- ward administration offices;
- relevant county government departments;
- educational institutions;
- healthcare facilities;
- and other local institutions within the project area.

These official communications facilitated coordination of stakeholder engagement activities and enhanced institutional participation during the consultation process.

7.4.3 PUBLIC NOTICES AND POSTERS

Public notices and awareness posters were utilized within strategic locations across the settlements to inform residents about the ESIA process and upcoming public consultation meetings. The notices contained information regarding:

- the nature of the proposed excision project;
- objectives of the ESIA study;
- dates and venues for public participation meetings;
- and opportunities for stakeholders to provide comments and views regarding the project.

The notices were placed in accessible public locations including:

- chiefs' offices;
- schools;
- markets;
- administrative centres;
- healthcare facilities;
- and other community gathering points within the settlements.

The use of posters and notices enhanced visibility of the consultation process and supported wider community awareness and participation.



Figure 7-5: Photographic evidence of notification and public awareness activities

7.4.4 PUBLIC ANNOUNCEMENTS DURING COMMUNITY MEETINGS

Public announcements were also conducted during community meetings and barazas organized within the project area. During these sessions, community members were informed about:

- the objectives of the proposed excision;
- the ESIA process;
- potential environmental and social considerations;
- and the importance of community participation within the assessment process.

The announcements provided opportunities for community members to seek clarification, raise concerns, and understand the proposed consultation procedures. The meetings also enabled the ESIA team to explain the purpose of the study and encourage inclusive participation among local residents and vulnerable groups.



Figure 7-6: Photographic evidence of posters and public awareness activities

7.4.5 DOCUMENTATION OF NOTIFICATION AND CONSULTATION PROCESSES

All notification and awareness creation activities undertaken during the ESIA process were documented through:

- attendance registers;
- photographic records;
- copies of official notification letters;
- consultation schedules;
- meeting minutes;
- and field notes.

The documentation formed part of the evidence required to demonstrate compliance with NEMA public participation requirements and to confirm that affected communities and relevant stakeholders were adequately informed and consulted during the ESIA process.

The consultation records further provided evidence of stakeholder representation, participation levels, and issues raised during the engagement process, which were subsequently integrated into the ESIA findings and recommendations.

Table 7-2: Documentation Records and Attendance Registers from Public Participation Activities

No.	Activity / Meeting	Date & Venue	Stakeholders Engaged	Key Discussion Highlights	Key Outcomes / Agreements
1	Inception and Key Stakeholder Engagement Meeting	19/1/2026 – Paradise Inn, Marsabit	REPAL, Nine Wells Consultancy, NEMA, KWS, County Government of Marsabit, MCA Representatives, GIS Technical Team, Community Representatives	Discussions focused on the ESIA process, historical background of the excision, legal and environmental requirements, GIS mapping, wildlife conservation, future settlement planning, and land tenure regularization.	Stakeholders agreed on the importance of a comprehensive ESIA process, accurate spatial demarcation, environmental safeguards, and continued inter-agency collaboration.
2	Public Participation Meeting – Karare II	9/6/2026 – Karare Chief's Office Grounds	Community elders, residents, GIS Team, ESIA Team, REPAL representatives, MCA, KWS representatives	Community members were briefed on the ESIA process, boundary demarcation, wildlife conservation concerns, settlement recognition, land tenure security, and environmental management requirements.	Community members supported the excision process and committed to cooperating with GIS mapping activities and wildlife conservation measures including protection of wildlife corridors.
3	Public Participation Meeting – Kamboe	10/6/2026 – Kamboe Chief's Camp	Residents, women groups, youth groups, elders, teachers, healthcare practitioners, ESIA Team	Discussions focused on education access, healthcare services, infrastructure challenges, environmental conservation, employment opportunities, water shortages, and legal	Participants supported the excision process and emphasized the need for improved infrastructure, water access, education facilities, and sustainable livelihood opportunities.

No.	Activity / Meeting	Date & Venue	Stakeholders Engaged	Key Discussion Highlights	Key Outcomes / Agreements
				recognition of settlements.	
4	Public Participation Meeting – Parkishon	11/6/2026 – Parkishon Trading Centre	Village elders, local residents, women groups, youth representatives, ESIA Team	Community members discussed land ownership challenges, environmental conservation, wildlife interactions, infrastructure limitations, and future settlement planning within the proposed excision areas.	Community members expressed support for the proposed excision process and committed to supporting environmental conservation initiatives including protection of vegetation and wildlife corridors.
5	Public Participation Meeting – Kambinye	12/6/2026 – Kambinye Community Grounds	Area Chief, elders, residents, youth representatives, ESIA Team	Discussions focused on land ownership concerns, environmental degradation, cultural heritage protection, future investment opportunities, and sustainable land use planning within the settlement areas.	Community members endorsed the proposed excision process and emphasized environmental stewardship, sustainable development planning, and protection of ecological resources.
6	Focus Group Discussions (FGDs) – Parkishon	23/1/2026 – Parkishon Village	Youth representatives, women representatives, men representatives, education practitioners, healthcare practitioners, community stakeholders	Discussions focused on land tenure security, environmental degradation, access to services, women's participation, grazing rights, youth employment, and healthcare access.	Participants recommended inclusive stakeholder engagement, establishment of grievance mechanisms, and integration of conservation with community development planning.
7	Focus Group Discussions	23/1/2026 – Kambinye Village	Community elders, women groups, youth	Discussions focused on future settlement planning,	Community members endorsed the excision process

No.	Activity / Meeting	Date & Venue	Stakeholders Engaged	Key Discussion Highlights	Key Outcomes / Agreements
	(FGDs) – Kambinye		representatives, teachers, healthcare practitioners, ESIA Team	environmental conservation, healthcare services, land ownership, infrastructure needs, and livelihood sustainability.	and emphasized environmental stewardship, sustainable development planning, and continued stakeholder engagement.
8	Consultation Meeting with NEMA County Office	18TH June 2025 Marsabit Town – NEMA Office	County Director of Environment, ESIA Team	Discussions focused on ESIA licensing requirements, environmental safeguards, human-wildlife conflict management, and compliance with EMCA regulations.	NEMA committed to providing technical guidance during the ESIA process and emphasized integration of wildlife mitigation measures within the ESIA study.
9	Consultation with County Lands and Physical Planning Department	18TH JUNE 2018 County Lands Office, Marsabit	County Lands Officers, Physical Planning Officers, ESIA Team	Discussions focused on land adjudication, spatial planning requirements, settlement planning, and future land registration processes.	The Lands Office committed to supporting mapping, boundary verification, and future land use planning processes.
10	Consultation Meeting with KWS and KFS	19TH JUNE 2018 Marsabit Town	Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), ESIA Team	Discussions focused on ecological connectivity, wildlife corridors, environmental conservation, and management of human-wildlife interactions.	KWS and KFS agreed to support conservation initiatives and protection of ecological corridors within the proposed excision areas.
11	Key Informant Interview – Kamboe Primary and Junior School	23RD JUNE 2015 Kamboe Primary and Junior School	Head Teacher, ESIA Team	Discussions focused on enrolment trends, staffing challenges, infrastructure limitations, barriers to education, and water shortages affecting learning conditions.	The school administration emphasized the need for improved educational facilities, water infrastructure, and support for vulnerable learners.

No.	Activity / Meeting	Date & Venue	Stakeholders Engaged	Key Discussion Highlights	Key Outcomes / Agreements
12	Transect Walks and Field Observations	30 JUNE 2025 Karare II, Parkishon, Kamboe and Kambinye Areas	ESIA Team, GIS Technical Team, Community Representatives	Field assessments focused on settlement patterns, land use characteristics, environmental sensitivity, wildlife movement areas, drainage systems, and infrastructure distribution.	The field assessments confirmed the existence of permanent settlements and recommended integrated land use planning and protection of ecological corridors.
13	Public Notice and Poster Distribution Exercise	2ND JUNE 2026 Karare II, Kamboe, Parkishon and Kambinye Areas	ESIA Team, REPAL Representatives, Chiefs, Community Members	Public notices and consultation posters were distributed and displayed within strategic public locations including chiefs' offices, trading centres, health facilities, schools, and public notice boards in compliance with NEMA public participation requirements. Community members were sensitized on the dates, venues, and objectives of the consultation meetings.	Stakeholders acknowledged receipt of the public notices and committed to mobilizing community members to attend the public participation meetings. The exercise enhanced awareness and transparency within the ESIA consultation process.
14	Community Mobilization and Awareness Creation	4TH JUNE 2026 Karare II, Kamboe, Parkishon and Kambinye Settlements	Chiefs, Village Elders, Women Groups, Youth Representatives, ESIA Team	Mobilization activities focused on sensitizing communities regarding the proposed excision process, stakeholder consultation schedules, environmental conservation concerns, and the importance of participation within the ESIA process.	Increased stakeholder awareness and participation were achieved across the proposed excision areas. Community leaders committed to supporting inclusive participation and dissemination of information during the ESIA process.

The use of public notices, official announcements, institutional notifications, and community mobilization mechanisms significantly contributed to effective dissemination of information, stakeholder awareness, and inclusive participation during the ESIA process for the proposed excision of settled areas from the Marsabit National Reserve.

7.5 CONTINUOUS STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement within an Environmental and Social Impact Assessment (ESIA) process is a continuous and iterative activity that extends throughout the project planning, assessment, implementation, monitoring, and decision-making phases. In line with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), and the Environmental (Impact Assessment and Audit) Regulations, 2003, stakeholder engagement for the proposed excision of Karare settled areas from the Marsabit National Reserve was undertaken progressively over an extended period to ensure adequate consultation, transparency, inclusivity, and incorporation of stakeholder views into the ESIA process.

For the proposed excision project, stakeholder engagement activities commenced in August 2025 during the preliminary ESIA scoping and reconnaissance phase. Initial consultations focused on key institutions and stakeholders directly associated with land administration, environmental management, wildlife conservation, settlement planning, and community leadership within the project area.

During the early consultation phase, meetings and engagements were undertaken with:

- the National Environment Management Authority (NEMA);
- Kenya Wildlife Service (KWS);
- Kenya Forest Service (KFS);
- County Government of Marsabit;
- County Department of Lands and Physical Planning;
- Karare Ward leadership;
- local administration including chiefs and assistant chiefs;
- REPAL representatives;
- and community elders from the proposed excision areas.

The initial consultations focused on understanding the legal and environmental context of the proposed excision process, identifying key environmental and social concerns, obtaining institutional guidance regarding ESIA requirements, and understanding community settlement dynamics within the reserve landscape. Key issues identified during this phase included land tenure insecurity, human-wildlife interactions, environmental conservation concerns, future settlement planning, infrastructure limitations, and protection of ecological corridors.

Following completion of the preliminary scoping phase, stakeholder engagement activities continued into 2026 through expanded consultations, public participation meetings, Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), transect walks, household consultations, and institutional meetings conducted across Karare II, Kamboe, Parkishon, and Kambinye settlements.

The 2026 consultation phase focused on:

- community sensitization regarding the proposed excision process;
- collection of stakeholder views and concerns;
- validation of environmental and social baseline conditions;
- identification of vulnerable groups;
- assessment of existing infrastructure and livelihood systems;
- and formulation of recommendations and mitigation measures for integration into the ESIA report.

Additional consultations undertaken in 2026 involved:

- public participation barazas;
- meetings with women groups and youth groups;
- consultations with education and healthcare practitioners;
- institutional stakeholder meetings;
- and continued engagement with local administration and conservation agencies.

The continuous stakeholder engagement process enabled the ESIA team to progressively gather information, verify field observations, identify emerging concerns, strengthen community awareness, and ensure that stakeholder perspectives were adequately incorporated into the ESIA findings and recommendations. The process further enhanced transparency, stakeholder ownership, institutional coordination, and community participation throughout the ESIA study period.

The consultation process demonstrated broad stakeholder support for the proposed excision process while emphasizing the importance of balancing settlement regularization, environmental conservation, sustainable land use planning, and protection of wildlife corridors and sensitive ecological areas within the project landscape.

7.6 COMMUNITY MEETINGS AND CONSULTATIONS

Community meetings and consultations formed a critical component of the Environmental and Social Impact Assessment (ESIA) process for the proposed excision of settled areas from the Marsabit National Reserve. The consultations were undertaken to ensure that affected communities and stakeholders were adequately informed about the proposed excision process and provided with an opportunity to express their views, concerns, expectations, and recommendations regarding the project.

The meetings were conducted within Karare II, Kamboe, Parkishon, and Kambinye settlements through a participatory and inclusive approach involving local administration, community leaders, vulnerable groups, institutional stakeholders, and local residents. The consultations were facilitated by the ESIA study team in collaboration with REPAL representatives and local leadership structures.

The consultation process focused on explaining the objectives of the proposed excision, the ESIA process and legal requirements, potential environmental and social impacts, land tenure regularization, wildlife conservation concerns, and future settlement planning considerations. Community members were encouraged to openly share their concerns, recommendations, and expectations regarding the proposed excision process and future development within the settlement areas.

7.6.1 COMMUNITY MEETING WITHIN KARARE II – 9TH JUNE 2026

The public participation meeting for Karare II was held on 9th June 2026 at the Karare Chief's Office Grounds as indicated in the official public notice issued during the stakeholder notification process. The meeting brought together community elders, women representatives, youth groups, local residents, REPAL representatives, GIS technical personnel, conservation stakeholders, and the ESIA study team.

Discussions within Karare II focused on the historical settlement status of the area, land ownership insecurity, environmental conservation, and future infrastructure development needs. Community members acknowledged that the settlement has existed for several decades and emphasized the importance of formal recognition of the area to facilitate access to public services and development programs.

Participants highlighted several key concerns including land tenure insecurity, human-wildlife interactions, inadequate infrastructure, environmental degradation, and limited investment in public services due to the current legal status of the land. Community members further emphasized the need to protect wildlife corridors and maintain peaceful coexistence between local residents and wildlife populations within the surrounding reserve ecosystem.

The consultations revealed strong community support for the proposed excision process, with participants expressing optimism that legal recognition of the settlements would improve access to education, healthcare, water infrastructure, roads, and other public services.



Figure 7-7: Community Public Participation Meeting at Karare II Held on 9th June 2026

7.6.2 COMMUNITY MEETING WITHIN KAMBOE – 10TH JUNE 2026

The public participation meeting for Kamboe settlement was held on 10th June 2026 at the Kamboe Chief's Camp in accordance with the public notification schedule issued prior to the consultation process. The meeting involved participation from community elders, women groups, youth representatives, teachers, healthcare practitioners, local administration, and the ESIA study team.

Community discussions within Kamboe highlighted concerns relating to water shortages, infrastructure limitations, access to education, environmental conservation, and livelihood sustainability. Participants emphasized that legal recognition of the settlement would facilitate improved government investment in infrastructure development and social services.



Figure 7-8: Public Consultation Meeting within Kamboe Settlement Held on 10th June 2026

Women groups highlighted the challenges associated with water access and household resource shortages, particularly during prolonged dry periods. Youth groups emphasized the need for employment opportunities, technical training, and support for livelihood diversification programs.

Education stakeholders also raised concerns regarding inadequate school facilities, limited staffing, and water shortages affecting learning conditions.

Community members acknowledged the importance of wildlife conservation and indicated willingness to support protection of wildlife corridors and environmentally sensitive areas during future settlement planning processes.

7.6.3 COMMUNITY MEETING WITHIN PARKISHON – 11TH JUNE 2026

The Parkishon public participation meeting was held on 11th June 2026 at Parkishon Trading Centre following issuance of the official seven-day public notice and community mobilization activities. The meeting brought together local residents, elders, women groups, youth representatives, community leaders, and the ESIA consultation team.



Figure 7-9: Community Stakeholder Consultation Meeting within Parkishon Area Held on 11th June 2026

Consultations within Parkishon focused on land ownership concerns, environmental sustainability, grazing access, infrastructure development, and social service provision within the settlement. Community members emphasized the importance of balancing settlement expansion with environmental conservation and sustainable land management practices.

Participants expressed concerns regarding increasing environmental degradation, declining vegetation cover, limited healthcare access, poor road conditions, and inadequate access to water infrastructure. The consultations further revealed strong support for integrated land use planning and preservation of ecological connectivity areas to minimize future human-wildlife conflicts.

Women groups and elders particularly emphasized the importance of preserving cultural values, indigenous environmental knowledge, and traditional resource management practices within the area.

7.6.4 COMMUNITY MEETING WITHIN KAMBINYE – 12TH JUNE 2026

The public consultation meeting for Kambinye settlement was held on 12th June 2026 at Kambinye Community Grounds as indicated within the official public notice issued prior to commencement of stakeholder engagement activities. The meeting was attended by community elders, women representatives, youth groups, local administration, REPAL representatives, and the ESIA study team.



Figure 7-10: Community Consultation Meeting within Kambinye Area Held on 12th June 2026

Community consultations within Kambinye focused on land ownership, future settlement planning, grazing systems, environmental conservation, and livelihood security. Participants emphasized that the excision process should be implemented transparently and fairly while ensuring protection of ecological resources and culturally important sites within the area.

Community members highlighted concerns regarding future land allocation processes, protection of grazing areas, environmental degradation, and possible increase in settlement pressure following formal land recognition. Participants also emphasized the importance of maintaining wildlife corridors and supporting community-led conservation initiatives as part of future settlement planning processes.

The consultations indicated strong community willingness to cooperate with environmental management initiatives and sustainable land use planning activities following completion of the excision process.

7.6.5 KEY ISSUES RAISED DURING COMMUNITY CONSULTATIONS

Community consultations undertaken within Karare II, Kamboe, Parkishon, and Kambinye settlements generated extensive discussions regarding the social, environmental, economic, and institutional conditions affecting local residents within the proposed excision areas. The consultations revealed several recurring concerns and priorities consistently raised across the various stakeholder groups including elders, women groups, youth representatives, pastoralists, teachers, healthcare practitioners, vulnerable households, and local administration officials.

The issues raised during the consultations reflected the long-standing challenges associated with settlement within a gazetted conservation area where limitations in formal land tenure, infrastructure investment, and public service provision have affected socio-economic development and environmental management within the affected settlements.

1) LAND TENURE INSECURITY AND SETTLEMENT RECOGNITION

Land tenure insecurity emerged as the most dominant issue raised during the consultation process across all settlements. Community members expressed concern regarding the absence of formal ownership documentation despite having occupied and developed the areas for several decades. Participants indicated that the lack of secure land tenure has negatively affected household investment, infrastructure development, access to credit facilities, and long-term settlement planning.

Residents emphasized that the current legal status of the land as part of the Marsabit National Reserve has created uncertainty regarding ownership rights and has limited government investment in public infrastructure and social services. Community members therefore strongly supported the

proposed excision process as a mechanism for achieving formal settlement recognition and land ownership security.

Women groups particularly emphasized that land tenure insecurity disproportionately affects vulnerable households, widows, and female-headed households who often lack legal documentation or customary recognition over land ownership.

2) INADEQUATE SOCIAL INFRASTRUCTURE AND PUBLIC SERVICES

Stakeholders consistently raised concerns regarding inadequate public infrastructure and limited access to essential social services within the proposed excision areas. Participants noted that despite the existence of established settlements, investment in education, healthcare, water supply systems, roads, and administrative infrastructure remains inadequate due to the unresolved legal status of the settlements.

Education stakeholders highlighted:

- inadequate classrooms;
- shortage of teachers;
- insufficient learning materials;
- limited boarding facilities;
- and inadequate sanitation infrastructure within schools.

Healthcare practitioners and community members reported:

- inadequate healthcare staffing;
- shortage of drugs and medical supplies;
- poor referral systems;
- and limited maternal and child healthcare infrastructure.

Participants emphasized that legal recognition of the settlements would facilitate increased county and national government investment in public infrastructure and service delivery.

Table 7-3: Key Infrastructure Challenges Raised during Community Consultations

INFRASTRUCTURE SECTOR	KEY ISSUES RAISED BY COMMUNITIES
Education	Inadequate classrooms, shortage of teachers, limited learning materials, inadequate sanitation facilities, water shortages in schools

Healthcare	Shortage of medical personnel, inadequate drugs and equipment, poor referral systems, inadequate maternal healthcare services
Water Supply	Water shortages during dry seasons, inadequate boreholes, long distances to water points, unreliable water infrastructure
Roads	Poor road conditions, seasonal inaccessibility, limited internal access roads
Administration	Limited administrative offices, inadequate security infrastructure
Sanitation	Low sanitation coverage, reliance on pit latrines, inadequate waste management systems

3) Water Scarcity and Sanitation Challenges

Water scarcity emerged as one of the most critical concerns raised during the public consultation meetings. Community members indicated that households within the settlements experience recurrent water shortages particularly during prolonged drought periods. Women and children were identified as being disproportionately affected due to their primary role in water collection and household management.

Participants explained that existing water infrastructure including boreholes, water pans, kiosks, and storage facilities remains insufficient to meet growing community demand. Some settlements reported long walking distances to water points, unreliable water supply systems, and increased competition for water resources between households and livestock during dry seasons.

Sanitation conditions within portions of the project area were also reported to be inadequate. Participants indicated that many households rely on basic pit latrines while drainage and solid waste management systems remain poorly developed within the settlements.

4) HUMAN-WILDLIFE INTERACTIONS

Human-wildlife interactions emerged as a major concern during consultations due to the location of the settlements within or adjacent to important wildlife habitats and movement corridors associated with the Marsabit National Reserve ecosystem.

Community members reported occasional incidences involving:

- crop destruction by wildlife;
- livestock predation;
- restricted grazing access;

- and risks associated with wildlife movement near settlements.

Participants acknowledged the importance of wildlife conservation but emphasized the need for practical measures to minimize conflicts between wildlife and expanding human settlements. Several stakeholders proposed preservation of designated wildlife corridors, controlled settlement expansion, and strengthened community awareness on wildlife conservation practices.

Conservation agencies and community leaders further emphasized the importance of balancing settlement regularization with protection of ecologically sensitive areas and wildlife movement routes.

Table 7-4: Common Human-Wildlife Interaction Issues Raised by Communities

WILDLIFE INTERACTION ISSUE	COMMUNITY CONCERNS
Livestock predation	Loss of goats, sheep, and calves to predators
Crop destruction	Wildlife damaging farms and kitchen gardens
Wildlife movement near settlements	Safety concerns especially for children and livestock
Grazing competition	Competition for pasture and water resources
Habitat disturbance	Fear of increased environmental degradation following settlement expansion

5) ENVIRONMENTAL DEGRADATION AND VEGETATION LOSS

Community members and institutional stakeholders raised concerns regarding increasing environmental degradation within portions of the proposed excision areas. Key concerns included:

- vegetation loss;
- charcoal burning;
- overgrazing;
- soil erosion;
- and degradation of seasonal drainage areas.

Participants observed that increasing settlement pressure and prolonged drought conditions have contributed to reduction in vegetation cover and deterioration of grazing resources within some sections of the landscape. Elders and pastoralists indicated that pasture conditions have declined over time due to recurrent droughts and increasing human activities.

Stakeholders emphasized the need for:

- environmental restoration programs;
- tree planting initiatives;
- sustainable grazing management;
- and protection of ecologically sensitive areas during future settlement planning.

6) GRAZING SYSTEMS AND LIVELIHOOD VULNERABILITY

Pastoralism remains the dominant livelihood activity within the proposed excision areas and consultations revealed concerns regarding declining pasture availability and increasing livelihood vulnerability associated with drought conditions and environmental degradation.

Pastoralists expressed concern that unplanned settlement expansion could potentially reduce grazing areas and obstruct livestock movement routes if future land use planning is not properly managed. Community members therefore recommended that future settlement planning should integrate grazing management systems and preserve important communal grazing zones.

Youth groups also highlighted increasing unemployment and declining livelihood opportunities within the settlements. Participants emphasized the need for livelihood diversification programs, vocational training, and support for small-scale business activities following formalization of the settlements.

7) VULNERABLE GROUPS AND SOCIAL INCLUSION

Women groups, youth representatives, elderly persons, persons living with disabilities, and vulnerable households emphasized the importance of ensuring inclusive participation and equitable access to future development opportunities associated with the proposed excision process.

Women groups raised concerns regarding:

- limited economic opportunities;
- heavy domestic responsibilities;
- inadequate access to water;
- and vulnerability during drought periods.

Youth representatives highlighted unemployment, limited access to technical training opportunities, and inadequate support for income-generating activities. Vulnerable households also emphasized the need for transparent land allocation processes and equitable access to future public services and development opportunities.

Participants therefore recommended that implementation of the excision process should incorporate social inclusion measures targeting vulnerable groups and marginalized households.

8) COMMUNITY EXPECTATIONS AND RECOMMENDATIONS

The consultation process revealed overwhelming community support for the proposed excision process across all settlements. Community members expressed optimism that legal recognition of the settlements would improve:

- access to land ownership documents;
- infrastructure investment;
- education and healthcare services;
- water supply systems;
- road accessibility;
- and livelihood opportunities.

Stakeholders further recommended:

- protection of wildlife corridors;
- implementation of structured land use planning;
- strengthening environmental conservation initiatives;
- establishment of grievance redress mechanisms;
- and continued stakeholder engagement throughout implementation of the excision process.

The issues raised during the consultation process were subsequently integrated into the ESIA baseline analysis, impact assessment, mitigation measures, Environmental and Social Management Plan (ESMP), and project recommendations.

7.7 RESPONSES TO STAKEHOLDER CONCERNS

The concerns, views, and recommendations raised by stakeholders during the public participation and consultation process were carefully reviewed and integrated into the Environmental and Social Impact Assessment (ESIA) process. The ESIA study team analyzed the issues raised by communities, institutions, local administration, and conservation stakeholders and incorporated appropriate responses and mitigation measures within the project planning framework, impact assessment, and Environmental and Social Management Plan (ESMP).

1) RESPONSE TO LAND TENURE INSECURITY CONCERNS

Land tenure insecurity emerged as one of the most significant concerns raised by communities across Karare II, Kamboe, Parkishon, and Kambinye settlements. Community members expressed concern regarding the absence of formal ownership documentation despite long-term occupation of the settlements.

In response, the proposed excision process seeks to facilitate formal recognition of the settlements and provide a framework for future land adjudication, demarcation, and issuance of land ownership documentation in accordance with applicable legal and institutional procedures. The ESIA further recommends structured land use planning and transparent land allocation processes to minimize future land-related disputes and ensure equitable access to land ownership opportunities.

2) RESPONSE TO INADEQUATE INFRASTRUCTURE AND PUBLIC SERVICE CONCERNS

Stakeholders raised concerns regarding inadequate educational facilities, healthcare infrastructure, water supply systems, roads, sanitation infrastructure, and administrative services within the proposed excision areas. Participants attributed the limited infrastructure investment to the current legal status of the settlements within the reserve.

The ESIA therefore recommends integration of the proposed excision areas into formal county and national development planning frameworks following completion of the excision process. Recommendations have also been provided for future improvement of:

- education infrastructure;
- healthcare services;
- water supply systems;
- sanitation facilities;
- road accessibility;
- and administrative infrastructure within the settlements.

The study further emphasizes the need for coordinated infrastructure planning to accommodate future population growth and settlement expansion.

3) RESPONSE TO WATER SCARCITY AND SANITATION CHALLENGES

Water scarcity and inadequate sanitation infrastructure were consistently identified as major challenges affecting local communities, particularly women and children who bear the primary responsibility for household water collection.

In response, the ESIA recommends:

- expansion and rehabilitation of community water infrastructure;
- development of additional boreholes and water storage systems;
- strengthening of water resource management systems;
- and improvement of sanitation infrastructure within the settlements.

The ESIA also recommends implementation of sustainable water management measures and protection of water catchment and drainage areas to improve long-term water availability within the project area.

4) RESPONSE TO HUMAN-WILDLIFE INTERACTION CONCERNS

Communities expressed concern regarding livestock predation, destruction of property, grazing competition, and safety risks associated with wildlife movement near settlements and grazing areas.

To address these concerns, the ESIA recommends:

- preservation of designated wildlife movement corridors;
- integration of ecological considerations within future land use planning;
- strengthening of community awareness on wildlife conservation;
- and collaboration between communities, Kenya Wildlife Service (KWS), and local administration in management of human-wildlife interactions.

The ESIA further recommends controlled settlement expansion within ecologically sensitive areas to minimize obstruction of wildlife movement routes and reduce future human-wildlife conflicts.

5) RESPONSE TO ENVIRONMENTAL DEGRADATION CONCERNS

Stakeholders raised concerns regarding vegetation loss, overgrazing, soil erosion, charcoal burning, and degradation of ecologically sensitive areas within portions of the project landscape.

In response, the ESIA proposes several environmental management measures including:

- community tree planting initiatives;
- environmental restoration programmes;

- protection of drainage systems and ecological corridors;
- controlled settlement planning;
- and strengthening of environmental conservation awareness within the settlements.

The study further recommends integration of sustainable land use management principles into future settlement development planning to minimize environmental degradation within the proposed excision areas.

6) RESPONSE TO GRAZING AND LIVELIHOOD CONCERNS

Pastoralists and community elders raised concerns regarding declining pasture availability, reduced grazing access, and vulnerability of pastoral livelihoods to drought and settlement expansion.

The ESIA therefore recommends:

- preservation of communal grazing areas;
- integration of grazing management systems within future land use plans;
- and implementation of sustainable rangeland management practices within the settlements.

The study also recommends strengthening livelihood diversification initiatives, drought resilience programmes, and community-based natural resource management systems to improve socio-economic resilience within the project area.

7) RESPONSE TO YOUTH AND VULNERABLE GROUP CONCERNS

Youth groups highlighted unemployment, inadequate technical training opportunities, and limited livelihood diversification within the settlements. Women groups and vulnerable households also emphasized concerns relating to economic vulnerability, water shortages, and limited access to development opportunities.

In response, the ESIA recommends:

- strengthening youth empowerment and vocational training initiatives;
- promoting inclusive participation during implementation of the excision process;
- supporting women-led livelihood activities;
- and ensuring equitable access to future development opportunities and public services.

The ESIA further emphasizes the importance of integrating vulnerable groups into future planning and decision-making processes associated with settlement development and environmental management.

8) RESPONSE TO COMMUNITY REQUESTS FOR TRANSPARENCY AND CONTINUED ENGAGEMENT

Stakeholders consistently emphasized the importance of transparency, fairness, and continued stakeholder involvement throughout implementation of the proposed excision process.

In response, the ESIA recommends:

- continued stakeholder consultations during future implementation stages;
- establishment of grievance redress mechanisms;
- transparent communication regarding land allocation and planning processes;
- and active involvement of local communities, local administration, and institutional stakeholders throughout implementation of the project.

The study further recommends periodic stakeholder feedback sessions and community sensitization programmes to enhance transparency, trust, and community ownership of the process.

Table 7-5: Summary of Stakeholder Concerns and ESIA Responses

STAKEHOLDER CONCERN	ESIA RESPONSE / RECOMMENDATION
Land tenure insecurity	Support structured land adjudication and transparent settlement planning
Inadequate infrastructure	Recommend future investment in schools, healthcare, roads, water, and sanitation
Water shortages	Expansion of boreholes, water storage systems, and sustainable water management
Human-wildlife interactions	Protection of wildlife corridors and strengthening conservation awareness
Environmental degradation	Environmental restoration, tree planting, and sustainable land management
Grazing and livelihood challenges	Protection of grazing areas and promotion of sustainable rangeland management
Youth unemployment	Support for vocational training and livelihood diversification programmes
Vulnerable group concerns	Promote inclusive participation and equitable access to development opportunities

Transparency concerns	Continued stakeholder engagement and establishment of grievance mechanisms

The responses incorporated within the ESIA process aim to ensure that the proposed excision process supports sustainable settlement development, environmental conservation, improved public service delivery, and long-term socio-economic resilience within the proposed excision areas.

7.7.1 COMMUNITY RECOMMENDATIONS AND EXPECTATIONS

The stakeholder consultation process revealed overwhelming support for the proposed excision process across Karare II, Kamboe, Parkishon, and Kambinye settlements. Community members generally viewed the proposed excision as a long-awaited opportunity to address historical land tenure challenges, improve settlement recognition, and facilitate socio-economic development within the affected areas.

Participants expressed optimism that formal recognition of the settlements would create opportunities for improved government investment in public infrastructure and service delivery including education facilities, healthcare services, roads, water supply systems, sanitation infrastructure, electricity connectivity, and administrative services. Community members further indicated that secure land tenure would enhance household investment, settlement planning, and access to financial and development opportunities within the area.

Many stakeholders emphasized that legal recognition of the settlements would strengthen community confidence and improve long-term livelihood security by enabling residents to formally own and develop their land. Youth groups particularly expressed expectations that the excision process would attract development programmes, employment opportunities, vocational training initiatives, and improved socio-economic prospects for younger populations within the settlements.

Despite the strong support for the excision process, stakeholders emphasized the importance of ensuring that future settlement development remains environmentally sustainable and socially inclusive. Community members consistently recommended protection of wildlife movement corridors, ecological connectivity zones, grazing areas, seasonal drainage systems, and other environmentally sensitive areas within the wider Marsabit ecosystem.

Participants further recommended implementation of structured land use planning frameworks capable of guiding future settlement expansion, infrastructure development, grazing management, environmental conservation, and protection of culturally significant sites. Stakeholders emphasized

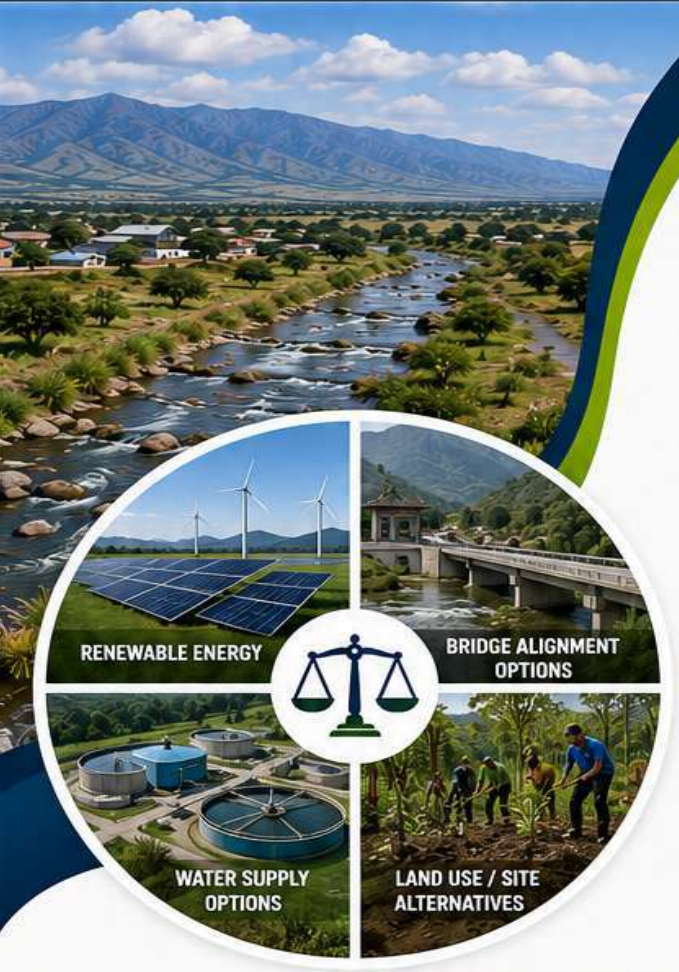
that unplanned settlement growth could potentially increase environmental degradation, human-wildlife conflicts, and pressure on natural resources if not properly managed.

Communities also recommended strengthening environmental conservation awareness programmes and promoting community participation in environmental restoration activities such as tree planting, protection of vegetation cover, sustainable grazing management, and conservation of water resources. Several stakeholders acknowledged the importance of maintaining peaceful coexistence between communities and wildlife and expressed willingness to support future conservation initiatives within the landscape.

Concerns were also raised regarding the need for transparency, accountability, and fairness during implementation of the excision process. Community members therefore recommended establishment of accessible grievance handling and conflict resolution mechanisms to address potential disputes relating to land allocation, boundary demarcation, environmental management, and future settlement planning.

Stakeholders further emphasized the importance of continued community engagement and institutional consultations throughout future implementation stages to ensure that affected communities remain adequately informed and involved in decision-making processes. Participants recommended regular feedback meetings, continuous public awareness programmes, and close collaboration between communities, government agencies, conservation institutions, and local administration during implementation of the excision process.

The consultation process therefore generated critical information regarding community priorities, environmental concerns, infrastructure needs, conservation expectations, and socio-economic development aspirations within the proposed excision areas. The views, recommendations, and concerns raised by stakeholders were subsequently integrated into the ESIA baseline analysis, impact assessment, mitigation measures, Environmental and Social Management Plan (ESMP), and overall project recommendations.



CHAPTER 08

PROJECT ALTERNATIVES ANALYSIS

EXPLORE · COMPARE · EVALUATE · SELECT · DECIDE

Exploring and evaluating reasonable project alternatives helps identify the option that best meets project objectives while avoiding, minimizing or mitigating negative environmental and social impacts and enhancing positive benefits.

WHY ANALYZE ALTERNATIVES?

Achieve Objectives
Identify options that best meet the project purpose and need.

Avoid & Minimize Impacts
Reduce potential adverse environmental and social impacts.

Enhance Benefits
Maximize positive impacts and long-term sustainability.

Ensure Feasibility
Consider technical, economic, institutional and social feasibility.

Support Decisions
Provide a transparent and rational basis for selection.

ALTERNATIVES ANALYSIS PROCESS

1. SCREEN
Identify a wide range of alternatives and screen out those that are clearly not viable.

2. DESCRIBE
Describe each alternative including key characteristics and assumptions.

3. ASSESS
Evaluate potential environmental and social impacts, benefits and risks.

4. COMPARE
Compare alternatives using evaluation criteria and stakeholder input.

5. SELECT
Identify the preferred alternative and justification for selection.

6. DISCLOSE
Document the analysis and disclose findings to stakeholders and authorities.

TYPES OF ALTERNATIVES

- **No-Project (Do-Nothing) Alternative** — The baseline scenario if the project is not implemented.
- **Alternative Locations / Alignments** — Different sites, routes or layouts.
- **Alternative Designs / Technologies** — Different engineering designs or technological options.
- **Alternative Methods** — Different construction methods or implementation approaches.
- **Alternative Scale / Size** — Different capacities, dimensions or phasing options.
- **Alternative Land Use / Resource Use** — Different ways of utilizing land and natural resources.

EVALUATION CRITERIA EXAMPLES

ENVIRONMENTAL
- Air quality
- Water resources
- Biodiversity & habitats
- Land use
- Natural hazards
- Climate change

SOCIAL
- Population & health
- Resettlement
- Livelihoods & jobs
- Cultural heritage
- Community cohesion
- Vulnerable groups

ECONOMIC
- Capital cost
- Operation & maintenance cost
- Economic benefits
- Cost–benefit ratio
- Affordability

TECHNICAL
- Engineering feasibility
- Reliability & performance
- Constructability
- Resource availability
- Technology maturity

INSTITUTIONAL
- Policy & legal compliance
- Institutional capacity
- Implementation arrangements
- Permitting requirements

SUSTAINABILITY
- Long-term viability
- Resource efficiency
- Climate resilience
- Intergenerational equity
- Cumulative impacts

OUTPUTS OF ALTERNATIVES ANALYSIS

- Shortlist of viable alternatives
- Impact comparison and trade-offs
- Preferred alternative
- Mitigation & management measures
- Stakeholder feedback summary
- Rationale for decision

KEY PRINCIPLES

- Be inclusive and transparent
- Use reliable data and sound science
- Consider local context and traditional knowledge
- Ensure fairness and equity
- Document and communicate clearly

Good decisions today create a sustainable and

CHAPTER 8: PROJECT ALTERNATIVES ANALYSIS

Analysis of project alternatives forms an important component of the Environmental and Social Impact Assessment (ESIA) process as it provides an opportunity to evaluate different options capable of achieving the project objectives while minimizing adverse environmental and social impacts. In accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), and the Environmental (Impact Assessment and Audit) Regulations, 2003, this chapter examines the various alternatives considered for the proposed excision of settled areas from the Marsabit National Reserve.

The alternatives analysis focuses on assessing the environmental, social, economic, legal, and institutional implications associated with different project options, including the "No Project" alternative, alternative land management approaches, and the proposed excision option. The analysis further considers issues relating to land tenure security, environmental conservation, settlement planning, infrastructure development, human-wildlife interactions, and long-term sustainability within the proposed excision areas.

The purpose of the alternatives analysis is to identify the most feasible and environmentally sustainable option capable of addressing the long-standing settlement challenges within Karare II, Kamboe, Parkishon, and Kambinye while ensuring protection of ecological integrity, wildlife corridors, and sensitive environmental resources within the wider Marsabit ecosystem.

8.1 NO PROJECT ALTERNATIVE

The "No Project" alternative refers to a scenario where the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve would not be undertaken. Under this alternative, the affected settlements would remain legally classified as part of the gazetted protected area despite the long-standing human occupation, establishment of permanent settlements, and development of public infrastructure within the area.

Maintaining the current status quo would imply continuation of the existing legal and administrative challenges associated with settlement within a protected conservation landscape. Communities residing within the proposed excision areas would continue to experience land tenure insecurity due

to lack of formal land ownership documentation and uncertainty regarding future settlement recognition.

8.1.1 IMPLICATIONS ON LAND TENURE AND SETTLEMENT RECOGNITION

Under the "No Project" alternative, communities within the proposed excision areas would continue facing challenges associated with insecure land tenure and lack of formal settlement recognition. Residents would remain without legal ownership documents despite having occupied and developed the settlements for several decades.

The absence of secure land tenure would continue limiting:

- household investment opportunities;
- infrastructure development;
- access to credit facilities;
- and long-term socio-economic planning within the settlements.

Community members would also continue facing uncertainty regarding future settlement legality and land administration processes within the reserve landscape.

8.1.2 IMPLICATIONS ON INFRASTRUCTURE DEVELOPMENT AND PUBLIC SERVICES

The "No Project" alternative would likely sustain the current limitations affecting investment in public infrastructure and social services within the settlements. Existing challenges relating to inadequate education facilities, limited healthcare infrastructure, poor road access, insufficient water supply systems, and weak administrative infrastructure would continue affecting local communities.

Due to the legal restrictions associated with development within gazetted reserve land, future public investment by county and national government institutions would likely remain constrained. This would continue limiting implementation of infrastructure development programmes and expansion of public services within the settlements.

8.1.3 IMPLICATIONS ON ENVIRONMENTAL MANAGEMENT

From an environmental perspective, maintaining the current reserve status without structured settlement planning may not necessarily guarantee improved environmental conservation outcomes.

Existing human activities within the settlements including grazing, infrastructure development, fuelwood collection, and localized vegetation clearing would likely continue without clear spatial planning frameworks and environmental management controls.

The absence of formalized settlement planning could therefore contribute to:

- gradual environmental degradation;
- habitat fragmentation;
- increased pressure on grazing systems;
- and encroachment into ecologically sensitive areas.

Additionally, lack of coordinated land use planning could further increase pressure on wildlife movement corridors and seasonal drainage systems within portions of the landscape.

8.1.4 IMPLICATIONS ON HUMAN-WILDLIFE INTERACTIONS

The "No Project" alternative would sustain the existing human-wildlife interaction challenges affecting local communities due to the continued overlap between settlement areas and wildlife habitats associated with the Marsabit ecosystem.

Community concerns relating to:

- livestock predation;
- wildlife movement near settlements;
- grazing competition;
- and destruction of property by wildlife

would likely remain unresolved in the absence of coordinated settlement planning and environmental management interventions.

The absence of clearly designated wildlife corridors and structured land use planning could potentially increase future human-wildlife conflicts within portions of the project area.

8.1.5 IMPLICATIONS ON LIVELIHOODS AND SOCIO-ECONOMIC DEVELOPMENT

Economically, the "No Project" alternative would likely limit future investment opportunities within the settlements due to lack of legal clarity regarding land ownership and settlement status. This would continue affecting:

- infrastructure financing;
- business development;
- institutional investment;
- and implementation of county and national development programmes within the affected areas.

Pastoral livelihoods would also continue facing increasing pressure associated with environmental degradation, declining grazing resources, drought conditions, and inadequate support infrastructure.

Socially, failure to implement the proposed excision could increase community dissatisfaction and perceptions of continued historical marginalization due to prolonged delays in settlement recognition and land regularization.

8.1.6 COMMUNITY PERSPECTIVES ON THE NO PROJECT ALTERNATIVE

Stakeholder consultations undertaken during the ESIA process revealed overwhelming community support for the proposed excision process, with many residents viewing it as a necessary step toward improving land tenure security, infrastructure development, livelihood resilience, and access to public services.

Most community members indicated that maintaining the current reserve status without excision would continue limiting socio-economic development and perpetuate long-standing settlement challenges within the area.

Communities further emphasized that the “No Project” alternative would not adequately address existing:

- land ownership concerns;
- infrastructure deficits;
- livelihood vulnerabilities;
- and settlement planning challenges.

8.1.7 CONCLUSION ON THE NO PROJECT ALTERNATIVE

Although the “No Project” alternative would technically maintain the current protected area status of the land, it would not adequately address the existing social, economic, environmental, and land tenure challenges affecting the proposed excision areas.

The alternative would therefore perpetuate:

- land tenure insecurity;
- inadequate infrastructure development;
- uncoordinated settlement growth;
- environmental pressure;
- and continued socio-economic vulnerability within the project area.

Based on the analysis undertaken, the "No Project" alternative was considered less desirable due to its inability to adequately address the long-standing settlement and development challenges affecting Karare II, Kamboe, Parkishon, and Kambinye settlements.

Table 8-1: Summary of Implications of the "No Project" Alternative

ASPECT	LIKELY IMPLICATIONS UNDER THE NO PROJECT ALTERNATIVE
Land Tenure	Continued land ownership insecurity and lack of formal settlement recognition
Infrastructure Development	Continued inadequate investment in roads, schools, healthcare, water, and sanitation
Environmental Management	Unplanned settlement expansion and continued environmental pressure
Human-Wildlife Interactions	Continued conflicts and unmanaged ecological interactions
Livelihoods	Limited economic opportunities and continued livelihood vulnerability
Settlement Planning	Absence of structured land use planning and spatial management
Social Wellbeing	Continued marginalization and limited access to public services
Conservation	Continued pressure on ecological corridors without integrated planning mechanisms

8.2 PARTIAL EXCISION ALTERNATIVE

The Partial Excision Alternative refers to a scenario where only selected portions of the currently settled areas within Karare II, Kamboe, Parkishon, and Kambinye would be excised from the Marsabit National Reserve while other sections would remain under protected reserve status. Under this alternative, excision would primarily target densely settled areas and exclude sections considered

environmentally sensitive, ecologically important, or strategically important for wildlife conservation and ecological connectivity.

The alternative would therefore involve a more restricted excision approach aimed at balancing settlement regularization with conservation objectives by retaining portions of the landscape under reserve protection. This approach would require careful delineation of settlement boundaries, ecological corridors, grazing areas, drainage systems, and wildlife movement zones within the broader project landscape.

8.2.1 POTENTIAL ADVANTAGES OF THE PARTIAL EXCISION ALTERNATIVE

One of the main advantages of the Partial Excision Alternative would be the potential reduction in direct environmental impacts associated with large-scale conversion of reserve land into formal settlement areas. Retaining environmentally sensitive zones within the reserve would help preserve important ecological habitats, wildlife movement corridors, grazing dispersal areas, and biodiversity conservation functions within the wider Marsabit ecosystem.

The alternative could also:

- reduce pressure on ecologically sensitive areas;
- minimize habitat fragmentation;
- maintain sections of natural vegetation cover;
- and support continued ecological connectivity between the reserve and surrounding landscapes.

From a conservation perspective, partial excision could provide opportunities for development of controlled buffer zones between settlement areas and core wildlife habitats, thereby potentially reducing future human-wildlife interactions within some sections of the landscape.

The approach may further allow phased settlement planning and gradual infrastructure development while providing additional time for environmental management planning and institutional coordination.

8.2.2 POTENTIAL CHALLENGES ASSOCIATED WITH THE PARTIAL EXCISION ALTERNATIVE

Despite the potential environmental benefits, the Partial Excision Alternative would present several significant social, legal, administrative, and planning challenges within the project area.

One of the major limitations of this alternative would be the possibility of excluding portions of already established settlements and community infrastructure from the excision process. This could create social dissatisfaction and perceptions of inequality among community members whose settlements or grazing areas may remain within the reserve boundaries.

Community consultations undertaken during the ESIA process revealed that settlement patterns within Karare II, Kamboe, Parkishon, and Kambinye are relatively interconnected, with residential areas, grazing systems, institutions, roads, water points, and livelihood activities occurring across different sections of the landscape. Partial excision could therefore create:

- fragmented settlement boundaries;
- administrative complexity;
- land ownership disputes;
- and difficulties in future settlement planning and service delivery.

The alternative could also complicate future infrastructure development due to uncertainty regarding settlement boundaries and legal jurisdiction within partially excised areas.

8.2.3 IMPLICATIONS ON LAND TENURE AND SETTLEMENT PLANNING

Under the Partial Excision Alternative, some residents and institutions could potentially remain within reserve land despite long-standing occupation and development. This would continue exposing portions of the population to land tenure insecurity and uncertainty regarding future settlement recognition.

The alternative may also create inconsistencies in:

- land ownership systems;
- spatial planning;
- infrastructure investment;
- and access to public development programmes.

Future settlement expansion within partially excised landscapes could become difficult to regulate and may increase risks of boundary conflicts and informal encroachment into retained reserve areas.

From a planning perspective, implementation of the Partial Excision Alternative would require:

- highly detailed spatial planning;
- accurate boundary demarcation;
- strict land use controls;
- and continuous monitoring of settlement expansion within the interface between reserve land and excised areas.

8.2.4 IMPLICATIONS ON HUMAN-WILDLIFE INTERACTIONS

Although retention of ecological corridors under the Partial Excision Alternative may support wildlife conservation objectives, the close proximity between settlements and retained reserve sections could continue exposing communities to human-wildlife interactions within some portions of the landscape.

The alternative may therefore not fully resolve existing concerns relating to:

- livestock predation;
- wildlife movement near settlements;
- grazing competition;
- and destruction of property by wildlife.

Additionally, unclear settlement boundaries and continued overlap between human activities and wildlife habitats could potentially increase conflicts within interface zones between excised and non-excised areas.

8.2.5 IMPLICATIONS ON ENVIRONMENTAL MANAGEMENT

Environmentally, the Partial Excision Alternative could potentially support retention of sensitive ecological areas and wildlife movement corridors within portions of the reserve landscape. However, without proper land use planning and coordinated environmental management, partially excised landscapes may still experience:

- environmental degradation;

- settlement pressure;
- vegetation loss;
- and increasing encroachment into protected zones.

The effectiveness of this alternative would therefore depend heavily on:

- enforcement of spatial planning regulations;
- community compliance with conservation measures;
- effective boundary management;
- and institutional coordination between conservation agencies and settlement authorities.

8.2.6 COMMUNITY PERSPECTIVES ON THE PARTIAL EXCISION ALTERNATIVE

Community consultations undertaken during the ESIA process indicated that most stakeholders preferred a comprehensive and clearly defined excision process capable of addressing long-standing settlement recognition and land ownership concerns across all affected settlements.

Several community members expressed concern that partial excision could:

- leave some households excluded from land regularization processes;
- create uncertainty regarding future land ownership;
- and contribute to social and administrative conflicts within the settlements.

However, stakeholders generally supported the idea of preserving wildlife corridors, ecological connectivity zones, grazing areas, and environmentally sensitive sections of the landscape as part of future land use planning within the excised areas. Communities therefore emphasized the importance of balancing settlement regularization with environmental conservation and sustainable land management.

8.2.7 CONCLUSION ON THE PARTIAL EXCISION ALTERNATIVE

The Partial Excision Alternative presents certain environmental advantages through potential retention of ecologically sensitive areas and wildlife movement corridors within the reserve landscape. However, the alternative also presents significant challenges relating to settlement fragmentation, land tenure insecurity, administrative complexity, infrastructure planning, and future boundary management.

Given the extent of existing settlement development and interconnected livelihood systems within Karare II, Kamboe, Parkishon, and Kambinye areas, the Partial Excision Alternative was considered less effective in comprehensively addressing the long-standing social, legal, and development challenges affecting local communities.

The ESIA therefore considers that while environmental conservation measures and protection of ecological corridors remain critically important, these objectives can be more effectively achieved through integrated land use planning and environmental management within a well-structured excision framework rather than through fragmented partial excision approaches.

Table 8-2: Summary of Implications of the Partial Excision Alternative

ASPECT	IMPLICATIONS UNDER THE PARTIAL EXCISION ALTERNATIVE
Environmental Conservation	Potential retention of sensitive habitats and wildlife corridors
Land Tenure	Continued insecurity for settlements excluded from excision
Settlement Planning	Increased complexity in spatial planning and boundary management
Infrastructure Development	Challenges in infrastructure expansion within fragmented settlement areas
Human-Wildlife Interactions	Continued interface conflicts near retained reserve sections
Administrative Management	Increased monitoring and enforcement requirements
Community Acceptance	Risk of dissatisfaction among excluded households
Long-Term Sustainability	Requires strong institutional coordination and land use controls

8.3 WILDLIFE CORRIDOR RETENTION ALTERNATIVE

The Wildlife Corridor Retention Alternative refers to an approach where the proposed excision of settled areas from the Marsabit National Reserve would be undertaken while specifically preserving and protecting designated wildlife movement corridors and ecologically sensitive connectivity zones within the project landscape. Under this alternative, settlement planning and land demarcation would intentionally exclude key wildlife movement routes, seasonal grazing dispersal areas,

drainage ecosystems, and ecological linkage zones considered important for maintaining wildlife mobility and ecological integrity within the wider Marsabit ecosystem.

The alternative recognizes that although the proposed excision areas contain long-established human settlements and public infrastructure, portions of the landscape still serve ecological functions including wildlife movement, seasonal grazing connectivity, and environmental buffering between settlement areas and protected reserve habitats.

8.3.1 RATIONALE FOR WILDLIFE CORRIDOR RETENTION

The Marsabit ecosystem supports wildlife populations that depend on movement across the landscape for access to grazing areas, water resources, breeding habitats, and seasonal migration routes. Field assessments, institutional consultations, GIS analysis, and stakeholder engagement undertaken during the ESIA process identified the existence of wildlife movement corridors traversing portions of Karare II, Parkishon, Kamboe, and surrounding landscapes.

Stakeholders including Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), local administration, and community members emphasized the importance of maintaining ecological connectivity and minimizing obstruction of wildlife movement routes during implementation of the proposed excision process.

The Wildlife Corridor Retention Alternative was therefore considered as a mechanism for balancing:

- settlement regularization;
- environmental conservation;
- sustainable land use planning;
- and reduction of future human-wildlife interactions.

8.3.2 POTENTIAL ADVANTAGES OF THE WILDLIFE CORRIDOR RETENTION ALTERNATIVE

One of the key advantages of this alternative is the potential to maintain ecological connectivity within the broader Marsabit ecosystem while simultaneously addressing settlement recognition and land tenure concerns affecting local communities.

Retention of wildlife corridors could contribute to:

- preservation of wildlife movement routes;
- reduction of habitat fragmentation;
- maintenance of ecosystem functionality;
- and protection of biodiversity within the landscape.

The approach could also help reduce direct human-wildlife conflicts by creating designated ecological buffers between settlement areas and core wildlife movement zones. Protection of ecological corridors may further support long-term environmental sustainability and strengthen integration of conservation principles within future settlement planning frameworks.

Additional potential advantages include:

- protection of seasonal drainage systems and vegetation cover;
- improved landscape-level environmental management;
- support for ecosystem resilience;
- and enhanced compatibility between settlement development and conservation objectives.

8.3.3 CHALLENGES ASSOCIATED WITH THE WILDLIFE CORRIDOR RETENTION ALTERNATIVE

Despite its environmental advantages, the Wildlife Corridor Retention Alternative presents several implementation and planning challenges within the project area. One of the primary challenges involves the complex settlement patterns already established within portions of the identified wildlife movement areas. Some sections of the proposed ecological corridors overlap with:

- residential settlements;
- grazing areas;
- roads and access routes;
- water points;
- and other community infrastructure.

Retention of wildlife corridors within heavily settled landscapes could therefore create:

- land use conflicts;
- restrictions on future settlement expansion;
- limitations on infrastructure development;
- and potential disputes regarding land allocation and boundary demarcation.

Additionally, effective implementation of this alternative would require:

- clear spatial planning frameworks;
- accurate GIS-based corridor mapping;
- community awareness and cooperation;
- long-term monitoring systems;
- and institutional enforcement mechanisms.

Without effective land use controls and continuous environmental management, retained wildlife corridors may gradually experience encroachment and environmental degradation over time.

8.3.4 IMPLICATIONS ON HUMAN-WILDLIFE INTERACTIONS

The Wildlife Corridor Retention Alternative has the potential to reduce future human-wildlife interactions by maintaining designated wildlife movement routes away from densely settled areas. Controlled settlement planning around ecological corridors may help minimize:

- livestock predation;
- destruction of property;
- wildlife movement through residential areas;
- and competition for grazing and water resources.

However, because portions of the project landscape are already settled and actively utilized by local communities, some level of interaction between wildlife and human activities may continue occurring within interface zones between settlements and retained ecological corridors.

The alternative would therefore require implementation of:

- community conservation awareness programmes;
- conflict mitigation measures;
- controlled land use planning;
- and collaborative management between conservation agencies and local communities.

8.3.5 IMPLICATIONS ON SETTLEMENT PLANNING AND DEVELOPMENT

Under this alternative, future settlement planning would need to incorporate designated ecological corridors and environmentally sensitive zones into formal land use plans. This would require

regulation of settlement expansion and infrastructure development within identified wildlife movement areas.

Although the approach may slightly limit future expansion opportunities within portions of the landscape, it would support development of more environmentally sustainable settlement patterns capable of balancing conservation and development objectives.

The ESIA therefore recommends that:

- ecological corridors be clearly mapped and demarcated;
- environmentally sensitive zones be protected from uncontrolled development;
- and future infrastructure planning integrate environmental conservation considerations.

8.3.6 COMMUNITY PERSPECTIVES ON WILDLIFE CORRIDOR RETENTION

Stakeholder consultations undertaken during the ESIA process indicated that most community members acknowledged the importance of wildlife conservation and ecological protection within the Marsabit landscape. Although communities strongly supported the proposed excision process, many stakeholders also emphasized the need to preserve wildlife corridors and environmentally sensitive areas during future settlement planning.

Community members indicated willingness to support:

- protection of wildlife movement routes;
- controlled settlement expansion;
- environmental conservation initiatives;
- and sustainable grazing management systems.

However, participants also emphasized that corridor retention measures should be implemented fairly and transparently to avoid displacement of households or restrictions on essential livelihood activities within already established settlement areas.

8.3.7 CONCLUSION ON THE WILDLIFE CORRIDOR RETENTION ALTERNATIVE

The Wildlife Corridor Retention Alternative presents an environmentally responsible approach capable of balancing settlement regularization with protection of ecological connectivity and wildlife conservation objectives within the Marsabit ecosystem.

The alternative supports:

- preservation of biodiversity and ecological functions;
- reduction of habitat fragmentation;
- improved environmental sustainability;
- and integration of conservation principles into future settlement planning processes.

However, successful implementation of this alternative would require:

- effective land use planning;
- accurate ecological mapping;
- strong institutional coordination;
- continuous stakeholder engagement;
- and long-term environmental monitoring and enforcement mechanisms.

Based on the ESIA findings, the study considers retention and protection of wildlife corridors within the proposed excision framework to be an important environmental management strategy necessary for promoting sustainable coexistence between human settlements and wildlife within the project landscape.

: Summary of Implications of the Wildlife Corridor Retention Alternative

Aspect	Implications under the Wildlife Corridor Retention Alternative
Environmental Conservation	Improved ecological connectivity and biodiversity protection
Wildlife Movement	Preservation of important wildlife movement routes
Human-Wildlife Interactions	Potential reduction in future conflict levels
Settlement Planning	Requires controlled expansion and environmental zoning
Infrastructure Development	Possible restrictions within designated ecological corridors
Community Livelihoods	Requires balancing grazing access and conservation objectives
Institutional Requirements	Requires strong monitoring, mapping, and enforcement systems
Long-Term Sustainability	Supports environmentally sustainable settlement planning

8.4 CONTROLLED SETTLEMENT ZONING ALTERNATIVE

The Controlled Settlement Zoning Alternative refers to an approach where the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settlements would be accompanied by implementation of structured land use planning and controlled development measures within the excised areas. Under this alternative, the settlement areas would be planned and managed through designated land use zones aimed at guiding future residential expansion, infrastructure development, grazing systems, environmental conservation, and protection of ecologically sensitive areas.

The alternative seeks to ensure that future settlement growth occurs in an organized and environmentally sustainable manner while minimizing environmental degradation, land use conflicts, obstruction of wildlife movement corridors, and uncontrolled encroachment into sensitive ecological areas within the wider Marsabit ecosystem.

8.4.1 RATIONALE FOR CONTROLLED SETTLEMENT ZONING

The proposed excision areas are currently experiencing gradual settlement expansion, increasing infrastructure development, and growing pressure on natural resources due to population growth and changing socio-economic conditions. Without structured planning mechanisms, future settlement expansion could potentially contribute to environmental degradation, loss of vegetation cover, obstruction of wildlife movement corridors, and increasing pressure on grazing systems and drainage areas.

The Controlled Settlement Zoning Alternative was therefore considered necessary to support orderly settlement development and ensure integration of environmental conservation considerations into future land use planning within the excised areas. The alternative further aims at balancing settlement regularization, infrastructure development, grazing management, and environmental protection within a coordinated spatial planning framework.

8.4.2 IMPLICATIONS ON SETTLEMENT PLANNING AND INFRASTRUCTURE DEVELOPMENT

Under this alternative, future settlement development would occur within clearly designated planning zones established through coordinated land use planning processes. Residential areas, grazing zones, commercial centres, public utility areas, wildlife corridors, and environmentally

sensitive zones would be identified and planned accordingly to minimize future land use conflicts and support sustainable settlement growth.

The approach would support improved planning and expansion of roads, schools, healthcare facilities, water infrastructure, sanitation systems, administrative offices, and other public services within the settlements. Structured settlement planning would also help improve accessibility, reduce unplanned development, and support more efficient delivery of public infrastructure and social services.

The alternative could further contribute to reducing future land disputes and informal encroachment into environmentally sensitive areas through establishment of clear spatial planning and development control mechanisms.

8.4.3 IMPLICATIONS ON ENVIRONMENTAL CONSERVATION

The Controlled Settlement Zoning Alternative has significant potential to strengthen environmental management within the proposed excision areas by integrating environmental protection measures into future settlement planning processes. The alternative would support protection of wildlife movement corridors, ecological connectivity zones, drainage systems, grazing dispersal areas, and other environmentally sensitive sections of the landscape.

Through controlled settlement planning, the alternative could minimize unregulated vegetation clearing, environmental degradation, habitat fragmentation, and settlement encroachment into sensitive ecological zones. The approach would further support implementation of environmental restoration programmes, tree planting initiatives, sustainable grazing management practices, and community conservation activities within the settlements.

The alternative therefore provides opportunities for promoting long-term environmental sustainability while accommodating the socio-economic and development needs of local communities.

8.4.4 IMPLICATIONS ON GRAZING SYSTEMS AND LIVELIHOOD ACTIVITIES

Pastoralism remains the dominant livelihood activity within the project area and the Controlled Settlement Zoning Alternative would therefore require integration of grazing management systems

into future land use planning frameworks. Designated grazing zones and livestock movement areas would help minimize conflicts between settlement expansion and pastoral livelihood systems.

The alternative could further support improved management of communal grazing areas and contribute to reduction of overgrazing and environmental degradation associated with uncontrolled livestock movement and settlement expansion. Additionally, the approach may support diversification of economic activities through development of organized commercial and trading areas within the settlements.

8.4.5 POTENTIAL CHALLENGES ASSOCIATED WITH THE ALTERNATIVE

Despite its potential advantages, implementation of the Controlled Settlement Zoning Alternative would require strong institutional coordination, technical planning capacity, community cooperation, and effective enforcement mechanisms. Successful implementation would depend on accurate spatial planning, participatory decision-making processes, continuous stakeholder engagement, and integration of local indigenous knowledge into land use planning systems.

Potential challenges may include difficulties in regulating informal settlement expansion, limited institutional capacity for enforcement of zoning regulations, and possible resistance to development restrictions within designated environmental protection zones. The alternative would also require continuous environmental monitoring and periodic review of settlement planning frameworks to address emerging development pressures within the project area.

8.4.6 COMMUNITY PERSPECTIVES ON CONTROLLED SETTLEMENT ZONING

Stakeholder consultations undertaken during the ESIA process indicated strong community support for organized settlement planning and environmentally sustainable development within the proposed excision areas. Community members emphasized the importance of balancing future settlement expansion with protection of wildlife corridors, grazing areas, water resources, and environmentally sensitive landscapes.

Participants acknowledged that structured land use planning would improve infrastructure development, minimize future conflicts, strengthen environmental conservation, and support orderly settlement growth. However, stakeholders also emphasized the importance of ensuring that

zoning regulations remain flexible enough to accommodate pastoral livelihood systems and future socio-economic development needs within the settlements.

8.4.7 CONCLUSION ON THE CONTROLLED SETTLEMENT ZONING ALTERNATIVE

The Controlled Settlement Zoning Alternative presents a practical and environmentally sustainable approach for managing future settlement development within the proposed excision areas. The alternative supports integration of settlement regularization, infrastructure development, environmental conservation, grazing management, and sustainable land use planning within a coordinated spatial framework.

The approach further provides opportunities for minimizing environmental degradation, protecting wildlife corridors and ecologically sensitive areas, improving public infrastructure planning, and promoting long-term socio-economic resilience within the settlements. However, successful implementation of the alternative would require strong institutional coordination, effective spatial planning systems, continuous stakeholder engagement, and active participation of local communities throughout future implementation processes.

Figure 8-1: Summary of Implications of the Controlled Settlement Zoning Alternative

ASPECT	IMPLICATIONS UNDER THE CONTROLLED SETTLEMENT ZONING ALTERNATIVE
Settlement Planning	Supports organized and controlled settlement development
Environmental Conservation	Enhances protection of ecological corridors and sensitive areas
Infrastructure Development	Facilitates coordinated infrastructure expansion
Grazing Management	Supports preservation of communal grazing systems
Human-Wildlife Interactions	Reduces conflict through planned zoning and ecological buffers
Land Use Conflicts	Minimizes future conflicts through spatial planning
Institutional Requirements	Requires strong planning and enforcement capacity
Long-Term Sustainability	Promotes environmentally sustainable settlement growth

8.5 BUFFER ZONE ALTERNATIVE

The Buffer Zone Alternative refers to an approach where the proposed excision of settled areas from the Marsabit National Reserve would incorporate establishment of designated transitional buffer zones between human settlements and the remaining protected reserve areas. Under this alternative, controlled buffer areas would be maintained around sections of the reserve boundary to reduce direct interaction between settlement activities and ecologically sensitive wildlife habitats.

The buffer zones would function as transitional landscapes aimed at minimizing environmental degradation, regulating settlement expansion near protected areas, and reducing human-wildlife interactions within the interface between settlements and conservation zones. The approach would therefore seek to balance settlement regularization and socio-economic development with long-term environmental conservation objectives within the broader Marsabit ecosystem.

8.5.1 RATIONALE FOR THE BUFFER ZONE ALTERNATIVE

The proposed excision areas are located adjacent to important wildlife habitats and ecological landscapes associated with the Marsabit National Reserve. Field assessments and stakeholder consultations undertaken during the ESIA process identified increasing interaction between settlements, grazing activities, and wildlife movement areas within portions of the landscape.

The Buffer Zone Alternative was therefore considered as a mechanism for reducing pressure on ecologically sensitive areas while supporting sustainable coexistence between local communities and wildlife populations. The alternative further aims at minimizing environmental degradation and controlling future settlement expansion toward protected reserve sections.

The approach recognizes the importance of maintaining ecological buffers capable of supporting:

- wildlife movement;
- vegetation protection;
- environmental stabilization;
- and gradual transition between settlement areas and conservation zones.

8.5.2 IMPLICATIONS ON ENVIRONMENTAL CONSERVATION

The Buffer Zone Alternative has significant potential to strengthen environmental protection within the interface between the proposed excision areas and the remaining reserve landscape. The establishment of controlled buffer zones could help reduce habitat disturbance, vegetation loss, and encroachment into ecologically sensitive areas.

The alternative would further support protection of:

- wildlife movement routes;
- seasonal drainage systems;
- grazing dispersal areas;
- and environmentally sensitive habitats within portions of the project landscape.

Through regulated land use within buffer areas, the approach could contribute to improved ecosystem stability and reduction of environmental degradation associated with uncontrolled settlement expansion and natural resource exploitation near reserve boundaries.

The alternative may also support implementation of environmental restoration initiatives including tree planting, controlled grazing management, and conservation awareness programmes within the buffer zones.

8.5.3 IMPLICATIONS ON HUMAN-WILDLIFE INTERACTIONS

One of the primary objectives of the Buffer Zone Alternative is reduction of direct interaction between wildlife and human settlements. The establishment of transitional buffer areas could help reduce:

- livestock predation;
- wildlife movement through residential zones;
- grazing competition;
- and destruction of property associated with wildlife activities near settlements.

By creating separation between intensive settlement areas and core wildlife habitats, the alternative could contribute to minimizing future human-wildlife conflicts within the project area.

However, because some sections of the landscape are already occupied and actively utilized by local communities, complete elimination of human-wildlife interactions may not be achievable. The effectiveness of the alternative would therefore depend on:

- proper land use regulation;
- effective environmental management;
- community cooperation;
- and continued collaboration between conservation agencies and local residents.

8.5.4 IMPLICATIONS ON SETTLEMENT EXPANSION AND INFRASTRUCTURE DEVELOPMENT

The Buffer Zone Alternative may introduce certain limitations on future settlement expansion and infrastructure development within sections located adjacent to protected reserve areas. Development activities within designated buffer zones may require stricter environmental controls and land use restrictions to minimize impacts on adjacent ecological systems.

While this may support environmental sustainability, some community members may perceive the restrictions as limiting future development opportunities within portions of the landscape. The alternative would therefore require careful spatial planning and community sensitization to ensure understanding of the environmental importance of the buffer zones.

Despite these potential restrictions, the approach could contribute to more organized and environmentally sustainable settlement planning by discouraging unregulated expansion into environmentally sensitive areas.

8.5.5 IMPLICATIONS ON GRAZING SYSTEMS AND LIVELIHOOD ACTIVITIES

Pastoralism remains the dominant livelihood activity within the proposed excision areas and therefore implementation of buffer zones would need to consider existing grazing systems and livestock movement patterns within the landscape.

The Buffer Zone Alternative could support sustainable grazing management by regulating grazing intensity within environmentally sensitive areas and minimizing overgrazing near reserve boundaries. However, if not properly planned, restrictions within buffer zones could potentially reduce grazing access for some pastoral households.

The alternative would therefore require integration of:

- controlled grazing systems;
- community-based rangeland management;
- and participatory land use planning approaches

to ensure that environmental conservation objectives are balanced with livelihood needs of local communities.

8.5.6 POTENTIAL CHALLENGES ASSOCIATED WITH THE BUFFER ZONE ALTERNATIVE

Implementation of the Buffer Zone Alternative would require effective institutional coordination, clear spatial planning frameworks, community participation, and long-term environmental monitoring mechanisms. The alternative may also require continuous enforcement of land use regulations within designated buffer areas to prevent gradual settlement encroachment and environmental degradation.

Potential implementation challenges may include:

- pressure for settlement expansion near reserve boundaries;
- community resistance to land use restrictions;
- difficulties in enforcing controlled development regulations;
- and limited institutional capacity for long-term environmental monitoring.

The alternative would also require accurate mapping and demarcation of buffer zones and continuous stakeholder engagement to ensure local community support and compliance with environmental management measures.

8.5.7 COMMUNITY PERSPECTIVES ON THE BUFFER ZONE ALTERNATIVE

Stakeholder consultations undertaken during the ESIA process indicated that many community members acknowledged the importance of maintaining environmental protection measures and reducing direct human-wildlife interactions within the project area.

Communities generally supported the concept of preserving environmentally sensitive areas and maintaining controlled ecological transition zones near wildlife habitats, provided that such

measures do not result in displacement of households or excessive restrictions on livelihood activities.

Participants further emphasized the importance of ensuring that implementation of buffer zones remains transparent, participatory, and compatible with existing pastoral livelihood systems and future settlement development needs.

8.5.8 CONCLUSION ON THE BUFFER ZONE ALTERNATIVE

The Buffer Zone Alternative presents an environmentally responsible approach capable of supporting coexistence between settlement development and conservation objectives within the Marsabit ecosystem. The alternative provides opportunities for reducing environmental degradation, minimizing human-wildlife interactions, protecting ecological systems, and promoting sustainable land use planning within the interface between settlements and protected reserve areas.

However, successful implementation of the alternative would require effective spatial planning, institutional coordination, community participation, and long-term environmental management mechanisms. The approach would further require balancing environmental protection objectives with settlement development needs and pastoral livelihood systems within the project area.

Overall, the Buffer Zone Alternative is considered a viable environmental management strategy capable of complementing the proposed excision process through protection of ecologically sensitive areas and promotion of sustainable settlement development within the wider project landscape.

Figure 8-2: Summary of Implications of the Buffer Zone Alternative

ASPECT	IMPLICATIONS UNDER THE BUFFER ZONE ALTERNATIVE
Environmental Conservation	Enhances protection of reserve boundary ecosystems
Human-Wildlife Interactions	Reduces direct interaction between settlements and wildlife
Settlement Expansion	Introduces controlled development near reserve boundaries
Grazing Systems	Requires regulated grazing management within buffer areas
Infrastructure Development	May restrict expansion within environmentally sensitive zones
Institutional Requirements	Requires monitoring, enforcement, and spatial planning
Community Livelihoods	Needs balance between conservation and livelihood activities
Long-Term Sustainability	Supports environmentally sustainable settlement planning

8.6 CO-MANAGEMENT ALTERNATIVE

The Co-Management Alternative refers to an approach where the proposed excision areas would be managed collaboratively through a shared governance framework involving local communities, conservation agencies, county government institutions, and other relevant stakeholders. Under this alternative, settlement regularization and environmental conservation activities would be implemented simultaneously through coordinated management structures aimed at balancing socio-economic development with protection of ecological resources within the wider Marsabit ecosystem.

The alternative recognizes that the proposed excision areas contain both established human settlements and environmentally sensitive landscapes that continue to support ecological functions including wildlife movement, grazing systems, and biodiversity conservation. The co-management approach therefore seeks to promote shared responsibility and joint decision-making in management of natural resources, settlement development, and environmental conservation within the project area.

8.6.1 RATIONALE FOR THE CO-MANAGEMENT ALTERNATIVE

The proposed excision areas have historically experienced overlapping interests relating to settlement development, pastoral livelihoods, wildlife conservation, and natural resource utilization. Stakeholder consultations undertaken during the ESIA process revealed the need for improved coordination between communities, conservation institutions, and government agencies to address environmental challenges and promote sustainable land management within the landscape.

The Co-Management Alternative was therefore considered as a mechanism for enhancing collaboration between local communities and conservation stakeholders while promoting environmentally sustainable settlement development. The approach aims at strengthening community participation in environmental conservation and encouraging shared ownership of environmental management responsibilities within the excision areas.

The alternative further recognizes that long-term environmental sustainability within the project area will depend significantly on active involvement of local communities in protection of wildlife corridors, grazing systems, vegetation cover, drainage systems, and other ecological resources.

8.6.2 IMPLICATIONS ON ENVIRONMENTAL CONSERVATION

The Co-Management Alternative has strong potential to strengthen environmental conservation through active participation of local communities in environmental protection and natural resource management activities. Under this approach, communities would play an important role in:

- protection of wildlife corridors;
- environmental monitoring;
- tree planting initiatives;
- sustainable grazing management;
- and conservation awareness programmes.

The alternative could further support improved protection of ecologically sensitive areas by promoting collaborative environmental planning and increasing local community ownership of conservation initiatives within the landscape. Through joint management structures, the alternative may contribute to:

- reduction of environmental degradation;
- improved ecosystem restoration;
- sustainable utilization of natural resources;
- and strengthening of local environmental governance systems.

The approach may also enhance integration of indigenous knowledge and traditional environmental management practices into future conservation and land use planning frameworks.

8.6.3 IMPLICATIONS ON HUMAN-WILDLIFE INTERACTIONS

Human-wildlife interactions remain one of the major concerns affecting communities within the proposed excision areas due to the close proximity between settlements and wildlife habitats associated with the Marsabit ecosystem. The Co-Management Alternative could support reduction of human-wildlife conflicts through collaborative management approaches involving:

- community conservation awareness;
- participatory monitoring of wildlife movement;
- protection of wildlife corridors;
- and improved communication between communities and conservation agencies.

The approach may also strengthen local reporting systems and promote community involvement in identifying and managing wildlife conflict hotspots within the landscape. However, successful management of human-wildlife interactions under this alternative would require continuous collaboration, adequate institutional support, and sustained stakeholder engagement to ensure effective implementation of agreed conservation measures.

8.6.4 IMPLICATIONS ON SETTLEMENT PLANNING AND INFRASTRUCTURE DEVELOPMENT

Under the Co-Management Alternative, future settlement planning and infrastructure development would need to incorporate both community development priorities and environmental conservation objectives. Collaborative planning processes could support more environmentally sustainable infrastructure development while minimizing impacts on ecological systems and wildlife movement areas.

The alternative may further improve coordination between local communities, county government institutions, and conservation agencies during planning and implementation of:

- roads;
- schools;
- healthcare facilities;
- water supply systems;
- and other public infrastructure within the settlements.

Through participatory planning approaches, the alternative could contribute to more inclusive and socially acceptable settlement development processes while strengthening environmental safeguards within future infrastructure projects.

8.6.5 IMPLICATIONS ON LIVELIHOOD SYSTEMS AND NATURAL RESOURCE MANAGEMENT

Pastoralism and natural resource utilization remain central livelihood activities within the proposed excision areas. The Co-Management Alternative could support sustainable management of grazing systems and communal natural resources through collaborative planning and community-based resource management initiatives.

The approach may strengthen:

- sustainable grazing practices;
- protection of communal grazing areas;
- drought resilience measures;
- and community participation in environmental restoration programmes.

Additionally, the alternative could create opportunities for community involvement in conservation-based livelihood activities including environmental restoration initiatives, eco-tourism support services, and community conservation programmes.

The integration of local indigenous knowledge into natural resource management systems may further strengthen environmental sustainability and resilience within the project landscape.

8.6.6 POTENTIAL CHALLENGES ASSOCIATED WITH THE CO-MANAGEMENT ALTERNATIVE

Despite its potential advantages, implementation of the Co-Management Alternative may present several institutional and operational challenges. Effective co-management systems would require:

- strong institutional coordination;
- clear governance structures;
- continuous stakeholder engagement;
- and adequate technical and financial support.

Potential challenges may include:

- differing stakeholder priorities;
- conflicts between conservation and development interests;
- limited institutional capacity;
- and difficulties in maintaining long-term coordination between multiple actors.

The alternative would also require establishment of transparent decision-making mechanisms and clearly defined roles and responsibilities among communities, government institutions, and conservation agencies to minimize conflicts and improve accountability.

8.6.7 COMMUNITY PERSPECTIVES ON THE CO-MANAGEMENT ALTERNATIVE

Stakeholder consultations undertaken during the ESIA process indicated strong community willingness to participate in environmental conservation and sustainable land management activities within the project area. Many community members acknowledged the importance of maintaining peaceful coexistence between settlements and wildlife while protecting ecological resources within the landscape.

Participants expressed support for collaborative environmental management approaches provided that local communities remain actively involved in planning, decision-making, and implementation processes. Community members further emphasized the importance of ensuring that conservation initiatives do not negatively affect pastoral livelihoods, grazing systems, or future socio-economic development opportunities within the settlements.

The consultations also revealed strong support for community awareness programmes, environmental education, and continued engagement between local communities and conservation institutions.

8.6.8 CONCLUSION ON THE CO-MANAGEMENT ALTERNATIVE

The Co-Management Alternative presents a collaborative and environmentally sustainable approach for balancing settlement development, environmental conservation, and natural resource management within the proposed excision areas. The alternative supports active participation of local communities in environmental protection while strengthening cooperation between communities, government institutions, and conservation agencies.

The approach further provides opportunities for improving environmental governance, reducing human-wildlife conflicts, strengthening sustainable grazing management, and integrating indigenous environmental knowledge into future settlement planning and conservation initiatives.

However, successful implementation of the alternative would require strong institutional coordination, transparent governance structures, continuous stakeholder engagement, and adequate technical and financial support to sustain long-term collaborative management systems within the project landscape.

Overall, the Co-Management Alternative is considered an important complementary strategy capable of supporting sustainable coexistence between human settlements and ecological conservation objectives within the Marsabit ecosystem.

Figure 8-3: Summary of Implications of the Co-Management Alternative

ASPECT	IMPLICATIONS UNDER THE CO-MANAGEMENT ALTERNATIVE
Environmental Conservation	Strengthens collaborative environmental management
Community Participation	Enhances local involvement in conservation and planning
Human-Wildlife Interactions	Supports joint management and conflict reduction
Settlement Planning	Encourages environmentally sustainable infrastructure development
Grazing Management	Promotes community-based natural resource management
Institutional Coordination	Requires strong collaboration among stakeholders
Livelihood Systems	Supports integration of conservation and livelihood activities
Long-Term Sustainability	Strengthens shared environmental governance systems

8.7 COMPARATIVE ANALYSIS OF ALTERNATIVES

The comparative analysis of alternatives was undertaken to evaluate the environmental, social, economic, institutional, and technical implications associated with the different project alternatives considered for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settlements from the Marsabit National Reserve. The analysis aimed at identifying the most feasible and sustainable option capable of addressing long-standing settlement challenges while ensuring protection of ecological integrity and environmentally sensitive areas within the broader Marsabit ecosystem.

The alternatives assessed included:

- the No Project Alternative;
- Partial Excision Alternative;
- Wildlife Corridor Retention Alternative;
- Controlled Settlement Zoning Alternative;
- Buffer Zone Alternative;

- and the Co-Management Alternative.

Each alternative was evaluated based on its ability to address land tenure insecurity, environmental conservation, infrastructure development, human-wildlife interactions, livelihood sustainability, settlement planning, and long-term socio-economic resilience within the proposed excision areas.

8.7.1 ENVIRONMENTAL CONSIDERATIONS

From an environmental perspective, the No Project Alternative was considered less desirable due to its inability to adequately address uncoordinated settlement expansion, environmental degradation, and increasing pressure on natural resources within the reserve landscape. Although the alternative would technically maintain the reserve status of the land, it would not provide structured environmental management or settlement planning mechanisms necessary for long-term sustainability.

The Partial Excision Alternative presented certain environmental benefits through retention of portions of ecologically sensitive areas and wildlife habitats. However, the alternative was considered likely to create fragmented settlement patterns and administrative complexity which could undermine effective environmental management and future settlement planning.

The Wildlife Corridor Retention Alternative was considered environmentally favorable due to its focus on preserving ecological connectivity and maintaining wildlife movement routes within the landscape. Similarly, the Buffer Zone Alternative presented important environmental advantages through establishment of transitional ecological protection areas between settlements and conservation zones.

The Controlled Settlement Zoning Alternative was also considered environmentally sustainable due to its emphasis on structured land use planning, environmental zoning, protection of sensitive areas, and regulation of future settlement expansion. The Co-Management Alternative further strengthened environmental sustainability through promotion of collaborative environmental governance and active community participation in conservation activities.

8.7.2 SOCIAL AND LAND TENURE CONSIDERATIONS

Socially, the No Project Alternative was considered highly unfavorable because it would perpetuate land tenure insecurity, limited infrastructure investment, inadequate public services, and long-standing settlement recognition challenges affecting local communities.

The Partial Excision Alternative also presented social challenges due to the possibility of excluding portions of established settlements from the excision process. This could potentially create perceptions of inequality, social dissatisfaction, and future land ownership disputes among affected communities.

The Wildlife Corridor Retention and Buffer Zone Alternatives were considered socially acceptable provided that implementation does not result in displacement of households or excessive restrictions on livelihood activities. Community consultations revealed strong support for environmental conservation measures as long as settlement recognition and livelihood security are maintained.

The Controlled Settlement Zoning Alternative was considered socially beneficial because it supports organized settlement planning, improved infrastructure development, and future service delivery while minimizing conflicts between different land uses. The Co-Management Alternative further strengthened social sustainability by promoting inclusive decision-making, stakeholder participation, and collaborative management of natural resources and settlement development processes.

8.7.3 IMPLICATIONS ON HUMAN-WILDLIFE INTERACTIONS

Human-wildlife interactions remain a major concern within the project area due to the close relationship between settlements and wildlife habitats associated with the Marsabit ecosystem.

The No Project Alternative was considered unlikely to significantly improve management of human-wildlife interactions because existing settlement patterns and environmental pressures would continue without coordinated planning interventions.

The Wildlife Corridor Retention Alternative and Buffer Zone Alternative were both considered effective in reducing future conflicts through preservation of ecological corridors and establishment of transitional protection areas between settlements and wildlife habitats.

Similarly, the Controlled Settlement Zoning Alternative provides opportunities for minimizing conflicts through planned settlement expansion and protection of ecological connectivity zones. The

Co-Management Alternative further supports collaborative management of human-wildlife interactions through community participation and conservation awareness initiatives.

8.7.4 INFRASTRUCTURE DEVELOPMENT AND SETTLEMENT PLANNING CONSIDERATIONS

The No Project Alternative was considered unsuitable from a development perspective because it would continue limiting public investment and coordinated infrastructure development within the settlements.

The Partial Excision Alternative may create planning difficulties due to fragmented settlement boundaries and inconsistencies in future infrastructure expansion and service delivery.

In contrast, the Controlled Settlement Zoning Alternative was considered highly favorable for infrastructure development because it supports organized spatial planning, coordinated settlement expansion, and integration of public infrastructure planning within future development frameworks.

The Buffer Zone Alternative and Wildlife Corridor Retention Alternative also support environmentally sustainable infrastructure planning provided that development activities remain compatible with ecological conservation objectives.

The Co-Management Alternative further enhances settlement planning through collaborative decision-making and integration of community priorities into future infrastructure development processes.

8.7.5 INSTITUTIONAL AND MANAGEMENT CONSIDERATIONS

Implementation of all alternatives would require varying levels of institutional coordination and environmental management capacity. However, the No Project Alternative was considered weak from an institutional management perspective because it does not provide adequate frameworks for addressing existing settlement and environmental management challenges.

The Partial Excision Alternative would require complex boundary management and continuous monitoring systems due to fragmented land use arrangements within the landscape.

The Controlled Settlement Zoning, Wildlife Corridor Retention, Buffer Zone, and Co-Management Alternatives all require strong institutional coordination, stakeholder engagement, environmental

monitoring, and land use planning mechanisms to ensure effective implementation and long-term sustainability.

Among these alternatives, the Co-Management Alternative was considered particularly important for strengthening long-term governance and promoting collaborative environmental management within the project area.

8.7.6 PREFERRED ALTERNATIVE

Based on the comparative analysis undertaken, the preferred approach for the proposed excision process involves implementation of the excision alongside integration of:

- wildlife corridor protection measures;
- controlled settlement zoning;
- buffer zone management;
- and collaborative co-management principles.

This integrated approach is considered the most environmentally sustainable and socially acceptable option capable of balancing settlement regularization, infrastructure development, livelihood sustainability, and environmental conservation within the proposed excision areas.

The preferred alternative supports:

- secure land tenure;
- organized settlement planning;
- protection of ecological corridors;
- sustainable natural resource management;
- reduction of human-wildlife interactions;
- and long-term socio-economic resilience within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Figure 8-4: Comparative Analysis of Project Alternatives

ALTERNATIVE	KEY ADVANTAGES	KEY LIMITATIONS	OVERALL SUITABILITY
No Project Alternative	Maintains reserve status	Continues land tenure insecurity, inadequate infrastructure, and unplanned settlement growth	Low
Partial Excision Alternative	Retains some ecological areas	Creates fragmented settlements and planning challenges	Moderate
Wildlife Corridor Retention Alternative	Protects ecological connectivity and wildlife movement	Requires strict land use controls and monitoring	High
Controlled Settlement Zoning Alternative	Supports organized settlement planning and environmental management	Requires strong planning and enforcement systems	High
Buffer Zone Alternative	Reduces environmental pressure and human-wildlife interactions	May restrict expansion within some areas	High
Co-Management Alternative	Strengthens collaborative environmental governance and community participation	Requires continuous institutional coordination	High

The comparative analysis indicates that an integrated approach combining structured settlement planning, environmental conservation, wildlife corridor protection, buffer zone management, and collaborative governance mechanisms provides the most suitable framework for implementation of the proposed excision process within the Marsabit landscape.

8.8 PREFERRED ALTERNATIVE

Based on the comparative analysis of alternatives undertaken during the Environmental and Social Impact Assessment (ESIA) process, the preferred alternative for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settlements from the Marsabit National Reserve is the implementation of the proposed excision integrated with controlled settlement zoning, protection of wildlife corridors, establishment of ecological buffer zones, and collaborative co-management approaches.

The preferred alternative was selected because it provides the most balanced and sustainable approach for addressing the long-standing land tenure, settlement planning, environmental conservation, and socio-economic challenges affecting the project area while maintaining critical ecological functions within the broader Marsabit ecosystem.

The alternative recognizes the reality of long-established settlements and existing public infrastructure within the proposed excision areas while also acknowledging the environmental sensitivity of the surrounding landscape and the importance of maintaining ecological connectivity and wildlife conservation functions.

8.8.1 JUSTIFICATION FOR SELECTION OF THE PREFERRED ALTERNATIVE

The preferred alternative was considered the most suitable option because it effectively addresses the major concerns raised during stakeholder consultations, institutional engagements, field assessments, and environmental analysis undertaken during the ESIA process.

One of the primary justifications for selection of the preferred alternative is its ability to facilitate formal settlement recognition and improve land tenure security for communities that have occupied the area for several decades. Legal recognition of the settlements is expected to support improved socio-economic development, infrastructure investment, access to public services, and long-term settlement planning within the affected areas.

The preferred alternative also provides opportunities for:

- organized settlement planning;
- structured infrastructure development;
- protection of environmentally sensitive areas;
- and improved environmental management within the project landscape.

Unlike the No Project Alternative, the preferred option provides a practical framework for addressing existing settlement realities while minimizing future environmental and social risks associated with unplanned settlement expansion.

8.8.2 ENVIRONMENTAL SUSTAINABILITY CONSIDERATIONS

The preferred alternative integrates environmental conservation principles into the proposed excision process through retention and protection of wildlife movement corridors, ecological connectivity zones, seasonal drainage systems, and environmentally sensitive landscapes within the broader ecosystem. The approach further incorporates controlled settlement zoning and ecological buffer areas aimed at minimizing:

- habitat fragmentation;

- obstruction of wildlife movement routes;
- vegetation degradation;
- and uncontrolled encroachment into sensitive ecological zones.

The preferred alternative therefore supports coexistence between human settlements and environmental conservation objectives while promoting sustainable land use planning and long-term ecological resilience within the project area. The alternative also creates opportunities for implementation of:

- environmental restoration initiatives;
- tree planting programmes;
- sustainable grazing management systems;
- and community conservation awareness activities.

8.8.3 SOCIAL AND ECONOMIC CONSIDERATIONS

Socially, the preferred alternative is expected to significantly improve settlement security, infrastructure development, and socio-economic conditions within Karare II, Kamboe, Parkishon, and Kambinye settlements.

The alternative supports future investment in:

- education facilities;
- healthcare infrastructure;
- water supply systems;
- roads and transport infrastructure;
- sanitation systems;
- and administrative services.

Improved settlement recognition and land tenure security are also expected to strengthen household investment opportunities, livelihood diversification, economic growth, and access to development financing and public development programmes within the area.

Community consultations undertaken during the ESIA process revealed overwhelming support for the preferred alternative, with stakeholders expressing optimism that the excision process would improve livelihood security, social wellbeing, and access to essential services.

8.8.4 MANAGEMENT OF HUMAN-WILDLIFE INTERACTIONS

The preferred alternative incorporates measures aimed at minimizing future human-wildlife interactions through:

- protection of wildlife corridors;

- establishment of ecological buffer zones;
- controlled settlement expansion;
- and integration of environmental considerations into future land use planning.

The alternative further promotes collaborative environmental management approaches involving local communities, conservation agencies, county government institutions, and local administration structures.

These measures are expected to support sustainable coexistence between wildlife populations and surrounding communities while minimizing future environmental conflicts within the landscape.

8.8.5 INSTITUTIONAL AND PLANNING CONSIDERATIONS

The preferred alternative supports integration of the proposed excision areas into formal county and national planning frameworks following completion of the excision process. This will facilitate improved spatial planning, infrastructure coordination, environmental management, and future development control within the settlements.

The alternative further emphasizes:

- participatory planning approaches;
- continuous stakeholder engagement;
- collaborative environmental management;
- and establishment of clear land use planning frameworks to guide future development within the excised areas.

Successful implementation of the preferred alternative will however require strong institutional coordination, effective environmental monitoring systems, continuous community participation, and enforcement of land use planning and environmental management measures.

8.8.6 CONCLUSION ON THE PREFERRED ALTERNATIVE

Overall, the preferred alternative represents the most feasible, socially acceptable, and environmentally sustainable option for implementation of the proposed excision process within Karare II, Kamboe, Parkishon, and Kambinye settlements.

The alternative provides a balanced framework for addressing:

- land tenure insecurity;
- settlement regularization;
- infrastructure development;
- environmental conservation;
- grazing management;

- and long-term socio-economic resilience within the project area.

By integrating controlled settlement planning, ecological conservation measures, wildlife corridor protection, buffer zone management, and collaborative co-management approaches, the preferred alternative supports sustainable coexistence between human settlements and the surrounding Marsabit ecosystem.

The ESIA therefore concludes that implementation of the preferred alternative, together with the proposed environmental and social mitigation measures and Environmental and Social Management Plan (ESMP), provides the most appropriate pathway for achieving sustainable settlement development and environmental management within the proposed excision areas.

Table 8-3: Summary of the Preferred Alternative

COMPONENT	PREFERRED APPROACH
Settlement Regularization	Full excision of established settlement areas
Environmental Conservation	Protection of wildlife corridors and sensitive ecological areas
Settlement Planning	Controlled settlement zoning and structured spatial planning
Human-Wildlife Management	Buffer zones and ecological protection measures
Natural Resource Management	Sustainable grazing and environmental restoration initiatives
Governance Framework	Collaborative co-management and stakeholder participation
Infrastructure Development	Coordinated public infrastructure and service delivery planning
Long-Term Sustainability	Integrated environmental and socio-economic planning framework



CHAPTER 09

IMPACT IDENTIFICATION AND ASSESSMENT

KEY IMPACT AREAS

- PHYSICAL
- SOCIAL
- ECONOMIC
- HEALTH
- CULTURAL HERITAGE
- OTHER

IMPACT ASSESSMENT PROCESS

1. IDENTIFY → 2. PREDICT → 3. EVALUATE → 4. PRIORITIZE → 5. DOCUMENT

ASSESSMENT CONSIDERATIONS

- MAGNITUDE
- DURATION
- EXTENT
- SENSITIVITY
- REVERSIBILITY
- PROBABILITY

SIGNIFICANCE LEVEL

- High
- Moderate
- Low
- Negligible
- No Impact

Identifying and assessing impacts helps predict changes and guide better decisions.

CHAPTER 9: IMPACT IDENTIFICATION AND ASSESSMENT

This chapter presents the identification, analysis, and assessment of the potential environmental and social impacts associated with the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve. The impact assessment was undertaken in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), the Environmental (Impact Assessment and Audit) Regulations, 2003, and the approved Terms of Reference (ToR) for the ESIA study.

The assessment evaluates both positive and negative impacts likely to arise during the pre-excision, excision, settlement planning, and long-term land use management phases of the proposed project. The analysis considers impacts on the physical environment, biological environment, socio-economic conditions, infrastructure systems, land use patterns, wildlife habitats, ecological connectivity, and community livelihoods within the project area and its surrounding landscape.

Impact identification and assessment were informed by baseline environmental and social studies, field observations, GIS and spatial analysis, stakeholder consultations, institutional engagements, and professional judgement by the ESIA study team. The chapter further evaluates the significance, magnitude, extent, duration, reversibility, and likelihood of the identified impacts and proposes appropriate mitigation and enhancement measures aimed at minimizing adverse effects while maximizing potential socio-economic and environmental benefits associated with the proposed excision process.

9.1 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology applied for the Environmental and Social Impact Assessment (ESIA) of the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve was designed to systematically identify, predict, evaluate, and assess the potential environmental and social impacts associated with the proposed project.

The methodology was developed in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), the Environmental (Impact Assessment and Audit) Regulations, 2003, the approved Terms of Reference (ToR), and internationally accepted ESIA

principles and procedures. The assessment adopted an integrated approach combining field investigations, stakeholder consultations, baseline environmental and social analysis, GIS and spatial analysis, institutional consultations, and professional judgement in evaluating the significance of identified impacts.

The methodology further considered both positive and negative impacts likely to occur during the excision process, future settlement planning, infrastructure development, and long-term land use management within the proposed excision areas. Figure 9-1 outlines the methological framework used in this study.

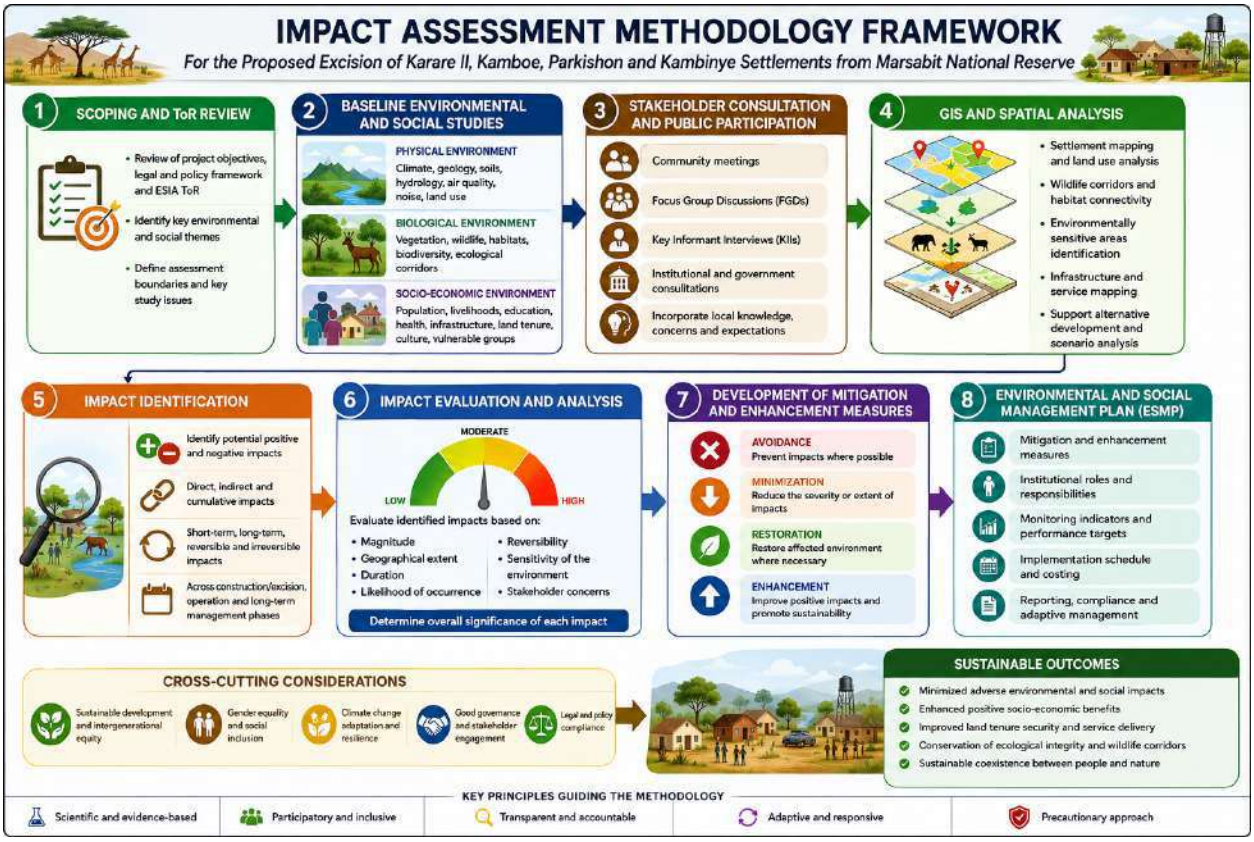


Figure 9-1: Impact assessment methodology framework

9.1.1 IMPACT IDENTIFICATION PROCESS

Impact identification involved systematic examination of project activities and assessment of their potential interactions with the physical, biological, social, economic, and institutional environment within the project area. The process focused on identifying existing and potential environmental and

social issues associated with settlement regularization, land use changes, infrastructure development, grazing systems, wildlife conservation, and future settlement expansion.

The identification of impacts was informed through field observations, site inspections, stakeholder consultations, Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), institutional consultations, GIS analysis, and review of baseline environmental and social conditions within the project area. The assessment considered direct, indirect, cumulative, short-term, long-term, reversible, and irreversible impacts likely to arise from implementation of the proposed excision process.

9.1.2 BASELINE ENVIRONMENTAL AND SOCIAL ANALYSIS

The impact assessment was informed by detailed environmental and social baseline studies undertaken within Karare II, Kamboe, Parkishon, and Kambinye settlements and the surrounding landscape. The baseline studies provided information regarding the existing physical environment, ecological conditions, infrastructure systems, socio-economic characteristics, livelihood activities, and settlement patterns within the proposed excision areas.

The baseline analysis covered climatic conditions, geology, soils, drainage systems, land use characteristics, vegetation cover, wildlife habitats, ecological corridors, infrastructure distribution, population dynamics, education, healthcare, water supply systems, livelihood systems, vulnerable groups, and existing environmental challenges within the landscape.

The baseline information provided an important reference point for evaluating the nature, extent, and significance of potential impacts associated with the proposed project.

9.1.3 STAKEHOLDER CONSULTATION AND PUBLIC PARTICIPATION

Stakeholder consultation formed a critical component of the impact assessment methodology. Consultations were undertaken with local communities, women groups, youth groups, pastoralists, local administration, conservation agencies, county government departments, education and healthcare practitioners, and other relevant stakeholders within the project area.

The consultations were aimed at obtaining local knowledge regarding environmental conditions, livelihood systems, settlement dynamics, infrastructure challenges, and environmental concerns affecting the proposed excision areas. The consultation process also assisted in identifying sensitive

environmental and social issues including land tenure insecurity, human-wildlife interactions, environmental degradation, grazing pressures, infrastructure limitations, and livelihood vulnerabilities.

The views, concerns, and recommendations raised during stakeholder consultations were integrated into the impact assessment process and informed development of mitigation measures and management recommendations.

9.1.4 GIS AND SPATIAL ANALYSIS

Geographical Information Systems (GIS) and spatial analysis techniques were utilized to support assessment of settlement distribution, land use patterns, ecological connectivity, wildlife movement corridors, environmentally sensitive areas, and infrastructure distribution within the project landscape.

Spatial analysis assisted in identifying areas of ecological sensitivity, wildlife corridors, grazing systems, drainage networks, and settlement expansion trends within the proposed excision areas. GIS analysis further supported assessment of potential impacts relating to habitat fragmentation, environmental degradation, land use changes, and human-wildlife interactions within the wider Marsabit ecosystem.

The spatial analysis also informed development and evaluation of project alternatives including wildlife corridor retention, controlled settlement zoning, and buffer zone management approaches.

9.1.5 IMPACT EVALUATION CRITERIA

The identified impacts were evaluated based on several criteria including the magnitude of impact, geographical extent, duration, reversibility, likelihood of occurrence, and overall significance of the impact. The assessment considered whether impacts were positive or negative, direct or indirect, temporary or permanent, localized or widespread, and reversible or irreversible.

The significance of impacts was determined through consideration of the sensitivity of the affected environment, the scale of anticipated environmental or social change, stakeholder concerns, and the capacity of the affected environment or communities to absorb or recover from the impacts.

9.1.6 IMPACT SIGNIFICANCE CLASSIFICATION

Potential impacts identified during the assessment were categorized according to their level of significance to facilitate prioritization of mitigation and management measures. Impact significance classification was informed by professional judgement, field observations, stakeholder consultations, environmental sensitivity analysis, and baseline environmental and social conditions within the project area.

Table 9-1: Impact Significance Classification Criteria

SIGNIFICANCE LEVEL	DESCRIPTION
High Impact	Impact likely to cause major environmental or social change with significant long-term consequences requiring substantial mitigation measures
Moderate Impact	Impact likely to cause noticeable environmental or social change requiring mitigation and management interventions
Low Impact	Impact expected to cause limited or localized change with manageable effects
Negligible Impact	Impact expected to have minimal or no significant environmental or social effect

9.1.7 ASSESSMENT OF POSITIVE AND NEGATIVE IMPACTS

The impact assessment considered both positive and negative impacts associated with the proposed excision process. Positive impacts assessed included potential improvements in land tenure security, infrastructure development, settlement planning, livelihood opportunities, access to public services, and socio-economic development within the settlements.

Negative impacts considered during the assessment included potential habitat fragmentation, pressure on ecological corridors, increased environmental degradation, human-wildlife interactions, grazing pressures, and increased pressure on natural resources resulting from future settlement expansion and land use changes.

The assessment further evaluated cumulative impacts likely to occur over time due to increasing population growth, infrastructure development, and changes in land use patterns within the project area.

9.1.8 DEVELOPMENT OF MITIGATION MEASURES

Mitigation and enhancement measures were developed for all significant adverse impacts identified during the assessment process. The mitigation measures were designed to avoid impacts where possible, minimize impacts that cannot be avoided, restore affected environmental conditions where necessary, and enhance positive socio-economic and environmental outcomes associated with the proposed project.

The mitigation measures developed during the assessment were subsequently integrated into the Environmental and Social Management Plan (ESMP) together with proposed implementation responsibilities, monitoring indicators, timelines, and management actions.

9.1.9 LIMITATIONS OF THE ASSESSMENT METHODOLOGY

Although the impact assessment methodology applied during the ESIA process was comprehensive, certain limitations were encountered during the assessment process. These included seasonal variability in environmental conditions, limited availability of long-term environmental monitoring data, and uncertainties associated with predicting future settlement expansion trends and long-term land use dynamics within the excised areas.

Additionally, some environmental and socio-economic impacts associated with future development activities may evolve over time depending on population growth, infrastructure expansion, climate variability, institutional coordination, and implementation of future land use planning measures.

Despite these limitations, the methodology applied provided adequate information and analysis to support informed assessment of the likely environmental and social impacts associated with the proposed excision process and development of appropriate mitigation and management recommendations.

9.2 POSITIVE IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve is expected to generate several significant positive environmental, social, economic, institutional, and developmental impacts within the project area. The excision process will facilitate formal recognition of existing settlements and create opportunities for improved settlement

planning, infrastructure development, investment, environmental management, and socio-economic transformation within the affected communities.

The positive impacts are expected to occur progressively during implementation of the excision process and throughout subsequent settlement planning and development phases.

9.2.1 IMPROVED LAND TENURE SECURITY

One of the most significant positive impacts associated with the proposed excision process is improvement of land tenure security for local communities residing within the project area. The settlements within Karare II, Kamboe, Parkishon, and Kambinye have existed for several decades, yet many residents continue to experience uncertainty regarding land ownership and legal settlement status due to the reserve designation of the land.

The proposed excision is expected to facilitate legal recognition of the settlements and create opportunities for future land adjudication, demarcation, and issuance of ownership documentation. Improved land tenure security will enhance community confidence, reduce land ownership disputes, and support long-term socio-economic stability within the settlements. Secure land tenure is also expected to encourage household investment in:

- housing improvement;
- livelihood diversification;
- business development;
- and sustainable land management practices.

9.2.2 ENHANCED INFRASTRUCTURE DEVELOPMENT

The proposed excision is expected to facilitate improved planning and investment in public infrastructure within the settlements. The current reserve status of the land has limited development of infrastructure and public services in some sections of the project area due to legal and administrative constraints associated with settlement within protected reserve land.

Following the excision process, the settlements are expected to benefit from improved investment in:

- roads and transport infrastructure;
- water supply systems;

- sanitation facilities;
- healthcare infrastructure;
- education facilities;
- electricity and communication services;
- and administrative infrastructure.

Improved infrastructure development will contribute to enhanced accessibility, improved service delivery, better mobility, and increased socio-economic opportunities within the project area.

9.2.3 IMPROVED ACCESS TO PUBLIC SERVICES

The proposed excision will create opportunities for improved provision of essential public services within the settlements. Legal recognition of the settlements is expected to facilitate integration of the project area into formal county and national development planning frameworks.

This is expected to improve access to:

- healthcare services;
- education facilities;
- water and sanitation services;
- security services;
- agricultural extension services;
- and social protection programmes.

Improved access to public services will contribute to better living conditions, improved public health outcomes, increased educational opportunities, and enhanced socio-economic wellbeing within the affected communities.

9.2.4 INCREASED ECONOMIC OPPORTUNITIES AND INVESTMENT

The proposed excision is expected to stimulate economic growth and increase investment opportunities within the project area. Formal recognition of the settlements will likely attract both public and private sector investment in infrastructure, housing, trade, livestock production, and small-scale enterprises. Improved land tenure security and infrastructure development are also expected to enhance:

- household economic resilience;
- market access;
- employment opportunities;
- and livelihood diversification within the settlements.

The excision process may further encourage development of trading centres, local businesses, livestock markets, and community enterprises capable of improving household incomes and supporting local economic growth.

9.2.5 IMPROVED SETTLEMENT PLANNING AND LAND USE MANAGEMENT

The proposed excision will provide opportunities for implementation of structured settlement planning and improved land use management within the affected areas. Integration of the settlements into formal planning systems will support development of organized settlement layouts, infrastructure planning, environmental zoning, and regulation of future settlement expansion.

Controlled settlement planning is expected to minimize:

- unplanned settlement growth;
- land use conflicts;
- encroachment into environmentally sensitive areas;
- and future infrastructure challenges within the project area.

The excision process will therefore create opportunities for more sustainable and coordinated development within the settlements.

9.2.6 STRENGTHENED ENVIRONMENTAL MANAGEMENT

Although the proposed excision involves conversion of reserve land into formally recognized settlement areas, the process also provides opportunities for strengthening environmental management through implementation of planned environmental conservation measures and sustainable land use practices.

The ESIA process has identified the need for:

- protection of wildlife corridors;
- conservation of ecologically sensitive areas;

- sustainable grazing management;
- environmental restoration initiatives;
- and community environmental awareness programmes.

The proposed excision therefore creates opportunities for integration of environmental conservation principles into future settlement planning and development processes. The project may further support implementation of:

- tree planting initiatives;
- environmental rehabilitation programmes;
- controlled settlement zoning;
- and collaborative environmental management systems involving local communities and conservation stakeholders.

9.2.7 REDUCED SOCIAL AND ADMINISTRATIVE CONFLICTS

The long-standing overlap between settlement areas and protected reserve boundaries has contributed to uncertainty regarding settlement legality, infrastructure development, land ownership, and administrative jurisdiction within the project area. The proposed excision is expected to reduce these uncertainties and improve clarity regarding:

- land administration;
- settlement boundaries;
- infrastructure planning;
- and governance systems within the settlements.

Improved administrative clarity may contribute to reduction of social tensions, land disputes, and conflicts associated with land ownership and settlement recognition within the project area.

9.2.8 IMPROVED COMMUNITY PARTICIPATION IN DEVELOPMENT PLANNING

The excision process and subsequent settlement planning activities are expected to enhance community participation in local development and environmental management processes. Through stakeholder engagement and participatory planning approaches, local communities will have increased opportunities to contribute to decision-making processes affecting settlement planning,

infrastructure development, natural resource management, and environmental conservation within the area.

Strengthened community participation may contribute to improved ownership of development initiatives and increased sustainability of future projects and environmental management programmes within the settlements.

9.2.9 IMPROVED LIVELIHOOD RESILIENCE

The proposed excision is expected to strengthen livelihood resilience within the project area through improved settlement security, better infrastructure, increased investment opportunities, and improved access to markets and public services.

Pastoralist households are likely to benefit from improved livestock marketing opportunities, better accessibility, and increased support services following formal recognition of the settlements. Additionally, improved infrastructure and economic diversification opportunities may reduce vulnerability to droughts, environmental shocks, and socio-economic instability within the area.

The project may therefore contribute to improved long-term socio-economic resilience among communities within Karare II, Kamboe, Parkishon, and Kambinye settlements.

9.2.10 OVERALL SIGNIFICANCE OF POSITIVE IMPACTS

Overall, the proposed excision process is expected to generate substantial positive social and economic benefits within the project area. The project will facilitate formal settlement recognition, strengthen infrastructure development, improve land tenure security, support economic growth, and create opportunities for sustainable settlement planning and environmental management.

While implementation of the project may also result in certain environmental and social risks requiring mitigation, the positive impacts associated with improved settlement security, socio-economic development, infrastructure expansion, and enhanced public service delivery are considered highly significant and long-term in nature.

Figure 9-2: Summary of Key Positive Impacts

POSITIVE IMPACT	EXPECTED OUTCOME
Improved Land Tenure Security	Enhanced legal recognition and reduced land ownership disputes
Infrastructure Development	Improved roads, water systems, healthcare, education, and public facilities
Access to Public Services	Better healthcare, education, sanitation, and administrative services
Economic Growth	Increased investment, trade, employment, and livelihood diversification
Settlement Planning	Improved spatial planning and controlled settlement development
Environmental Management	Strengthened conservation planning and sustainable land use management
Reduced Administrative Conflicts	Improved governance and land administration clarity
Community Participation	Increased stakeholder involvement in planning and development
Livelihood Resilience	Improved socio-economic stability and reduced vulnerability

9.3 NEGATIVE IMPACTS

Despite the significant positive socio-economic benefits associated with the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settlements from the Marsabit National Reserve, the project also has the potential to generate several negative environmental and social impacts if not properly planned and managed.

The identified adverse impacts are primarily associated with future settlement expansion, land use changes, infrastructure development, increasing human activities, and pressure on natural resources within the project landscape. The magnitude and significance of these impacts will largely depend on the effectiveness of environmental management measures, settlement planning controls, and long-term implementation of mitigation strategies proposed under the Environmental and Social Management Plan (ESMP).

The negative impacts identified during the assessment include impacts on ecological systems, wildlife movement corridors, vegetation cover, grazing systems, water resources, settlement planning, and socio-economic conditions within the project area.

9.3.1 HABITAT FRAGMENTATION AND LOSS OF ECOLOGICAL CONNECTIVITY

One of the major environmental concerns associated with the proposed excision process is the potential fragmentation of wildlife habitats and ecological connectivity zones within the wider Marsabit ecosystem. The project area contains sections that continue to support wildlife movement and ecological functions despite the existence of established settlements and human activities.

Future settlement expansion, infrastructure development, fencing, road development, and land subdivision may contribute to obstruction of wildlife movement routes and fragmentation of natural habitats if not properly planned and controlled. The impact is likely to affect:

- wildlife movement patterns;
- ecological connectivity;
- biodiversity conservation;
- and ecosystem resilience within portions of the project landscape.

Without proper protection of ecological corridors and environmentally sensitive areas, the project may increase pressure on remaining natural habitats and reduce the ability of wildlife populations to move freely across the landscape. The impact is considered moderate to high in significance due to the ecological sensitivity of portions of the project area.

9.3.2 INCREASED HUMAN-WILDLIFE INTERACTIONS

The proposed excision may contribute to increased human-wildlife interactions resulting from expansion of settlements and human activities closer to wildlife habitats and movement corridors associated with the Marsabit ecosystem. Potential impacts may include:

- livestock predation by wildlife;
- destruction of crops and property;
- threats to human safety;
- and increased conflict between communities and wildlife populations.

Expansion of roads, settlements, grazing areas, and infrastructure within interface zones between settlements and wildlife habitats may further intensify interactions between communities and wildlife. The impact is likely to be more pronounced within sections located close to wildlife corridors and ecological transition zones. If not properly managed through protection of wildlife corridors,

buffer zones, and controlled settlement planning, human-wildlife conflicts may increase over time within the project area.

9.3.3 PRESSURE ON VEGETATION COVER AND NATURAL RESOURCES

The proposed excision is expected to stimulate population growth, settlement expansion, infrastructure development, and increasing demand for natural resources within the project area. This may result in increased pressure on:

- vegetation cover;
- fuelwood resources;
- grazing systems;
- and natural ecosystems.

Uncontrolled settlement expansion and increasing demand for construction materials and energy resources may contribute to:

- deforestation;
- vegetation degradation;
- overgrazing;
- and loss of indigenous vegetation cover.

The project area is already characterized by fragile arid and semi-arid ecosystems which are highly vulnerable to environmental degradation and slow ecological recovery. Increased pressure on natural resources may therefore accelerate land degradation and reduce ecological resilience within portions of the landscape. The impact is considered moderate in significance but may become highly significant if settlement growth remains uncontrolled.

9.3.4 LAND DEGRADATION AND SOIL EROSION

Future settlement development and increasing human activities may contribute to land degradation and localized soil erosion within the project area. Land clearing for settlement expansion, road development, infrastructure construction, and increased livestock concentration may destabilize soils and expose surfaces to erosion processes. The arid and semi-arid conditions within the project area, combined with sparse vegetation cover and seasonal runoff events, increase the susceptibility of the landscape to:

- soil erosion;
- surface runoff;
- and degradation of fragile land systems.

The impact may be particularly significant within drainage systems, settlement expansion zones, overgrazed areas, and sections with disturbed vegetation cover. Without implementation of sustainable land management practices and environmental restoration measures, land degradation may increase over time within the proposed excision areas.

9.3.5 INCREASED PRESSURE ON GRAZING SYSTEMS

Pastoralism remains the dominant livelihood activity within the project area and the proposed excision may increase pressure on communal grazing systems due to population growth, settlement expansion, and increasing livestock concentrations within the excised areas. Expansion of residential settlements and infrastructure may reduce available grazing space and contribute to competition over pasture and water resources. Increased grazing pressure may further accelerate:

- overgrazing;
- vegetation degradation;
- soil compaction;
- and reduced pasture productivity within the landscape.

The impact may be exacerbated during drought periods when pasture and water resources become limited within the region. Proper grazing management systems and protection of communal grazing areas will therefore be necessary to minimize long-term degradation of rangeland resources.

9.3.6 INCREASED WASTE GENERATION AND SANITATION CHALLENGES

Improved settlement recognition and population growth following the excision process may result in increased generation of:

- domestic solid waste;
- wastewater;
- and other forms of environmental pollution within the settlements.

The project area currently experiences limited waste management infrastructure and sanitation services. Increased population density and infrastructure development may therefore place additional pressure on existing sanitation systems and contribute to environmental pollution if adequate waste management measures are not implemented. Poor waste disposal practices may lead to:

- localized land contamination;
- visual pollution;
- blockage of drainage systems;
- and increased public health risks within the settlements.

The impact is considered moderate and manageable through implementation of proper waste management and sanitation planning measures.

9.3.7 RISK OF UNPLANNED SETTLEMENT EXPANSION

The proposed excision may stimulate future settlement expansion and migration into the project area due to improved land tenure security and increasing development opportunities within the settlements. Without effective settlement planning and development control mechanisms, unregulated settlement growth may contribute to:

- encroachment into environmentally sensitive areas;
- increased pressure on natural resources;
- infrastructure strain;
- and future land use conflicts.

The impact highlights the importance of implementing controlled settlement zoning, spatial planning frameworks, and environmental management measures within the excised areas.

9.3.8 INCREASED DEMAND FOR WATER RESOURCES

The proposed excision and subsequent population growth may increase demand for water resources within the project area. Existing water supply systems within some settlements are already limited and characterized by seasonal water shortages. Increased domestic, livestock, and institutional water demand may place additional pressure on:

- boreholes;
- water pans;
- shallow wells;
- and other local water sources.

Over-abstraction of groundwater resources and increasing competition over water access may contribute to reduced water availability during dry seasons. The impact is considered moderate and will require strengthening of sustainable water resource management systems and future investment in water infrastructure.

9.3.9 SOCIO-ECONOMIC INEQUALITY AND LAND SPECULATION RISKS

The formalization of settlements and improved land tenure security may increase land value and attract external interest in land acquisition within the project area. This may create risks associated with:

- land speculation;
- unequal access to land ownership opportunities;
- and marginalization of vulnerable households.

If not properly regulated, the excision process may contribute to socio-economic inequality and future land ownership disputes within the settlements. Transparent land adjudication processes and inclusive stakeholder participation will therefore be important in minimizing potential social conflicts associated with future land allocation and ownership systems.

9.3.10 CUMULATIVE ENVIRONMENTAL IMPACTS

The cumulative effects of settlement expansion, infrastructure development, grazing pressure, vegetation degradation, and increasing resource utilization may contribute to long-term environmental changes within the wider Marsabit ecosystem. Although some individual impacts may initially appear localized or moderate in significance, their combined long-term effects may result in:

- progressive environmental degradation;
- habitat loss;
- reduced ecological resilience;
- and increasing pressure on natural resources within the landscape.

The assessment therefore emphasizes the importance of integrated environmental management, controlled settlement planning, and continuous environmental monitoring during implementation of the proposed project.

9.3.11 OVERALL SIGNIFICANCE OF NEGATIVE IMPACTS

Overall, the negative impacts associated with the proposed excision are considered manageable provided that the recommended mitigation measures, environmental safeguards, settlement planning controls, and Environmental and Social Management Plan (ESMP) are effectively implemented. Most of the identified impacts are linked to future settlement expansion and land use changes rather than the legal excision process itself. The impacts can therefore be minimized through:

- controlled settlement zoning;
- protection of wildlife corridors;
- environmental restoration programmes;
- sustainable grazing management;
- community awareness initiatives;
- and effective institutional coordination.

Table 9-2: Summary of Key Negative Impacts

NEGATIVE IMPACT	POTENTIAL CONSEQUENCE
Habitat Fragmentation	Disruption of wildlife movement and ecological connectivity
Human-Wildlife Interactions	Increased conflict between communities and wildlife
Vegetation Degradation	Loss of vegetation cover and ecosystem degradation
Land Degradation and Soil Erosion	Increased soil instability and erosion risks
Pressure on Grazing Systems	Overgrazing and reduced pasture productivity
Waste Generation and Pollution	Increased sanitation and environmental health challenges
Unplanned Settlement Expansion	Encroachment into sensitive areas and infrastructure pressure
Increased Water Demand	Pressure on limited water resources
Land Speculation Risks	Potential inequality and land ownership conflicts
Cumulative Environmental Impacts	Long-term ecological degradation and resource pressure

9.4 ECOLOGICAL AND BIODIVERSITY IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve has the potential to generate several ecological and biodiversity-related impacts within the project area and the wider Marsabit ecosystem. Although the proposed excision areas are already characterized by established human settlements, infrastructure development, grazing activities, and modified landscapes, portions of the area continue to support ecological functions including wildlife movement, seasonal grazing systems, vegetation cover, drainage ecosystems, and ecological connectivity.

The ecological impacts associated with the proposed project are therefore primarily linked to future settlement expansion, land use changes, infrastructure development, increased human activities, and pressure on natural resources following formal settlement recognition and development within the excised areas.

The assessment considered impacts on:

- vegetation cover and habitats;
- wildlife movement corridors;
- biodiversity conservation;
- ecological connectivity;
- grazing systems;
- drainage ecosystems;
- and overall ecosystem integrity within the landscape.

9.4.1 IMPACTS ON VEGETATION COVER

The proposed excision may contribute to gradual reduction of natural vegetation cover within portions of the project area due to future settlement expansion, infrastructure development, increased fuelwood harvesting, and expansion of human activities. Vegetation within the project landscape currently consists predominantly of arid and semi-arid bushland, shrubland, sparse woodland vegetation, grassland patches, and scattered indigenous tree species adapted to dry climatic conditions.

Expansion of residential settlements, roads, trading centres, and public infrastructure may result in localized vegetation clearing and disturbance of natural habitats. Increased demand for construction materials, fencing materials, and domestic energy resources may further contribute to vegetation degradation within sections of the landscape.

The impact may lead to:

- reduction of vegetation density;
- loss of indigenous plant species;
- degradation of grazing vegetation;
- and reduced ecological stability within disturbed areas.

However, because significant portions of the proposed excision areas are already occupied and actively utilized by communities, the scale of direct vegetation loss associated with the excision itself is expected to remain moderate and localized. Implementation of:

- environmental restoration programmes;
- tree planting initiatives;
- controlled settlement zoning;
- and sustainable natural resource management practices

will be important in minimizing long-term vegetation degradation within the project area.

9.4.2 IMPACTS ON WILDLIFE MOVEMENT CORRIDORS

Field investigations, GIS analysis, stakeholder consultations, and institutional engagements undertaken during the ESIA process identified the presence of wildlife movement corridors and ecological connectivity zones traversing portions of the proposed excision landscape. These corridors facilitate seasonal movement of wildlife between different sections of the wider Marsabit ecosystem.

Future settlement expansion, fencing, road development, increased human presence, and infrastructure growth may obstruct or narrow portions of these movement corridors if not properly planned and managed. Potential impacts associated with disruption of wildlife corridors include:

- restriction of wildlife mobility;
- increased wildlife stress;
- fragmentation of habitats;
- and increased human-wildlife interactions within settlement interface zones.

The impact is considered significant because ecological connectivity remains important for long-term biodiversity conservation and ecosystem functionality within the region. To minimize this impact, the ESIA recommends:

- protection and mapping of wildlife corridors;
- integration of ecological buffers within settlement planning;

- and controlled land use development within sensitive ecological zones.

9.4.3 HABITAT FRAGMENTATION

The proposed excision may contribute to fragmentation of natural habitats within portions of the project area due to increasing land subdivision, settlement concentration, infrastructure expansion, and changing land use patterns following formalization of the settlements.

Habitat fragmentation may reduce the continuity of ecological systems and limit movement of wildlife species between different habitat zones. Fragmentation may also increase edge effects and expose ecological systems to increased human disturbance and environmental pressure.

Although parts of the landscape are already modified by settlement and pastoral activities, continued unregulated development could accelerate habitat fragmentation within ecologically sensitive sections of the project area. The impact may particularly affect:

- small mammals;
- reptiles;
- bird species;
- and wildlife populations dependent on movement across open rangelands and bushland habitats.

Implementation of controlled settlement zoning and ecological corridor protection measures will therefore be necessary to reduce habitat fragmentation risks.

9.4.4 IMPACTS ON BIODIVERSITY CONSERVATION

The project area supports ecological systems typical of arid and semi-arid ecosystems including indigenous vegetation species, wildlife habitats, grazing systems, and seasonal ecological processes associated with the wider Marsabit landscape.

Although the proposed excision areas no longer function as core wildlife habitats due to long-standing settlement occupation, portions of the area continue to contribute to landscape-level biodiversity conservation through maintenance of ecological connectivity and natural vegetation cover. Future population growth and increasing human activities may place additional pressure on biodiversity resources through:

- vegetation degradation;
- habitat disturbance;
- increased livestock pressure;

- and expansion of settlement infrastructure.

The impact may contribute to gradual reduction in ecological quality and biodiversity resilience within portions of the landscape if environmental safeguards are not effectively implemented. However, the assessment established that biodiversity impacts are likely to remain moderate provided that:

- wildlife corridors are protected;
- environmentally sensitive areas are conserved;
- and sustainable land use management measures are implemented within the excised areas.

9.4.5 IMPACTS ON GRAZING ECOSYSTEMS

The proposed excision may increase pressure on communal grazing systems and rangeland ecosystems due to increasing livestock concentration, settlement expansion, and competition over available pasture resources.

Pastoralism remains the dominant livelihood system within the project area and grazing resources form an important ecological and socio-economic component of the landscape. Increased settlement development and reduction of open grazing space may contribute to:

- overgrazing;
- vegetation depletion;
- soil compaction;
- and reduced pasture productivity.

The impact may become more significant during drought periods when grazing resources become limited across the region. Poor grazing management may further accelerate environmental degradation and reduce ecological resilience of rangeland ecosystems within the proposed excision areas. The ESIA therefore recommends implementation of:

- sustainable grazing management systems;
- rangeland restoration initiatives;
- and protection of communal grazing areas

to support long-term sustainability of pastoral ecosystems within the landscape.

9.4.6 IMPACTS ON DRAINAGE SYSTEMS AND SEASONAL WATER ECOSYSTEMS

The proposed project may contribute to localized disturbance of seasonal drainage systems and associated ecological functions due to future settlement expansion and infrastructure development

within drainage corridors and low-lying areas. Drainage systems within the project area provide important ecological functions including:

- seasonal water conveyance;
- vegetation support;
- groundwater recharge;
- and localized wildlife and livestock water access.

Encroachment into drainage systems and uncontrolled settlement development may disrupt natural water flow patterns and contribute to:

- soil erosion;
- sedimentation;
- and degradation of riparian vegetation within some sections of the landscape.

The impact is expected to remain moderate provided that drainage systems and environmentally sensitive areas are integrated into future land use planning and protected from uncontrolled development.

9.4.7 IMPACTS ON ECOSYSTEM RESILIENCE

The arid and semi-arid ecosystems within the project area are naturally fragile and highly sensitive to environmental disturbance, climate variability, and prolonged drought conditions. Increasing settlement density and pressure on natural resources may reduce the resilience of ecological systems and their ability to recover from environmental stress.

Potential cumulative ecological impacts associated with vegetation loss, overgrazing, habitat fragmentation, and increasing human activities may gradually reduce ecosystem stability and adaptive capacity within portions of the landscape. However, implementation of:

- environmental restoration programmes;
- community conservation initiatives;
- controlled settlement planning;
- and sustainable natural resource management measures

can significantly improve long-term ecosystem resilience within the excised areas.

9.4.8 POSITIVE ECOLOGICAL OPPORTUNITIES ASSOCIATED WITH THE PROJECT

Despite the identified ecological risks, the proposed excision process also creates opportunities for strengthening environmental conservation and ecological management within the project area. The ESIA process has facilitated identification of:

- ecological corridors;
- environmentally sensitive areas;
- and priority environmental management concerns within the landscape.

The project further provides opportunities for integration of:

- environmental restoration initiatives;
- community conservation programmes;
- ecological zoning;
- wildlife corridor protection;
- and sustainable land management measures

within future settlement planning frameworks.

Formal settlement planning and environmental regulation may therefore improve environmental governance and ecological management compared to the current unregulated settlement situation.

9.4.9 OVERALL SIGNIFICANCE OF ECOLOGICAL AND BIODIVERSITY IMPACTS

Overall, the ecological and biodiversity impacts associated with the proposed excision are considered moderate but manageable provided that appropriate mitigation measures and environmental safeguards are effectively implemented.

The most significant ecological concerns relate to:

- wildlife corridor obstruction;
- habitat fragmentation;
- vegetation degradation;
- and increased pressure on grazing ecosystems.

However, because the project area already contains established settlements and modified landscapes, the proposed excision is not expected to result in complete transformation of previously undisturbed natural habitats. The assessment therefore concludes that implementation of:

- controlled settlement zoning;
- ecological corridor protection;
- buffer zone management;

- sustainable grazing systems;
- and environmental restoration programmes

will be critical in minimizing long-term ecological impacts and promoting sustainable coexistence between settlement development and biodiversity conservation within the Marsabit ecosystem.

Table 9-3: Summary of Ecological and Biodiversity Impacts

ECOLOGICAL COMPONENT	POTENTIAL IMPACT
Vegetation Cover	Localized vegetation clearing and degradation
Wildlife Corridors	Obstruction or narrowing of wildlife movement routes
Habitat Integrity	Habitat fragmentation and ecological disturbance
Biodiversity Conservation	Increased pressure on ecological systems and biodiversity resources
Grazing Ecosystems	Overgrazing and reduced pasture productivity
Drainage Systems	Disturbance of seasonal drainage ecosystems
Ecosystem Resilience	Reduced ecological stability under increasing environmental pressure
Environmental Management Opportunities	Improved ecological planning and conservation integration

9.5 WILDLIFE CORRIDOR AND CONNECTIVITY IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve has potential implications on wildlife movement corridors and ecological connectivity within the wider Marsabit ecosystem. Although significant portions of the project area are already occupied by established settlements and human activities, field investigations, GIS analysis, institutional consultations, and stakeholder engagement confirmed that parts of the landscape continue to function as wildlife movement zones and ecological transition areas linking different habitats within the region. Wildlife corridors within the project landscape play an important ecological role by facilitating:

- seasonal wildlife movement;
- access to grazing and water resources;
- genetic exchange between wildlife populations;
- and maintenance of ecosystem connectivity across the Marsabit landscape.

The proposed project may therefore affect wildlife movement dynamics and ecological connectivity primarily through future settlement expansion, infrastructure development, fencing, increased human presence, and land use changes within portions of the landscape.

9.5.1 EXISTING WILDLIFE CORRIDORS AND ECOLOGICAL CONNECTIVITY

The baseline assessment established that wildlife movement within the project area is influenced by seasonal grazing patterns, availability of water resources, vegetation distribution, and ecological connectivity between the Marsabit National Reserve and surrounding rangelands.

Several sections within Karare II, Parkishon, and Kamboe areas were identified as important ecological linkage zones supporting movement of wildlife species through relatively open bushland and grazing landscapes. Wildlife movement within these areas is currently influenced by:

- settlement distribution;
- livestock grazing activities;
- road infrastructure;
- vegetation cover;
- and seasonal environmental conditions.

Consultations with Kenya Wildlife Service (KWS), local communities, and conservation stakeholders indicated that although wildlife movement has already reduced in some heavily settled sections, ecological connectivity remains important for maintaining ecosystem functionality and reducing concentration of wildlife pressure within restricted habitats.

The assessment further established that the existing settlement pattern remains relatively dispersed in some portions of the landscape, thereby still allowing limited wildlife movement across sections of the project area.

9.5.2 POTENTIAL OBSTRUCTION OF WILDLIFE MOVEMENT CORRIDORS

One of the major impacts associated with the proposed excision process is the potential obstruction or narrowing of wildlife movement corridors resulting from future settlement expansion and infrastructure development within ecologically sensitive areas. Formal settlement recognition may stimulate:

- increased construction activities;

- fencing of land parcels;
- road expansion;
- and concentration of development within sections currently functioning as wildlife movement routes.

If not properly planned and regulated, these activities may reduce the permeability of the landscape and limit the ability of wildlife species to move between habitats and seasonal resource areas. The impact may particularly affect:

- medium-sized mammals;
- grazing wildlife species;
- and wildlife populations dependent on movement across open rangelands and bushland ecosystems.

Obstruction of wildlife corridors may also increase wildlife concentration within remaining movement routes and intensify ecological pressure on adjacent habitats. The impact is considered moderate to high in significance due to the ecological importance of connectivity within the wider Marsabit ecosystem.

9.5.3 INCREASED HUMAN-WILDLIFE INTERFACE

Future settlement growth and increasing human activities within corridor zones may increase the interface between wildlife and human settlements. Expansion of settlements into wildlife movement areas may increase the likelihood of:

- wildlife encounters near homesteads;
- livestock predation;
- destruction of property;
- and competition over grazing and water resources.

Wildlife species displaced from traditional movement routes may increasingly pass through settlement areas, thereby increasing risks of human-wildlife conflicts within portions of the project landscape. The impact may become more significant during dry seasons and drought periods when wildlife movement intensifies in search of water and grazing resources.

The assessment established that unmanaged settlement expansion within wildlife corridors could contribute to long-term escalation of conflict between conservation objectives and community livelihood activities.

9.5.4 HABITAT FRAGMENTATION AND ECOLOGICAL ISOLATION

The proposed excision may contribute to fragmentation of ecological systems and gradual isolation of wildlife habitats if settlement development occurs without adequate environmental planning and corridor protection measures. Habitat fragmentation may reduce ecological continuity and interfere with:

- wildlife dispersal;
- breeding patterns;
- migration behaviour;
- and long-term biodiversity resilience within the landscape.

Increasing land subdivision and physical barriers such as fences and infrastructure may further restrict movement of wildlife species across the landscape. Although some ecological fragmentation already exists due to long-standing settlement occupation, unregulated future expansion may accelerate ecosystem fragmentation and reduce the ecological functionality of remaining wildlife corridors. The impact is considered cumulative in nature and may gradually increase over time if proper environmental safeguards are not implemented.

9.5.5 IMPACTS ON ECOLOGICAL CONNECTIVITY

Ecological connectivity within the Marsabit ecosystem is important for maintaining healthy wildlife populations, ecosystem resilience, and environmental stability. The proposed excision may influence ecological connectivity through changes in land use patterns and increasing human pressure within the landscape. Loss or degradation of ecological connectivity may result in:

- restricted wildlife mobility;
- reduced habitat access;
- increased ecological stress;
- and reduced ecosystem adaptability to climate variability and environmental changes.

However, the assessment established that ecological connectivity impacts can be substantially minimized through:

- protection of identified wildlife corridors;
- controlled settlement zoning;
- establishment of ecological buffer zones;
- and regulation of infrastructure development within sensitive areas.

The project therefore presents both risks and opportunities regarding future ecological connectivity management within the project area.

9.5.6 IMPACTS OF ROADS AND INFRASTRUCTURE ON WILDLIFE MOVEMENT

Improvement and expansion of roads and transport infrastructure following the excision process may increase disturbance within wildlife movement zones. Roads can create physical and behavioural barriers to wildlife movement and increase:

- noise disturbance;
- human activity levels;
- and risk of wildlife-vehicle interactions.

Road expansion and increased accessibility may also encourage settlement growth and increased human activities within previously less disturbed ecological zones.

However, because the project area already contains existing roads and settlement infrastructure, the anticipated impacts are expected to remain moderate provided that future infrastructure development is integrated into environmental planning frameworks.

The ESIA therefore recommends that future infrastructure planning should avoid major wildlife movement corridors and environmentally sensitive areas wherever possible.

9.5.7 POTENTIAL POSITIVE IMPACTS ON WILDLIFE CORRIDOR MANAGEMENT

Despite the identified risks, the proposed excision process also creates opportunities for improved wildlife corridor planning and ecological management within the project area. The ESIA process has facilitated:

- identification and mapping of ecological corridors;

- recognition of environmentally sensitive areas;
- and increased awareness regarding wildlife conservation concerns within the settlements.

Formal settlement planning and integration of ecological zoning measures may improve long-term management of wildlife corridors compared to the current situation characterized by unregulated settlement growth. The project further creates opportunities for:

- collaborative corridor management;
- community conservation initiatives;
- environmental restoration programmes;
- and establishment of ecological buffer zones within the landscape.

Improved coordination between local communities, conservation agencies, and county government institutions may therefore strengthen future ecological connectivity management within the project area.

9.5.8 MITIGATION AND MANAGEMENT CONSIDERATIONS

The assessment established that wildlife corridor and connectivity impacts can be effectively minimized through implementation of appropriate environmental management and land use planning measures. Key management considerations include:

- protection and demarcation of identified wildlife corridors;
- integration of ecological zoning into settlement planning;
- restriction of settlement expansion within sensitive ecological areas;
- controlled fencing and infrastructure development;
- establishment of ecological buffer zones;
- and strengthening community awareness on wildlife conservation.

Continuous environmental monitoring and collaboration between communities, Kenya Wildlife Service (KWS), county government institutions, and other conservation stakeholders will also be important in ensuring long-term protection of ecological connectivity within the landscape.

9.5.9 OVERALL SIGNIFICANCE OF WILDLIFE CORRIDOR AND CONNECTIVITY IMPACTS

Overall, the impacts of the proposed excision on wildlife corridors and ecological connectivity are considered moderate but potentially significant in the long term if future settlement expansion remains uncontrolled. The most critical concerns relate to:

- obstruction of wildlife movement routes;
- increasing human-wildlife interactions;
- habitat fragmentation;
- and gradual reduction of ecological connectivity within portions of the landscape.

However, the assessment established that because the project area already contains long-established settlements and modified landscapes, the proposed excision itself is unlikely to create entirely new ecological disruptions. Instead, the key environmental risk lies in future uncontrolled settlement growth and infrastructure expansion following formalization of the settlements. The assessment therefore concludes that implementation of:

- controlled settlement zoning;
- wildlife corridor retention measures;
- ecological buffer zones;
- sustainable land use planning;
- and collaborative environmental management systems

will be essential in maintaining ecological connectivity and promoting coexistence between human settlements and wildlife conservation objectives within the Marsabit ecosystem.

Table 9-4: Summary of Wildlife Corridor and Connectivity Impacts

IMPACT AREA	POTENTIAL IMPACT
Wildlife Movement Corridors	Obstruction or narrowing of movement routes
Ecological Connectivity	Reduced landscape permeability and ecosystem linkage
Human-Wildlife Interface	Increased interactions between wildlife and settlements
Habitat Integrity	Habitat fragmentation and ecological isolation
Infrastructure Development	Disturbance of wildlife movement through roads and settlement growth
Conservation Opportunities	Improved ecological planning and corridor management
Long-Term Ecosystem Stability	Potential reduction in ecosystem resilience if unmanaged

9.6 HUMAN-WILDLIFE CONFLICT IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve has potential implications on human-wildlife interactions within the project area and the wider Marsabit ecosystem. The settlements are located within landscapes historically associated with wildlife movement, grazing dispersal systems, and ecological connectivity linked to the reserve ecosystem.

Although the project area currently contains established settlements, roads, institutions, and human activities, wildlife movement and occasional interactions between communities and wildlife continue to occur within portions of the landscape. The proposed excision and subsequent settlement development may therefore influence the nature, frequency, and intensity of human-wildlife conflicts within the area if future land use changes and settlement expansion are not properly managed.

The assessment considered impacts associated with:

- livestock predation;
- wildlife movement near settlements;
- competition over natural resources;
- threats to human safety;
- and potential escalation of conflicts between conservation objectives and community livelihood activities.

9.6.1 EXISTING HUMAN-WILDLIFE INTERACTION CONDITIONS

Field investigations and stakeholder consultations established that human-wildlife interactions already occur within portions of Karare II, Parkishon, Kamboe, and surrounding landscapes due to the proximity between settlements and wildlife habitats associated with the Marsabit ecosystem. Community members reported occasional incidences involving:

- livestock predation by carnivorous wildlife;
- wildlife movement near grazing areas and settlements;
- destruction of property;
- and competition for grazing and water resources during drought periods.

Consultations with local communities and Kenya Wildlife Service (KWS) further indicated that wildlife movement within the area is influenced by seasonal environmental conditions, availability of pasture and water resources, settlement patterns, and ecological connectivity across the landscape.

Although the frequency of severe human-wildlife conflict incidents within the immediate settlement areas was reported to be relatively moderate compared to more remote wildlife habitats, communities acknowledged that interactions continue occurring particularly within ecological transition zones and grazing areas near reserve boundaries.

9.6.2 INCREASED SETTLEMENT EXPANSION AND WILDLIFE ENCROACHMENT

One of the primary risks associated with the proposed excision process is the possibility of future settlement expansion into wildlife movement zones and ecologically sensitive areas following formal settlement recognition. Improved land tenure security and infrastructure development may encourage:

- increased housing construction;
- expansion of grazing areas;
- road development;
- fencing;
- and concentration of human activities within sections previously characterized by relatively low settlement density.

Expansion of settlements and infrastructure into wildlife movement areas may reduce available wildlife space and increase the likelihood of wildlife movement through residential and grazing areas. This may consequently increase:

- livestock predation;
- wildlife encounters near settlements;
- and conflicts between wildlife and local communities.

The impact is expected to be more pronounced within sections located close to wildlife corridors and ecological connectivity zones.

9.6.3 LIVESTOCK PREDATION RISKS

Pastoralism remains the dominant livelihood activity within the project area and livestock forms the primary economic asset for many households within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Expansion of settlements and grazing systems within wildlife interface zones may increase the risk of livestock predation by carnivorous wildlife species moving through the landscape. Community consultations revealed concerns regarding occasional loss of goats, sheep, calves, and other livestock to predators particularly during drought periods and dry seasons when wildlife movement intensifies.

Increased livestock concentration and grazing activities near wildlife movement routes may further increase vulnerability of livestock to predation within portions of the project area. Livestock losses may contribute to:

- reduced household income;
- livelihood insecurity;
- and negative perceptions toward wildlife conservation initiatives within affected communities.

9.6.4 COMPETITION OVER GRAZING AND WATER RESOURCES

The proposed excision may increase pressure on grazing systems and water resources within the project area due to population growth, livestock concentration, and increasing settlement activities following formal settlement recognition.

Wildlife and livestock already depend on some shared grazing and water resources within portions of the landscape, particularly during prolonged drought periods. Increasing settlement density and expansion of grazing activities may therefore intensify competition over:

- pasture resources;
- seasonal grazing areas;
- water points;
- and ecological buffer zones.

The impact may contribute to increased movement of wildlife toward settlements and livestock grazing areas during periods of resource scarcity, thereby increasing the likelihood of human-wildlife interactions within the project area.

Poorly managed grazing expansion may also contribute to degradation of wildlife habitats and reduction of ecological resilience within the wider landscape.

9.6.5 THREATS TO HUMAN SAFETY

Although severe wildlife attacks on humans were not widely reported during stakeholder consultations, expansion of settlements and increasing human activities near wildlife movement areas may increase risks to human safety within portions of the project area. Potential risks may include:

- accidental encounters between people and wildlife;
- threats to children and herders within grazing areas;
- and increased movement of wildlife through settlement areas during dry periods.

The impact may become more significant where settlement expansion occurs within ecological corridors and poorly regulated interface zones between wildlife habitats and residential areas.

The assessment established that increased human presence within sensitive ecological areas could potentially increase tension between local communities and wildlife conservation objectives if adequate mitigation measures are not implemented.

9.6.6 IMPACTS ON WILDLIFE BEHAVIOUR AND MOVEMENT PATTERNS

Increasing settlement development and human activities within the project area may alter wildlife movement patterns and behaviour within portions of the landscape. Potential impacts may include:

- avoidance of traditional movement routes;
- increased wildlife stress;
- changes in grazing and movement behaviour;
- and concentration of wildlife within remaining open habitats.

Road development, fencing, settlement expansion, and increased noise and human activity may further discourage wildlife movement across certain sections of the landscape.

Alteration of wildlife movement patterns may also increase ecological pressure within adjacent habitats and reduce overall ecosystem connectivity within the wider Marsabit ecosystem.

9.6.7 SOCIO-ECONOMIC IMPACTS OF HUMAN-WILDLIFE CONFLICTS

Human-wildlife conflicts have potential socio-economic implications for local communities due to their effects on livelihoods, livestock productivity, household income, and community attitudes toward conservation initiatives. Livestock losses, damage to property, and restricted access to grazing areas may negatively affect household economic stability and contribute to:

- livelihood vulnerability;
- reduced tolerance toward wildlife conservation;
- and increased conflict between communities and conservation institutions.

Community members indicated that unresolved wildlife conflicts may discourage support for environmental conservation initiatives and increase pressure for expansion into wildlife habitats and ecological corridors.

The assessment therefore established that effective management of human-wildlife interactions will be critical for maintaining both livelihood sustainability and long-term conservation objectives within the project area.

9.6.8 POTENTIAL POSITIVE IMPACTS ON HUMAN-WILDLIFE CONFLICT MANAGEMENT

Despite the identified risks, the proposed excision process also creates opportunities for improving management of human-wildlife interactions within the project landscape. The ESIA process has facilitated:

- identification of wildlife corridors and conflict-prone areas;
- increased stakeholder awareness regarding ecological conservation;
- and integration of wildlife management considerations into future settlement planning frameworks.

The project further creates opportunities for:

- establishment of ecological buffer zones;

- controlled settlement zoning;
- collaborative management between communities and conservation agencies;
- and implementation of wildlife conflict awareness programmes.

Formal settlement planning and environmental regulation may therefore improve long-term management of human-wildlife interactions compared to the current unregulated settlement situation.

9.6.9 MITIGATION AND MANAGEMENT CONSIDERATIONS

The assessment established that human-wildlife conflict impacts can be substantially minimized through implementation of appropriate environmental planning and conservation management measures. Key mitigation measures include:

- protection of wildlife movement corridors;
- establishment of ecological buffer zones;
- controlled settlement expansion;
- regulation of fencing within corridor areas;
- strengthening community awareness on wildlife conservation;
- and collaborative conflict management between communities and conservation agencies.

The ESIA further recommends continuous monitoring of wildlife movement patterns and strengthening coordination between:

- Kenya Wildlife Service (KWS);
- local administration;
- county government institutions;
- and local communities

to support long-term coexistence between settlements and wildlife within the project area.

9.6.10 OVERALL SIGNIFICANCE OF HUMAN-WILDLIFE CONFLICT IMPACTS

Overall, the human-wildlife conflict impacts associated with the proposed excision are considered moderate but manageable provided that settlement expansion and land use changes are properly controlled and environmental safeguards effectively implemented.

The most significant concerns relate to:

- livestock predation;
- increased competition over grazing resources;
- obstruction of wildlife movement corridors;
- and expansion of settlements within ecological interface zones.

However, because the project area already contains long-established settlements and modified landscapes, the excision process itself is not expected to introduce entirely new wildlife conflict dynamics. Instead, the primary risk lies in future uncontrolled settlement growth and increasing pressure on ecological systems following formal settlement recognition. The assessment therefore concludes that implementation of:

- wildlife corridor protection measures;
- ecological zoning;
- controlled settlement planning;
- community conservation awareness programmes;
- and collaborative environmental management systems

will be essential in minimizing future human-wildlife conflicts and promoting sustainable coexistence between local communities and wildlife populations within the Marsabit ecosystem.

Table 9-5: Summary of Human-Wildlife Conflict Impacts

IMPACT AREA	POTENTIAL IMPACT
Settlement Expansion	Increased interaction between settlements and wildlife habitats
Livestock Predation	Loss of livestock and livelihood impacts
Grazing Competition	Increased competition over pasture and water resources
Human Safety Risks	Increased wildlife encounters near settlements
Wildlife Behaviour	Altered movement patterns and habitat avoidance
Socio-Economic Effects	Livelihood losses and reduced support for conservation
Conservation Opportunities	Improved wildlife management and ecological planning
Long-Term Sustainability	Need for integrated settlement and conservation management

9.7 SOCIO-ECONOMIC IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve is expected to generate a wide range of socio-economic impacts within the project area and surrounding communities. The impacts are associated with changes in land tenure systems, settlement recognition, infrastructure development, access to public services, livelihood systems, investment opportunities, and future land use management following formalization of the settlements. The socio-economic impacts identified during the assessment include both positive and negative effects likely to influence:

- household livelihoods;
- settlement development;
- access to infrastructure and public services;
- land ownership systems;
- community wellbeing;
- and long-term socio-economic resilience within the affected settlements.

The assessment established that the proposed excision is likely to result in substantial positive socio-economic transformation within the project area if properly planned and managed. However, certain risks relating to land use pressure, settlement expansion, social inequality, and resource competition may also emerge during future implementation phases.

9.7.1 IMPROVED LAND TENURE SECURITY

One of the most significant socio-economic benefits associated with the proposed excision process is the anticipated improvement in land tenure security within the project area. Communities within Karare II, Kamboe, Parkishon, and Kambinye have historically occupied the area without formal ownership documentation due to the reserve status of the land.

The proposed excision is expected to facilitate legal recognition of the settlements and create opportunities for future land adjudication, registration, and issuance of ownership documentation. Improved land tenure security is expected to:

- reduce land ownership disputes;
- improve household investment confidence;
- strengthen settlement stability;

- and enhance long-term socio-economic security among local communities.

Secure land ownership may further improve access to:

- financial services;
- development programmes;
- investment opportunities;
- and formal economic activities within the settlements.

The impact is considered highly positive and long-term in significance.

9.7.2 IMPROVED INFRASTRUCTURE DEVELOPMENT

The proposed excision is expected to significantly improve opportunities for infrastructure development within the project area. The current reserve status has limited coordinated investment in roads, healthcare facilities, water supply systems, sanitation infrastructure, administrative services, and public utilities within some sections of the settlements. Formal settlement recognition is expected to support integration of the project area into county and national development planning frameworks, thereby facilitating future investment in:

- road improvement;
- water infrastructure;
- education facilities;
- healthcare services;
- electricity connectivity;
- communication infrastructure;
- and public administrative facilities.

Improved infrastructure development will enhance accessibility, service delivery, mobility, and socio-economic integration within the settlements and surrounding areas. The impact is considered highly positive due to its long-term contribution to improved living standards and economic growth.

9.7.3 INCREASED ACCESS TO PUBLIC SERVICES

The proposed excision will create opportunities for improved access to public services within the settlements through formal recognition and integration into government planning systems. Communities are expected to benefit from improved access to:

- healthcare services;
- education facilities;
- water and sanitation services;
- security services;
- agricultural and livestock extension services;
- and social protection programmes.

Improved public service delivery is expected to contribute to:

- better health outcomes;
- improved educational attainment;
- enhanced community wellbeing;
- and reduction of socio-economic vulnerability within the project area.

The impact is particularly important for vulnerable groups including women, children, elderly persons, and marginalized households who currently experience limitations in access to social services and infrastructure.

9.7.4 ECONOMIC GROWTH AND LIVELIHOOD OPPORTUNITIES

The proposed excision is expected to stimulate economic growth and create new livelihood opportunities within the project area. Improved settlement recognition and land tenure security may attract both public and private sector investment in:

- trade and commerce;
- housing development;
- livestock production;
- transport services;
- small-scale enterprises;
- and community infrastructure.

The excision process may also contribute to development of organized trading centres and improved market accessibility for livestock and other local products. Improved infrastructure and service delivery may further support:

- employment creation;
- livelihood diversification;
- increased household income;
- and improved economic resilience within the settlements.

Pastoral communities may particularly benefit from improved accessibility, livestock marketing opportunities, and enhanced support services following formal settlement recognition.

9.7.5 IMPACTS ON PASTORAL LIVELIHOOD SYSTEMS

Pastoralism remains the dominant livelihood activity within Karare II, Kamboe, Parkishon, and Kambinye settlements. The proposed excision may therefore influence grazing systems, livestock mobility, and access to communal pasture resources within the project area. Positive impacts may include improved security of grazing areas and better infrastructure supporting pastoral livelihoods. However, future settlement expansion and increasing population density may also contribute to:

- reduction of open grazing space;
- increased grazing pressure;
- competition over water resources;
- and changes in traditional livestock movement systems.

If settlement growth remains uncontrolled, pastoral households may experience increasing pressure on communal grazing systems and reduced pasture availability over time. The impact is therefore considered both positive and potentially negative depending on the effectiveness of future land use planning and grazing management systems within the excised areas.

9.7.6 POPULATION GROWTH AND SETTLEMENT EXPANSION

Formal recognition of the settlements and improved infrastructure development may attract increased migration and population growth within the project area. Improved settlement security and economic opportunities may encourage expansion of residential settlements and increased concentration of human activities within the landscape.

While population growth may stimulate local economic development and expansion of social services, uncontrolled settlement growth may also contribute to:

- increased pressure on natural resources;
- environmental degradation;
- infrastructure strain;
- and future land use conflicts.

The impact therefore highlights the importance of implementing:

- controlled settlement zoning;
- sustainable land use planning;
- and effective infrastructure management systems

within the project area.

9.7.7 SOCIAL COHESION AND COMMUNITY STABILITY

The proposed excision is expected to improve social stability and community confidence by resolving long-standing settlement recognition and land ownership uncertainties affecting local communities. Improved land tenure security and clearer administrative structures may contribute to:

- reduced land disputes;
- improved community relations;
- strengthened local governance;
- and enhanced social cohesion within the settlements.

Community consultations undertaken during the ESIA process revealed strong support for the proposed excision process, with many residents viewing it as an important step toward improving socio-economic wellbeing and reducing historical marginalization. The impact is considered highly positive in terms of long-term community stability and settlement security.

9.7.8 RISKS OF LAND SPECULATION AND SOCIAL INEQUALITY

Despite the anticipated socio-economic benefits, the proposed excision may also create risks associated with land speculation, unequal land ownership opportunities, and socio-economic inequality within the project area.

Formalization of land ownership may increase land value and attract external interest in land acquisition and investment within the settlements. Without transparent and inclusive land allocation systems, vulnerable households may face risks of:

- land dispossession;
- unequal access to land ownership;
- and marginalization from future economic opportunities.

The impact may particularly affect:

- low-income households;
- female-headed households;
- vulnerable groups;
- and pastoral households dependent on communal land systems.

The assessment therefore emphasizes the need for transparent land adjudication processes and inclusive stakeholder participation during future land allocation and settlement planning processes.

9.7.9 PUBLIC HEALTH AND SANITATION IMPACTS

Improved settlement recognition and infrastructure development may contribute positively to public health outcomes through expansion of healthcare services, improved sanitation systems, and increased access to clean water infrastructure.

However, increasing population density and settlement growth may also place pressure on existing sanitation and waste management systems if adequate planning measures are not implemented. Potential negative impacts may include:

- increased domestic waste generation;
- sanitation challenges;
- localized environmental pollution;
- and increased risk of communicable diseases within densely settled areas.

The impact is considered manageable through investment in sanitation infrastructure, waste management systems, and public health awareness programmes.

9.7.10 IMPACTS ON VULNERABLE GROUPS

The proposed excision is expected to generate important socio-economic benefits for vulnerable groups within the project area through improved access to land ownership opportunities, infrastructure, healthcare, education, and social services.

Women, youth, elderly persons, and marginalized households are expected to particularly benefit from improved settlement security and future socio-economic development opportunities. However, vulnerable groups may also face risks associated with:

- unequal access to land allocation processes;
- limited participation in decision-making;
- and socio-economic exclusion if future planning processes are not adequately inclusive.

The ESIA therefore recommends strengthening:

- participatory planning approaches;
- stakeholder engagement mechanisms;
- and social inclusion measures

during implementation of future settlement planning activities.

9.7.11 OVERALL SIGNIFICANCE OF SOCIO-ECONOMIC IMPACTS

Overall, the socio-economic impacts associated with the proposed excision are considered highly positive and long-term in significance. The project is expected to significantly improve:

- land tenure security;
- infrastructure development;
- access to public services;
- economic opportunities;
- and community wellbeing within the project area.

The most significant socio-economic benefits relate to formal settlement recognition, improved infrastructure investment, increased livelihood opportunities, and enhanced socio-economic resilience among local communities.

Although certain risks associated with land speculation, settlement expansion, grazing pressure, and resource competition may emerge over time, these impacts are considered manageable through implementation of:

- sustainable land use planning;
- transparent land allocation systems;
- controlled settlement zoning;
- and inclusive stakeholder engagement processes.

The assessment therefore concludes that the proposed excision is likely to contribute positively to long-term socio-economic transformation and development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Table 9-6: Summary of Socio-Economic Impacts

SOCIO-ECONOMIC COMPONENT	POTENTIAL IMPACT
Land Tenure Security	Improved legal recognition and reduced land disputes
Infrastructure Development	Improved roads, healthcare, water supply, and public facilities
Public Services	Enhanced access to healthcare, education, sanitation, and administration
Economic Opportunities	Increased trade, employment, and livelihood diversification
Pastoral Livelihoods	Improved livelihood support but increased grazing pressure risks
Population Growth	Increased settlement expansion and infrastructure demand
Social Stability	Improved community confidence and governance clarity
Land Speculation Risks	Potential inequality and land ownership conflicts
Public Health	Improved services but increased sanitation demands
Vulnerable Groups	Improved socio-economic opportunities with inclusion safeguards needed

9.8 LAND USE AND SETTLEMENT IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve is expected to significantly influence land use patterns, settlement dynamics, infrastructure distribution, and future spatial development within the project area. The excision process will formally recognize existing settlements and facilitate future land adjudication,

settlement planning, and infrastructure expansion within the affected areas. The project area currently comprises a mixture of:

- residential settlements;
- communal grazing lands;
- trading centres;
- institutional infrastructure;
- seasonal drainage systems;
- and ecologically sensitive landscapes associated with the wider Marsabit ecosystem.

The proposed excision is therefore expected to generate both positive and negative impacts associated with changing land use patterns, settlement expansion, infrastructure growth, and increasing socio-economic activities within the landscape.

9.8.1 FORMALIZATION OF EXISTING SETTLEMENTS

One of the major positive land use impacts associated with the proposed excision is the formal recognition and regularization of long-established settlements within Karare II, Kamboe, Parkishon, and Kambinye areas.

The settlements currently exist within land legally classified as part of the Marsabit National Reserve despite decades of permanent human occupation and development of public infrastructure including:

- schools;
- healthcare facilities;
- administrative offices;
- roads;
- religious institutions;
- and residential homesteads.

The excision process is expected to improve legal clarity regarding settlement status and facilitate future settlement planning, land registration, and infrastructure investment within the project area. Formalization of settlements is also expected to reduce uncertainty associated with land ownership and improve community confidence regarding long-term settlement security.

9.8.2 CHANGES IN LAND USE PATTERNS

The proposed excision is expected to influence future land use patterns within the project area due to increasing settlement development, infrastructure expansion, and socio-economic activities following legal recognition of the settlements. Current land use within the project area is dominated by:

- pastoral grazing systems;
- dispersed rural settlements;
- localized trading activities;
- institutional land uses;
- and natural vegetation landscapes.

Following the excision process, some sections of the landscape may experience increased conversion of open grazing land and natural vegetation into:

- residential areas;
- trading centres;
- public infrastructure zones;
- and transportation corridors.

The impact may contribute to gradual transformation of the landscape from predominantly pastoral and semi-natural land use systems toward more structured settlement and mixed land use patterns. Although such changes are expected to support socio-economic development and improved infrastructure planning, uncontrolled land conversion may also contribute to environmental degradation and reduction of open communal grazing areas if not properly managed.

9.8.3 SETTLEMENT EXPANSION AND URBANIZATION PRESSURE

The proposed excision may stimulate future settlement expansion and increasing population concentration within the project area due to improved land tenure security and increasing development opportunities. Formal recognition of the settlements is likely to encourage:

- housing development;
- business expansion;
- infrastructure growth;
- and increased migration into the area.

Expansion of settlements may increase demand for:

- land;

- water resources;
- infrastructure;
- public services;
- and energy resources within the landscape.

If future settlement growth occurs without proper planning controls, the project area may experience:

- unplanned settlement expansion;
- overcrowding;
- land subdivision conflicts;
- and encroachment into environmentally sensitive areas.

The impact is therefore considered moderate to high depending on the effectiveness of future spatial planning and settlement management systems.

9.8.4 PRESSURE ON COMMUNAL GRAZING LANDS

Pastoralism remains the dominant livelihood system within the project area and communal grazing lands form an important socio-economic and ecological resource for local communities. The proposed excision and future settlement expansion may reduce available communal grazing areas due to:

- increased residential development;
- infrastructure expansion;
- fencing of land parcels;
- and land subdivision processes.

Reduction of open grazing space may contribute to:

- increased grazing pressure;
- overgrazing;
- livestock concentration;
- and competition over pasture resources within portions of the landscape.

The impact may become more significant during drought periods when livestock mobility and access to grazing resources become critically important for pastoral livelihoods. The assessment therefore emphasizes the importance of:

- controlled settlement zoning;
- preservation of communal grazing systems;

- and sustainable rangeland management

within future land use planning frameworks.

9.8.5 ENCROACHMENT INTO ENVIRONMENTALLY SENSITIVE AREAS

One of the key environmental concerns associated with changing land use patterns within the project area is the potential encroachment into ecologically sensitive areas following future settlement expansion. Environmentally sensitive areas identified during the baseline assessment include:

- wildlife movement corridors;
- seasonal drainage systems;
- ecological connectivity zones;
- grazing dispersal areas;
- and fragile vegetation landscapes.

Without effective settlement planning and environmental regulation, future development activities may extend into these sensitive areas resulting in:

- habitat disturbance;
- increased environmental degradation;
- obstruction of wildlife movement;
- and alteration of natural drainage systems.

The impact highlights the need for integration of ecological zoning and environmental protection measures within future settlement planning processes.

9.8.6 INCREASED LAND SUBDIVISION AND FENCING

The formalization of land ownership systems following the excision process may increase land subdivision and fencing activities within the settlements. Although land demarcation and ownership documentation may improve tenure security and reduce land disputes, uncontrolled subdivision and fencing may also contribute to:

- fragmentation of communal grazing systems;
- restriction of livestock mobility;
- obstruction of wildlife movement corridors;
- and increasing social conflicts over land boundaries.

Increased fencing may particularly affect pastoral livelihood systems that traditionally depend on flexible livestock movement across open communal landscapes. The impact is considered manageable through implementation of:

- participatory land use planning;
- controlled subdivision systems;
- and protection of communal access routes and ecological corridors.

9.8.7 IMPROVED SETTLEMENT PLANNING OPPORTUNITIES

Despite the identified risks, the proposed excision also creates important opportunities for improved settlement planning and coordinated land use management within the project area. The project provides opportunities for development of:

- structured settlement layouts;
- road networks;
- infrastructure planning systems;
- environmental zoning frameworks;
- and controlled development regulations.

Formal settlement planning may help minimize:

- unplanned settlement growth;
- land use conflicts;
- environmental degradation;
- and future infrastructure challenges within the settlements.

The excision process further creates opportunities for integration of:

- ecological conservation measures;
- drainage protection;
- wildlife corridor retention;
- and sustainable land management systems

within future settlement planning frameworks.

9.8.8 IMPACTS ON INSTITUTIONAL AND PUBLIC LAND USES

The proposed excision is expected to strengthen planning and expansion of institutional land uses within the project area including:

- schools;
- healthcare facilities;
- administrative offices;
- security infrastructure;
- water infrastructure;
- and public utility areas.

Legal recognition of the settlements will facilitate future allocation and protection of land for public infrastructure and community services. This will improve institutional planning and support more organized development within the settlements. The impact is considered highly positive due to its contribution toward improved public service delivery and socio-economic development within the project area.

9.8.9 RISKS OF LAND USE CONFLICTS

Changing land use patterns and increasing land value following the excision process may contribute to future land use conflicts if proper planning and land administration systems are not established. Potential conflicts may arise between:

- settlement development and grazing systems;
- private land ownership and communal resource use;
- infrastructure development and ecological conservation objectives;
- and competing land ownership claims.

The assessment established that transparent land adjudication processes and participatory planning systems will be important in minimizing future land use conflicts within the settlements.

9.8.10 OVERALL SIGNIFICANCE OF LAND USE AND SETTLEMENT IMPACTS

Overall, the land use and settlement impacts associated with the proposed excision are considered highly significant due to their long-term influence on settlement development, infrastructure planning, livelihood systems, and environmental management within the project area. The most important positive impacts relate to:

- formal settlement recognition;
- improved land tenure security;
- infrastructure planning opportunities;

- and structured settlement development.

However, the project also presents risks associated with:

- uncontrolled settlement expansion;
- reduction of communal grazing lands;
- encroachment into environmentally sensitive areas;
- land subdivision pressures;
- and future land use conflicts.

The assessment therefore concludes that implementation of:

- controlled settlement zoning;
- participatory land use planning;
- ecological protection measures;
- and sustainable rangeland management systems

will be essential for ensuring environmentally sustainable and socially acceptable settlement development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Table 9-7: Summary of Land Use and Settlement Impacts

LAND USE COMPONENT	POTENTIAL IMPACT
Settlement Formalization	Improved legal recognition and planning opportunities
Land Use Change	Increased conversion of grazing and natural land into settlement areas
Settlement Expansion	Increased infrastructure growth and urbanization pressure
Grazing Systems	Reduction of communal grazing space and increased grazing pressure
Environmentally Sensitive Areas	Risk of encroachment into ecological corridors and drainage systems
Land Subdivision	Increased fencing and fragmentation of open landscapes
Settlement Planning	Improved spatial planning and organized infrastructure development
Institutional Land Uses	Improved allocation of land for public infrastructure and services
Land Use Conflicts	Potential competition between development and resource use activities

9.9 CULTURAL HERITAGE IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve has potential implications on cultural heritage resources, indigenous knowledge systems, traditional land use practices, and community cultural identity within the project area. The settlements are predominantly inhabited by pastoral communities with strong

cultural attachment to the landscape, traditional grazing systems, communal resource management practices, and indigenous socio-cultural institutions that have evolved over many decades within the wider Marsabit ecosystem. The assessment established that the project area contains important cultural values associated with:

- traditional pastoral livelihood systems;
- indigenous environmental knowledge;
- communal grazing practices;
- cultural identity;
- traditional governance structures;
- and sacred or culturally important community spaces.

Although no nationally gazetted archaeological or historical heritage sites were identified within the immediate proposed excision areas during the field assessment, the landscape continues to hold important socio-cultural significance to local communities.

9.9.1 IMPACTS ON INDIGENOUS KNOWLEDGE SYSTEMS

The proposed excision process may positively contribute to preservation and strengthening of indigenous knowledge systems by improving settlement security and supporting long-term continuity of traditional pastoral livelihood systems within the project area. Local communities within Karare II, Kamboe, Parkishon, and Kambinye possess valuable indigenous knowledge relating to:

- drought adaptation;
- livestock management;
- grazing systems;
- environmental conservation;
- water resource utilization;
- and conflict resolution mechanisms.

Formal settlement recognition may provide opportunities for integration of indigenous knowledge into future land use planning, natural resource management, and environmental conservation initiatives within the settlements.

However, increasing settlement expansion, modernization, changing land use patterns, and socio-economic transformation may gradually contribute to erosion of traditional knowledge systems and cultural practices if appropriate cultural preservation measures are not promoted.

The impact is therefore considered both positive and potentially negative depending on the extent to which traditional knowledge systems are integrated into future planning and development processes.

9.9.2 IMPACTS ON TRADITIONAL PASTORAL LIFESTYLE

Pastoralism remains the dominant socio-cultural and economic system within the project area and forms an important aspect of local cultural identity and community organization. The proposed excision may influence traditional pastoral systems through changes in land ownership structures, settlement patterns, grazing systems, and resource access arrangements.

Improved settlement security and infrastructure development may positively support pastoral livelihoods through enhanced market access, improved service delivery, and better infrastructure within the settlements.

However, future settlement expansion, increasing land subdivision, fencing, and reduction of open communal grazing areas may gradually alter traditional pastoral mobility systems and communal grazing practices that have historically characterized the area.

Changes in land tenure systems may also contribute to increasing privatization of land and gradual transformation of traditional communal land management systems.

The impact may therefore influence long-term continuity of traditional pastoral cultural practices within portions of the project area.

9.9.3 IMPACTS ON CULTURAL IDENTITY AND COMMUNITY COHESION

The proposed excision is expected to positively strengthen community identity and social stability through formal recognition of long-established settlements and clarification of land ownership status within the area.

Communities consulted during the ESIA process indicated that legal recognition of the settlements is viewed as an important step toward addressing historical marginalization and strengthening social

dignity and community confidence. Improved settlement security may therefore contribute positively to:

- cultural continuity;
- social cohesion;
- community stability;
- and preservation of local identity within the settlements.

However, rapid socio-economic transformation and increasing external investment within the area may also introduce new social dynamics and cultural influences that could gradually alter traditional community structures and cultural practices over time.

The impact is therefore considered largely positive but requiring careful management to ensure preservation of local cultural values and social cohesion.

9.9.4 IMPACTS ON COMMUNAL RESOURCE MANAGEMENT SYSTEMS

Traditional communal resource management systems currently play an important role in management of grazing lands, water resources, livestock movement, and conflict resolution within the project area. The proposed excision and future land adjudication processes may influence these communal systems through:

- land subdivision;
- formalization of ownership rights;
- settlement expansion;
- and changing land use patterns.

While formal land ownership may improve investment confidence and settlement planning, it may also contribute to gradual weakening of traditional communal management arrangements if not carefully integrated into future planning systems. The impact may particularly affect:

- communal grazing systems;
- livestock mobility routes;
- and traditional resource-sharing arrangements among pastoral communities.

The assessment therefore emphasizes the importance of maintaining participatory and culturally sensitive land use planning approaches capable of balancing formal land administration with traditional resource management practices.

9.9.5 POTENTIAL DISTURBANCE OF CULTURAL OR SACRED SITES

Field investigations and stakeholder consultations did not identify any nationally recognized archaeological monuments or formally gazetted cultural heritage sites within the immediate proposed excision areas. However, local communities indicated the existence of certain culturally important locations and traditional community spaces within portions of the landscape.

Future infrastructure development, settlement expansion, road construction, and land subdivision activities may potentially disturb undocumented cultural sites or areas of local cultural significance if proper consultation and environmental planning measures are not undertaken. Although the likelihood of major impacts on physical cultural heritage resources is considered low, the assessment recommends that:

- community consultation;
- culturally sensitive planning approaches;
- and chance-find procedures

be integrated into future development activities within the project area.

9.9.6 IMPACTS OF MODERNIZATION AND URBANIZATION

The proposed excision is expected to facilitate increased infrastructure development, economic growth, and socio-economic transformation within the settlements. While these developments are expected to improve living standards and socio-economic wellbeing, they may also contribute to gradual cultural transformation within the project area. Improved accessibility, expansion of trading centres, changing settlement patterns, and increasing interaction with external economic systems may influence:

- traditional lifestyles;
- cultural practices;
- youth social behaviour;
- and indigenous value systems.

The impact is expected to occur gradually over time and may contribute to reduced reliance on traditional livelihood systems and communal social structures within some sections of the community. However, improved education, communication, and socio-economic opportunities may also strengthen community resilience and support preservation of cultural identity through improved institutional and social development frameworks.

9.9.7 OPPORTUNITIES FOR CULTURAL PRESERVATION AND INTEGRATION

Despite the identified risks, the proposed excision process also creates opportunities for strengthening cultural preservation and integration of indigenous knowledge into future settlement planning and environmental management systems. The ESIA process has facilitated documentation of:

- local cultural values;
- indigenous environmental knowledge;
- traditional grazing systems;
- and community resource management practices within the project area.

Future planning frameworks may therefore incorporate:

- community-based conservation systems;
- traditional grazing management practices;
- indigenous drought adaptation strategies;
- and participatory cultural preservation initiatives.

The project further provides opportunities for strengthening collaboration between local communities, county government institutions, and development stakeholders in promoting culturally sensitive and environmentally sustainable development within the settlements.

9.9.8 OVERALL SIGNIFICANCE OF CULTURAL HERITAGE IMPACTS

Overall, the cultural heritage impacts associated with the proposed excision are considered moderate and largely manageable provided that culturally sensitive planning approaches and participatory stakeholder engagement processes are maintained throughout future implementation phases. The most significant positive impacts relate to:

- strengthening community identity;
- improving settlement security;
- preserving socio-cultural stability;
- and creating opportunities for integration of indigenous knowledge into future land use planning and environmental management systems.

Potential negative impacts mainly relate to:

- gradual erosion of traditional pastoral systems;
- increasing land subdivision;
- socio-cultural transformation;
- and possible weakening of communal resource management structures resulting from future settlement expansion and modernization.

The assessment therefore concludes that implementation of:

- participatory land use planning;
- culturally sensitive development approaches;
- indigenous knowledge integration;
- and continuous community engagement

will be essential for preserving cultural heritage values and promoting sustainable socio-cultural development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Table 9-8: Summary of Cultural Heritage Impacts

CULTURAL COMPONENT	POTENTIAL IMPACT
Indigenous Knowledge Systems	Opportunities for preservation and integration into planning
Traditional Pastoral Systems	Possible changes in communal grazing and livestock mobility systems
Cultural Identity	Improved settlement recognition and social stability
Communal Resource Management	Risk of weakening traditional communal management systems
Cultural Sites	Potential disturbance of undocumented cultural locations
Modernization and Urbanization	Gradual transformation of traditional lifestyles and practices
Cultural Preservation Opportunities	Improved integration of indigenous knowledge and cultural planning

9.10 CLIMATE CHANGE AND GHG IMPACTS

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve has potential implications on climate resilience, greenhouse gas (GHG) emissions, ecosystem stability, and long-term environmental sustainability within the project area. The project area lies within an arid and semi-arid landscape that is highly vulnerable to the impacts of climate variability and climate change including prolonged droughts, erratic rainfall patterns, increasing temperatures, land degradation, water scarcity, and declining pasture productivity.

The proposed excision itself is not expected to generate substantial industrial greenhouse gas emissions. However, future settlement expansion, infrastructure development, vegetation clearing, increasing energy demand, and changes in land use patterns may contribute to localized increases in greenhouse gas emissions and reduced ecological resilience if environmental safeguards are not effectively implemented. The assessment therefore considered:

- climate vulnerability within the project area;
- impacts of future land use changes on ecosystem resilience;
- potential greenhouse gas emission sources;
- and opportunities for climate adaptation and environmentally sustainable settlement planning.

9.10.1 EXISTING CLIMATE VULNERABILITY WITHIN THE PROJECT AREA

The project area is characterized by harsh climatic conditions typical of arid and semi-arid ecosystems. Communities within Karare II, Kamboe, Parkishon, and Kambinye frequently experience climate-related challenges including:

- prolonged drought periods;
- declining pasture availability;
- seasonal water shortages;
- high temperatures;
- and increasing livelihood vulnerability associated with climate variability.

Pastoral livelihoods within the area are particularly sensitive to climate change due to dependence on:

- grazing systems;
- livestock production;
- seasonal water resources;

- and ecosystem stability.

Stakeholder consultations undertaken during the ESIA process revealed that local communities have experienced increasing frequency and intensity of drought events over recent years, resulting in:

- livestock losses;
- declining pasture productivity;
- reduced household income;
- and increased pressure on natural resources.

The assessment therefore established that future settlement planning and land use management within the proposed excision areas must integrate climate resilience considerations to minimize long-term environmental and socio-economic vulnerability.

9.10.2 POTENTIAL GREENHOUSE GAS EMISSION SOURCES

Although the proposed excision process itself will not involve major industrial or energy-intensive activities, future settlement development and socio-economic growth within the excised areas may contribute to localized greenhouse gas emissions. Potential emission sources associated with future settlement expansion may include:

- vegetation clearing and biomass loss;
- increased use of fuelwood and charcoal for domestic energy;
- transportation emissions from increased road usage;
- construction activities;
- and increased waste generation within the settlements.

Expansion of settlements and infrastructure may also contribute to gradual reduction of vegetation cover capable of supporting carbon sequestration within portions of the landscape. The impact is expected to remain relatively low to moderate in comparison to large-scale infrastructure or industrial developments. However, cumulative long-term land use changes may gradually contribute to increased carbon emissions and reduced ecological resilience if not properly managed.

9.10.3 IMPACTS ON VEGETATION AND CARBON SEQUESTRATION

Vegetation within the project area plays an important ecological role in:

- carbon storage;
- soil stabilization;

- microclimate regulation;
- and protection of ecosystem resilience within the arid landscape.

Future settlement expansion and infrastructure development may result in localized clearing of vegetation cover and reduction of natural carbon sequestration capacity within sections of the project area. Loss of vegetation may further contribute to:

- increased soil exposure;
- accelerated land degradation;
- reduced ecological resilience;
- and increased vulnerability to climate-related environmental stress.

However, because significant portions of the project area are already occupied and modified by existing human activities, the anticipated direct vegetation loss associated with the excision process itself is expected to remain moderate. The ESIA therefore recommends implementation of:

- tree planting programmes;
- environmental restoration initiatives;
- sustainable grazing management;
- and protection of ecological corridors

to strengthen carbon sequestration and climate resilience within the landscape.

9.10.4 CLIMATE CHANGE IMPACTS ON WATER RESOURCES

Climate change is expected to continue affecting water availability within the project area through increasing rainfall variability, prolonged dry periods, and declining reliability of seasonal water sources. Future population growth and settlement expansion following the excision process may increase demand for:

- domestic water;
- livestock water supply;
- institutional water use;
- and small-scale economic activities within the settlements.

Increased pressure on already limited water resources may heighten vulnerability of local communities to climate-induced water scarcity particularly during drought periods. The assessment established that strengthening climate-resilient water management systems will be important for supporting long-term sustainability within the project area. Recommended measures include:

- protection of drainage systems;

- water harvesting initiatives;
- improved water storage infrastructure;
- groundwater management;
- and sustainable water use planning.

9.10.5 IMPACTS ON GRAZING SYSTEMS AND LIVELIHOOD RESILIENCE

Pastoral livelihood systems within the project area are highly sensitive to climate variability due to dependence on rangeland ecosystems and seasonal grazing patterns. Future settlement expansion and increasing pressure on grazing systems may reduce resilience of pastoral livelihoods to climate-related shocks including droughts and pasture scarcity. Potential impacts may include:

- reduced grazing availability;
- overgrazing;
- land degradation;
- and increased competition over pasture and water resources.

The cumulative effects of climate variability and increasing land use pressure may therefore heighten livelihood vulnerability within portions of the project area if sustainable grazing management systems are not implemented. The ESIA recommends integration of:

- climate-smart rangeland management;
- drought resilience strategies;
- controlled settlement zoning;
- and preservation of communal grazing areas

within future land use planning frameworks.

9.10.6 CLIMATE RESILIENCE OPPORTUNITIES ASSOCIATED WITH THE PROJECT

Despite the identified risks, the proposed excision process also creates important opportunities for strengthening climate resilience and environmentally sustainable settlement planning within the project area. Formal settlement recognition and integration into county development planning frameworks may facilitate investment in:

- climate-resilient infrastructure;
- sustainable water supply systems;
- drought adaptation measures;

- environmental restoration programmes;
- and improved disaster risk management systems.

The project further creates opportunities for integration of:

- climate adaptation strategies;
- ecological conservation measures;
- sustainable land management;
- and environmental awareness programmes

within future settlement development processes.

Improved settlement planning and environmental regulation may therefore contribute positively toward strengthening long-term climate resilience within the settlements.

9.10.7 POTENTIAL CUMULATIVE CLIMATE AND ENVIRONMENTAL IMPACTS

The cumulative effects of settlement expansion, vegetation degradation, increasing energy demand, grazing pressure, and climate variability may contribute to long-term environmental changes within the wider project landscape. Potential cumulative impacts may include:

- increasing land degradation;
- declining ecological resilience;
- reduced vegetation cover;
- declining pasture productivity;
- and increased vulnerability to droughts and environmental stress.

If future settlement development occurs without adequate environmental planning and climate adaptation measures, these impacts may gradually intensify over time. The assessment therefore emphasizes the importance of integrating:

- climate-sensitive land use planning;
- environmental restoration;
- ecological corridor protection;
- and sustainable natural resource management

within future implementation processes.

9.10.8 MITIGATION AND CLIMATE ADAPTATION MEASURES

The assessment established that climate change and greenhouse gas impacts associated with the proposed project can be effectively minimized through implementation of sustainable environmental management and climate adaptation measures. Key recommended measures include:

- protection and restoration of vegetation cover;
- promotion of tree planting initiatives;
- sustainable grazing management;
- climate-resilient settlement planning;
- protection of drainage systems and water resources;
- promotion of clean energy alternatives;
- and strengthening community awareness on climate adaptation and environmental conservation.

The ESIA further recommends integration of climate resilience considerations into:

- future infrastructure planning;
- settlement zoning;
- water resource management;
- and environmental management systems within the project area.

9.10.9 OVERALL SIGNIFICANCE OF CLIMATE CHANGE AND GHG IMPACTS

Overall, the climate change and greenhouse gas impacts associated with the proposed excision are considered low to moderate and manageable provided that sustainable settlement planning and environmental management measures are effectively implemented.

The project itself is not expected to generate substantial greenhouse gas emissions compared to large industrial or infrastructure projects. However, future land use changes and settlement expansion may contribute to localized environmental degradation and increased climate vulnerability if poorly managed. The most significant climate-related concerns relate to:

- vegetation degradation;
- reduced ecosystem resilience;
- pressure on water and grazing resources;
- and increasing vulnerability to drought and climate variability.

The assessment therefore concludes that implementation of:

- climate-sensitive land use planning;

- environmental restoration programmes;
- sustainable grazing management;
- ecological conservation measures;
- and climate adaptation initiatives

will be essential for promoting long-term environmental sustainability and climate resilience within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Table 9-9: Summary of Climate Change and GHG Impacts

CLIMATE COMPONENT	POTENTIAL IMPACT
Greenhouse Gas Emissions	Localized increase in emissions from settlement expansion and energy use
Vegetation and Carbon Storage	Reduction in vegetation cover and carbon sequestration potential
Water Resources	Increased pressure on climate-sensitive water systems
Grazing Systems	Reduced pasture resilience and increased drought vulnerability
Livelihood Resilience	Increased socio-economic vulnerability to climate variability
Ecosystem Stability	Reduced ecological resilience under increasing environmental pressure
Climate Adaptation Opportunities	Improved climate-resilient infrastructure and environmental planning
Long-Term Sustainability	Need for integrated climate-sensitive land use management

9.11 CUMULATIVE IMPACTS

Cumulative impacts refer to the combined environmental, ecological, social, and economic effects that may arise from the interaction of the proposed excision project with existing human activities, historical land use changes, ongoing environmental pressures, and foreseeable future developments within the project area and the wider Marsabit ecosystem. Unlike direct project impacts which occur immediately from a specific activity, cumulative impacts develop progressively over time through the interaction and accumulation of multiple environmental and socio-economic pressures within the landscape.

In the context of the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settlements, cumulative impacts are expected to arise mainly from increasing settlement expansion,

infrastructure growth, population increase, grazing pressure, vegetation degradation, climate variability, and changing land use patterns within the wider ecosystem. The assessment therefore focused on evaluating how the proposed project may interact with existing environmental and socio-economic conditions to influence long-term sustainability within the project area.

9.11.1 CUMULATIVE SETTLEMENT EXPANSION AND LAND USE CHANGE

One of the most significant cumulative impacts associated with the proposed excision relates to long-term settlement expansion and progressive transformation of land use patterns within the landscape. Formal recognition of the settlements is expected to encourage increased residential development, infrastructure expansion, business growth, and concentration of socio-economic activities within the excised areas.

Over time, this may gradually transform portions of the landscape from predominantly pastoral and semi-natural land use systems into more permanent settlement and mixed-use environments. The cumulative effects of continued settlement expansion may increase pressure on natural resources, infrastructure systems, grazing lands, and environmentally sensitive areas within the project area.

Without effective land use planning and settlement zoning controls, the cumulative impacts of settlement growth may contribute to environmental degradation, increased demand for water resources, infrastructure strain, and increasing competition over land and livelihood resources within the settlements.

9.11.2 CUMULATIVE PRESSURE ON GRAZING ECOSYSTEMS

Pastoralism remains the dominant livelihood activity within the project area and communal grazing systems already experience pressure from recurrent droughts, climate variability, increasing livestock populations, and changing land use patterns. The proposed excision, combined with future settlement growth and increasing infrastructure development, may cumulatively intensify pressure on communal grazing lands and pasture resources within the landscape.

Expansion of settlements, fencing, land subdivision, and infrastructure development may progressively reduce available grazing space and interfere with traditional livestock mobility systems. Over time, the cumulative effects may contribute to overgrazing, vegetation depletion, soil compaction, reduced pasture productivity, and increasing land degradation within portions of the project area.

These impacts may become more significant during drought periods when livestock mobility and access to grazing resources become critically important for pastoral livelihoods and environmental sustainability within the wider ecosystem.

9.11.3 CUMULATIVE ECOLOGICAL AND BIODIVERSITY IMPACTS

The project area forms part of the broader Marsabit ecosystem which supports ecological connectivity, wildlife movement, grazing systems, and biodiversity conservation functions. Although the proposed excision areas already contain established settlements and modified landscapes, cumulative ecological impacts may arise from continued habitat disturbance and increasing pressure on natural ecosystems over time.

Future settlement expansion and increasing human activities may progressively contribute to habitat fragmentation, reduction of ecological connectivity, obstruction of wildlife movement corridors, vegetation degradation, and localized biodiversity decline within portions of the landscape. When combined with existing pressures such as climate variability, environmental degradation, and increasing resource utilization, the cumulative impacts may gradually reduce ecosystem resilience and ecological stability within the wider Marsabit ecosystem.

The assessment established that cumulative ecological impacts may intensify over time if environmentally sensitive areas, wildlife corridors, and grazing systems are not adequately protected through future settlement planning and environmental management frameworks.

9.11.4 CUMULATIVE HUMAN-WILDLIFE CONFLICT IMPACTS

Human-wildlife interactions within the project area are already influenced by settlement patterns, grazing activities, ecological connectivity, and wildlife movement within the Marsabit landscape. The proposed excision and future settlement growth may cumulatively increase the interface between wildlife habitats and human settlements.

As settlements expand toward ecological transition zones and wildlife movement areas, cumulative impacts may include increased livestock predation, wildlife encounters near settlements, competition over grazing and water resources, and increased pressure on wildlife corridors. The impacts may become more significant during drought periods when wildlife movement intensifies in search of water and pasture resources.

The cumulative effects may gradually reduce community tolerance toward wildlife conservation and increase long-term conflict between conservation objectives and local livelihood systems if proper environmental safeguards are not implemented.

9.11.5 CUMULATIVE CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION IMPACTS

The project area is already highly vulnerable to climate variability and environmental degradation due to prolonged droughts, declining vegetation cover, fragile soils, and limited water availability. The cumulative effects of settlement expansion, vegetation clearing, increasing grazing pressure, and climate variability may progressively reduce ecological resilience and increase environmental vulnerability within the landscape.

Potential long-term impacts may include increasing land degradation, declining pasture productivity, soil erosion, reduced vegetation cover, and increasing pressure on water resources. The interaction between climate change and human-induced environmental pressures may therefore amplify ecosystem stress and reduce the ability of the environment to recover from drought and other climatic shocks.

The assessment established that climate-related cumulative impacts may gradually intensify if sustainable land management, environmental restoration, and climate adaptation measures are not effectively integrated into future settlement planning processes.

9.11.6 CUMULATIVE PRESSURE ON WATER RESOURCES AND INFRASTRUCTURE

Future population growth and infrastructure development associated with the proposed excision may cumulatively increase demand for domestic water supply, livestock water resources, sanitation services, healthcare infrastructure, roads, and education facilities within the settlements.

When combined with existing infrastructure limitations and climate-induced water scarcity, increasing demand may place substantial pressure on already constrained public infrastructure and natural water systems within the project area. Without coordinated planning and sustainable infrastructure development, cumulative impacts may contribute to declining service quality, water shortages, sanitation challenges, and increased public health risks within densely settled areas.

The assessment therefore emphasizes the importance of integrating long-term infrastructure planning, sustainable water management systems, and climate-resilient public service delivery frameworks within future settlement development processes.

9.11.7 POSITIVE CUMULATIVE IMPACTS

Despite the identified environmental and socio-economic risks, the proposed excision is also expected to generate important positive cumulative impacts within the project area over the long term. Formal settlement recognition and integration into county and national planning systems are expected to progressively improve infrastructure investment, public service delivery, socio-economic opportunities, governance systems, and community wellbeing within the settlements.

Over time, cumulative improvements in roads, healthcare services, education facilities, water infrastructure, administrative systems, and economic opportunities may significantly improve long-term socio-economic resilience and development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

The project further creates opportunities for cumulative improvements in environmental awareness, ecological planning, climate adaptation, and sustainable land use management through integration of environmental safeguards and participatory planning systems into future development frameworks.

9.11.8 MANAGEMENT OF CUMULATIVE IMPACTS

The assessment established that cumulative impacts associated with the proposed excision can be substantially minimized through implementation of integrated environmental and socio-economic management measures. Effective management will require long-term planning, institutional coordination, environmental monitoring, and continuous stakeholder engagement throughout future implementation phases.

Key management approaches include controlled settlement zoning, protection of wildlife corridors and ecological buffers, sustainable grazing management, climate-sensitive land use planning, environmental restoration programmes, infrastructure planning, and continuous monitoring of environmental and socio-economic conditions within the project area.

The ESIA further recommends strengthening collaboration between local communities, county government institutions, Kenya Wildlife Service (KWS), environmental agencies, and development stakeholders to support coordinated long-term management of cumulative impacts within the wider Marsabit landscape.

9.11.9 OVERALL SIGNIFICANCE OF CUMULATIVE IMPACTS

Overall, the cumulative impacts associated with the proposed excision are considered moderate to potentially significant in the long-term depending on the effectiveness of future settlement planning and environmental management systems. The most significant cumulative concerns relate to settlement expansion, pressure on grazing systems, ecological degradation, climate vulnerability, increasing resource demand, and long-term pressure on environmental systems within the wider Marsabit ecosystem.

However, the assessment established that implementation of integrated land use planning, environmental conservation measures, wildlife corridor protection, climate adaptation initiatives, sustainable infrastructure development, and participatory environmental management systems can substantially reduce cumulative risks while enhancing long-term socio-economic and environmental sustainability within the project area.

The assessment therefore concludes that cumulative impacts associated with the proposed excision are manageable provided that appropriate environmental safeguards, climate-sensitive planning approaches, and long-term environmental management measures are effectively implemented throughout future project implementation phases.

Table 9-10: Summary of Cumulative Impacts

CUMULATIVE IMPACT AREA	POTENTIAL LONG-TERM EFFECT
Settlement Expansion	Increased land use change and development pressure
Grazing Systems	Overgrazing and long-term pasture degradation
Ecological Systems	Habitat fragmentation and reduced ecological connectivity
Human-Wildlife Interactions	Increased long-term conflict risks
Climate and Environmental Stress	Reduced ecosystem resilience and increased drought vulnerability
Water Resources and Infrastructure	Increased pressure on water systems and public infrastructure
Socio-Economic Development	Improved long-term infrastructure and livelihood opportunities
Environmental Management	Need for integrated and coordinated long-term planning

9.12 RESIDUAL IMPACTS

Residual impacts refer to the environmental and social effects that are expected to remain after implementation of the proposed mitigation measures, environmental safeguards, and management interventions identified during the Environmental and Social Impact Assessment (ESIA) process. Residual impacts may persist because certain environmental and socio-economic changes associated

with the proposed excision cannot be completely eliminated despite implementation of appropriate mitigation measures.

The assessment of residual impacts is important in determining the long-term acceptability and sustainability of the proposed project after application of mitigation and environmental management measures. In the context of the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settlements from the Marsabit National Reserve, residual impacts are expected to arise primarily from long-term land use changes, settlement expansion, ecological modification, increasing socio-economic activities, and cumulative environmental pressures within the wider Marsabit ecosystem.

The assessment established that most of the significant adverse impacts identified during the ESIA process can be substantially minimized through implementation of the proposed Environmental and Social Management Plan (ESMP), controlled settlement zoning, wildlife corridor protection, environmental restoration programmes, and sustainable land management measures. However, some residual impacts are expected to remain over the long term.

9.12.1 RESIDUAL ECOLOGICAL AND BIODIVERSITY IMPACTS

Even after implementation of proposed mitigation measures, some residual ecological impacts are expected to persist within portions of the project area due to gradual changes in land use patterns and increasing human activities following settlement formalization. Residual impacts may include:

- localized reduction in vegetation cover;
- partial modification of wildlife habitats;
- and gradual ecological disturbance associated with settlement growth and infrastructure development.

Although protection of ecological corridors, controlled settlement zoning, and environmental restoration initiatives are expected to substantially minimize impacts on biodiversity and ecosystem connectivity, certain ecological changes resulting from increasing human presence within the landscape are likely to remain unavoidable over time.

The residual ecological impacts are however expected to remain moderate and manageable provided that environmental safeguards and conservation measures are continuously implemented and monitored throughout future development phases.

9.12.2 RESIDUAL WILDLIFE CORRIDOR AND CONNECTIVITY IMPACTS

Implementation of wildlife corridor protection measures and ecological zoning is expected to significantly reduce impacts on wildlife movement and ecological connectivity within the project area. However, some residual impacts on wildlife movement patterns may persist due to increasing settlement density, road usage, fencing, and infrastructure development within portions of the landscape.

The assessment established that while major wildlife movement corridors can be protected and integrated into future settlement planning frameworks, complete restoration of historical wildlife movement conditions may not be achievable due to the already established nature of settlements within the proposed excision areas. Residual impacts may therefore include:

- reduced landscape permeability in some sections;
- altered wildlife movement behaviour;
- and continued human-wildlife interface within ecological transition zones.

The impacts are expected to remain moderate and localized if proposed environmental management measures are effectively implemented.

9.12.3 RESIDUAL HUMAN-WILDLIFE CONFLICT IMPACTS

Mitigation measures including ecological buffer zones, wildlife corridor protection, community awareness programmes, and controlled settlement planning are expected to substantially minimize human-wildlife conflicts within the project area.

However, because the settlements remain located within landscapes associated with wildlife movement and ecological connectivity, some level of human-wildlife interaction is expected to continue occurring over the long term. Residual impacts may include occasional:

- livestock predation;
- wildlife movement near settlements;
- and competition over grazing and water resources during drought periods.

The assessment established that while these impacts may not be entirely eliminated, effective collaboration between local communities, Kenya Wildlife Service (KWS), county government

institutions, and environmental stakeholders can significantly reduce the severity and frequency of future conflicts.

9.12.4 RESIDUAL LAND USE AND SETTLEMENT IMPACTS

Implementation of controlled settlement zoning and participatory land use planning is expected to reduce risks associated with unplanned settlement growth and land use conflicts within the project area.

Nevertheless, some residual impacts associated with long-term settlement expansion and changing land use patterns are expected to remain over time. These may include gradual reduction of open communal grazing areas, increasing land subdivision, localized infrastructure pressure, and changing settlement density within portions of the landscape.

The assessment established that future population growth and increasing socio-economic activities may continue influencing land use dynamics despite implementation of planning controls and environmental safeguards.

The residual impacts are however expected to remain manageable provided that long-term settlement planning and land administration systems are continuously strengthened and enforced.

9.12.5 RESIDUAL SOCIO-ECONOMIC IMPACTS

Most of the socio-economic impacts associated with the proposed excision are expected to remain positive and long-term in nature following implementation of the project. Residual positive impacts are expected to include:

- improved land tenure security;
- enhanced infrastructure development;
- increased access to public services;
- and improved socio-economic opportunities within the settlements.

However, certain residual socio-economic risks may persist including:

- increased pressure on infrastructure and public services due to population growth;
- potential land speculation;
- and socio-economic inequalities associated with changing land ownership systems.

The assessment established that these residual impacts can be minimized through transparent land administration processes, inclusive stakeholder participation, and sustainable infrastructure planning frameworks.

9.12.6 RESIDUAL CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION IMPACTS

The proposed mitigation measures including vegetation restoration, sustainable grazing management, protection of drainage systems, and climate-sensitive land use planning are expected to reduce climate-related environmental risks within the project area.

However, residual impacts associated with climate variability and environmental stress are expected to continue affecting the landscape due to:

- prolonged drought conditions;
- increasing temperatures;
- and the naturally fragile nature of arid and semi-arid ecosystems within Marsabit County.

Some degree of environmental pressure associated with increasing settlement development and resource utilization is therefore expected to persist over the long term despite implementation of environmental management measures.

The assessment established that strengthening long-term climate adaptation strategies and environmental restoration programmes will remain essential for improving ecosystem resilience and reducing future climate vulnerability within the project area.

9.12.7 RESIDUAL IMPACTS ON GRAZING SYSTEMS

Implementation of sustainable grazing management systems and protection of communal grazing areas is expected to reduce long-term degradation of rangeland ecosystems within the project area.

However, increasing livestock populations, settlement growth, and climate variability may continue exerting residual pressure on grazing resources and pasture systems over time. Residual impacts may include localized overgrazing, seasonal pasture shortages, and increased competition over grazing areas during drought periods.

The impacts are expected to remain moderate provided that sustainable rangeland management systems and participatory grazing management approaches are continuously implemented within the settlements.

9.12.8 POSITIVE RESIDUAL IMPACTS

The proposed excision is expected to generate substantial long-term residual positive impacts within the project area even after completion of implementation phases. These positive residual impacts are expected to include:

- strengthened settlement security;
- improved socio-economic resilience;
- enhanced public service delivery;
- improved infrastructure systems;
- increased investment opportunities;
- and strengthened local governance structures.

The project is also expected to create long-term opportunities for:

- improved environmental planning;
- integration of ecological conservation measures into settlement development;
- and strengthened collaboration between communities and environmental management institutions.

These positive residual impacts are considered highly significant and are expected to contribute positively toward long-term socio-economic transformation within Karare II, Kamboe, Parkishon, and Kambinye settlements.

9.12.9 OVERALL SIGNIFICANCE OF RESIDUAL IMPACTS

Overall, the assessment established that residual impacts associated with the proposed excision are generally moderate and manageable following implementation of the proposed mitigation measures and Environmental and Social Management Plan (ESMP). The most important residual concerns relate to:

- long-term settlement expansion;

- continued pressure on grazing systems;
- partial ecological modification;
- climate vulnerability;
- and localized human-wildlife interactions within portions of the landscape.

However, the assessment further established that these impacts are not expected to result in irreversible or unacceptable environmental degradation provided that:

- controlled settlement planning;
- wildlife corridor protection;
- sustainable land management;
- environmental restoration;
- and continuous environmental monitoring

are effectively implemented throughout future project implementation phases.

The residual positive impacts associated with improved land tenure security, infrastructure development, public service delivery, socio-economic growth, and strengthened settlement planning are expected to substantially outweigh the anticipated residual adverse impacts within the project area.

Table 9-11: Summary of Residual Impacts

RESIDUAL IMPACT AREA	EXPECTED RESIDUAL EFFECT
Ecological Systems	Localized ecological modification and vegetation pressure
Wildlife Corridors	Partial alteration of wildlife movement patterns
Human-Wildlife Interactions	Continued occasional conflicts near ecological interface zones
Land Use and Settlement	Long-term settlement growth and grazing pressure
Socio-Economic Systems	Improved livelihoods with moderate infrastructure and land pressure
Climate and Environmental Stress	Continued vulnerability to drought and environmental degradation
Grazing Systems	Localized pasture pressure during drought periods
Positive Residual Impacts	Long-term improvements in settlement security and socio-economic resilience

9.13 IMPACT SIGNIFICANCE EVALUATION

Impact significance evaluation was undertaken to determine the relative importance and severity of the environmental and social impacts associated with the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve. The evaluation process assisted in identifying impacts requiring priority mitigation and management interventions during implementation of the proposed project.

The significance evaluation considered the nature, magnitude, duration, spatial extent, reversibility, sensitivity of the receiving environment, likelihood of occurrence, and cumulative characteristics of each identified impact. The assessment further considered stakeholder concerns raised during public participation and institutional consultations, as well as the ecological and socio-economic sensitivity of the project area.

The significance evaluation was undertaken both before and after implementation of mitigation measures in order to determine the expected effectiveness of the proposed Environmental and Social Management Plan (ESMP).

9.13.1 CRITERIA USED IN IMPACT SIGNIFICANCE EVALUATION

The impact significance evaluation was guided by a number of key assessment criteria used to determine the severity and importance of the identified environmental and social impacts.

The magnitude of impacts considered the scale or degree of environmental and socio-economic change likely to result from the proposed project. Impacts resulting in substantial environmental alteration, major ecological disruption, or significant socio-economic effects were considered to have high magnitude, while localized or limited changes were classified as moderate or low magnitude impacts.

The duration of impacts considered the expected time period over which the impacts would occur. Temporary impacts occurring during short-term implementation activities were considered less significant compared to long-term or permanent impacts likely to persist throughout the operational life of the settlements and associated land use changes.

The geographical extent of impacts considered the spatial area likely to be affected by the identified impacts. Localized impacts confined within specific portions of the project area were considered less

significant than impacts capable of affecting wider ecological systems, grazing landscapes, or broader socio-economic conditions within the Marsabit ecosystem.

The reversibility criterion evaluated the extent to which the affected environmental or socio-economic conditions could recover following implementation of mitigation measures. Reversible impacts were considered less significant than irreversible impacts likely to permanently alter ecological systems or socio-economic conditions.

The sensitivity of the receiving environment was also considered during the evaluation process. Ecologically sensitive areas such as wildlife corridors, drainage systems, grazing dispersal areas, and fragile arid ecosystems were considered highly sensitive due to their environmental importance and vulnerability to disturbance.

The likelihood of occurrence considered the probability that the identified impact would occur during implementation of the proposed project. Impacts considered highly probable under normal settlement development conditions were assigned higher significance ratings compared to impacts considered unlikely or infrequent.

9.13.2 IMPACT SIGNIFICANCE CLASSIFICATION

Based on the assessment criteria applied during the ESIA process, impacts were classified into four main significance categories including:

- high significance impacts;
- moderate significance impacts;
- low significance impacts;
- and negligible impacts.

High significance impacts were considered impacts likely to result in substantial environmental or socio-economic change requiring strong mitigation measures, environmental safeguards, and continuous monitoring. These impacts generally involved highly sensitive environmental systems or major socio-economic implications capable of affecting long-term sustainability within the project area.

Moderate significance impacts referred to impacts likely to result in noticeable environmental or socio-economic changes requiring mitigation and management interventions but considered manageable under proper implementation conditions.

Low significance impacts referred to impacts expected to result in limited or localized environmental and social effects that could be effectively managed using routine mitigation measures and standard environmental management practices.

Negligible impacts referred to impacts expected to cause minimal or insignificant environmental or socio-economic changes with little influence on overall environmental sustainability or community wellbeing.

The impact significance evaluation framework applied in this ESIA considered both pre-mitigation and post-mitigation conditions in order to determine the likely severity of impacts before and after implementation of the proposed environmental and social safeguards. This approach enabled the assessment team to distinguish between impacts that are inherently significant and those whose effects can be reduced through proper planning, mitigation, monitoring, and institutional coordination.

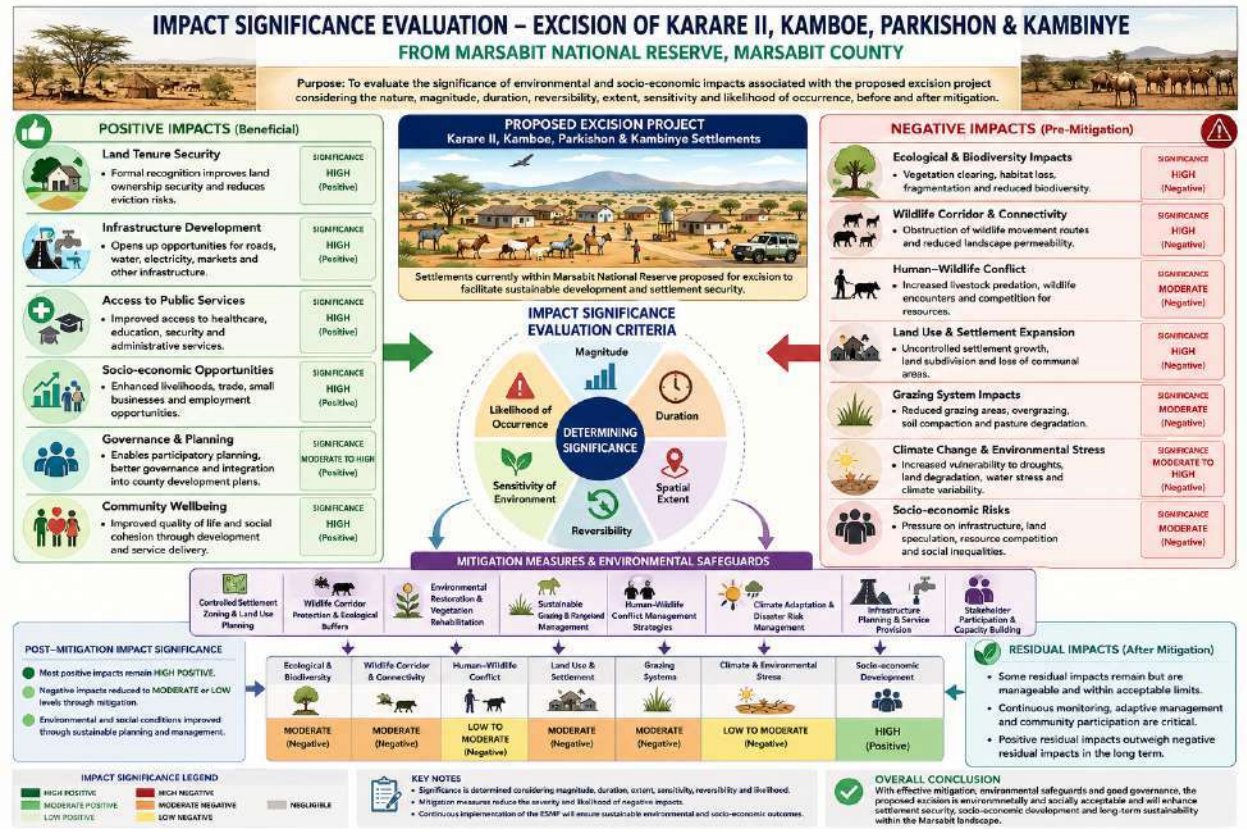


Figure 9-3: Impact Significance Evaluation Framework for the Proposed Excision of Karare II, Kamboe, Parkishon and Kambinye Settlements from Marsabit National Reserve

As illustrated in Figure 9-13, the evaluation process considered positive impacts such as improved land tenure security, infrastructure development, access to public services, socio-economic

opportunities, governance, and community wellbeing. It also considered negative impacts relating to ecological disturbance, wildlife corridor obstruction, human-wildlife conflict, land use change, grazing pressure, climate stress, and socio-economic risks. The framework further demonstrates how mitigation measures, including controlled settlement zoning, wildlife corridor protection, ecological buffers, restoration measures, sustainable grazing management, climate adaptation, and stakeholder participation, reduce the overall significance of adverse impacts.

9.13.3 EVALUATION OF POSITIVE IMPACTS

The significance evaluation established that several positive impacts associated with the proposed excision are highly significant and long-term in nature. The most significant positive impacts identified during the assessment include:

- improved land tenure security;
- enhanced infrastructure development;
- improved access to public services;
- increased socio-economic opportunities;
- and improved settlement planning within the project area.

The significance of these impacts was considered high because of their potential to substantially improve settlement security, socio-economic resilience, public service delivery, and long-term development opportunities within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Positive impacts associated with improved governance systems, environmental planning opportunities, and strengthened institutional coordination were considered moderate to high depending on the effectiveness of future implementation frameworks and stakeholder collaboration.

9.13.4 EVALUATION OF ECOLOGICAL AND BIODIVERSITY IMPACTS

Ecological and biodiversity impacts associated with the proposed excision were generally evaluated as moderate to high depending on the location and sensitivity of the affected environmental systems. Impacts relating to:

- wildlife corridor obstruction;
- habitat fragmentation;
- vegetation degradation;

- and ecological connectivity disruption

were considered highly significant within ecologically sensitive sections of the project area due to the importance of these systems in maintaining ecosystem functionality within the wider Marsabit landscape. However, the significance of these impacts was reduced during post-mitigation evaluation due to the proposed implementation of:

- wildlife corridor protection measures;
- ecological zoning;
- environmental restoration programmes;
- and controlled settlement planning frameworks.

Residual ecological impacts following mitigation were therefore considered moderate and manageable under proper environmental management conditions.

9.13.5 EVALUATION OF HUMAN-WILDLIFE CONFLICT IMPACTS

Human-wildlife conflict impacts were evaluated as moderate in significance due to the existing interaction between settlements and wildlife movement systems within the landscape. Impacts associated with:

- livestock predation;
- competition over grazing resources;
- wildlife movement near settlements;
- and risks to human safety

were considered important but manageable through implementation of ecological buffer zones, wildlife corridor protection, and collaborative conflict management measures. The assessment established that while human-wildlife interactions are likely to continue occurring within portions of the project area, effective environmental planning and conservation management can substantially reduce the severity and frequency of future conflicts.

9.13.6 EVALUATION OF LAND USE AND SETTLEMENT IMPACTS

Land use and settlement impacts were considered highly significant due to the long-term influence of the proposed excision on settlement development, infrastructure growth, land ownership systems, and future land use dynamics within the project area. Positive impacts relating to:

- formal settlement recognition;
- infrastructure planning;
- and improved land administration

were considered highly beneficial and long-term in nature.

However, negative impacts associated with:

- uncontrolled settlement expansion;
- reduction of communal grazing areas;
- land subdivision;
- and encroachment into environmentally sensitive areas

were considered moderate to high prior to mitigation.

Following implementation of controlled settlement zoning, participatory land use planning, and environmental safeguards, the significance of most land use impacts was reduced to moderate and manageable levels.

9.13.7 EVALUATION OF SOCIO-ECONOMIC IMPACTS

Socio-economic impacts associated with the proposed excision were largely evaluated as highly positive due to their anticipated contribution toward improved livelihoods, infrastructure development, socio-economic resilience, and public service delivery within the settlements. Impacts relating to:

- improved land tenure security;
- increased economic opportunities;
- infrastructure investment;
- and improved healthcare and education services

were considered highly significant due to their long-term socio-economic benefits for local communities. Potential adverse socio-economic impacts associated with:

- population growth;
- land speculation;
- infrastructure pressure;
- and resource competition

were considered moderate and manageable through effective governance systems and sustainable planning measures.

9.13.8 EVALUATION OF CLIMATE CHANGE AND CUMULATIVE IMPACTS

Climate change and cumulative impacts were evaluated as moderate to potentially high in the long-term depending on future settlement expansion trends, environmental management effectiveness, and climate variability within the region. Impacts relating to:

- vegetation degradation;
- increasing grazing pressure;
- climate vulnerability;
- and cumulative ecological stress

were considered significant due to the fragile nature of arid and semi-arid ecosystems within Marsabit County.

However, implementation of:

- climate-sensitive land use planning;
- sustainable grazing management;
- environmental restoration programmes;
- and ecological conservation measures

was considered capable of substantially reducing long-term environmental vulnerability and cumulative ecological degradation within the project area.

9.13.9 OVERALL IMPACT SIGNIFICANCE EVALUATION

Overall, the impact significance evaluation established that the proposed excision is environmentally and socially acceptable provided that the proposed mitigation measures and Environmental and Social Management Plan (ESMP) are effectively implemented.

The assessment established that while the project is associated with several moderate and potentially significant environmental impacts relating to ecological systems, wildlife movement, grazing resources, and land use change, these impacts are largely manageable under proper environmental planning and long-term monitoring frameworks.

The positive socio-economic impacts associated with improved settlement security, infrastructure development, public service delivery, and long-term socio-economic growth were considered highly significant and are expected to substantially outweigh the anticipated adverse impacts. The evaluation therefore concludes that implementation of:

- controlled settlement zoning;
- wildlife corridor protection;
- environmental restoration programmes;
- sustainable grazing management;
- climate adaptation measures;
- and participatory land use planning

will be essential for ensuring environmentally sustainable and socially acceptable implementation of the proposed excision process.

Table 9-12: Summary of Impact Significance Evaluation

IMPACT CATEGORY	PRE-MITIGATION SIGNIFICANCE	POST-MITIGATION SIGNIFICANCE
Land Tenure and Settlement Security	High Positive	High Positive
Infrastructure and Public Services	High Positive	High Positive
Ecological and Biodiversity Impacts	High Negative	Moderate Negative
Wildlife Corridor and Connectivity Impacts	High Negative	Moderate Negative
Human-Wildlife Conflict Impacts	Moderate Negative	Low to Moderate Negative
Grazing System Impacts	Moderate Negative	Moderate Negative
Land Use and Settlement Expansion	High Negative	Moderate Negative
Climate Change and Environmental Stress	Moderate Negative	Low to Moderate Negative
Socio-Economic Development Impacts	High Positive	High Positive
Cumulative Impacts	Moderate to High Negative	Moderate Negative



CHAPTER 10

MITIGATION MEASURES AND ESMP

Avoid, minimize, reduce, or compensate adverse impacts and enhance positive impacts through effective mitigation and management.

MITIGATION PRINCIPLES

AVOID
Avoid impacts where possible.

MINIMIZE
Minimize impacts at source.

REDUCE
Reduce impacts to acceptable levels.

COMPENSATE
Compensate for remaining significant impacts.

ENHANCE
Enhance positive impacts and opportunities.

TYPICAL MITIGATION MEASURES BY IMPACT AREA

IMPACT AREA	POTENTIAL IMPACTS	MITIGATION MEASURES	RESPONSIBLE PARTY	TIMING
PHYSICAL ENVIRONMENT	• Air pollution and dust • Noise and vibration • Soil erosion and sedimentation • Water pollution	• Control dust and emissions • Maintain equipment • Erosion and sediment control • Proper waste and wastewater management	Contractor Environmental Officer	Construction and Operation
SOCIO-ECONOMIC ENVIRONMENT	• Displacement and resettlement • Livelihood disruption • Traffic and access disruption • Influx of workers	• Implement RAP and livelihood support • Local hiring and skills training • Traffic management plan • Code of conduct for workers	Contractor Social Officer	Pre-construction, Construction and Operation
OCCUPATIONAL HEALTH AND SAFETY	• Accidents and injuries • Exposure to hazards • Health risks	• Implement OHS Plan • Provide PPE and training • Regular safety inspections • Emergency preparedness	Contractor Safety Officer	Construction and Operation
CULTURAL HERITAGE	• Damage to cultural properties • Loss of cultural sites	• Chance find procedure • Protect cultural sites • Consult with stakeholders	Contractor Community Liaison Officer	Pre-construction and Construction
BIODIVERSITY	• Habitat disturbance • Loss of vegetation • Wildlife disturbance	• Avoid sensitive areas • Re-vegetation and landscaping • Protect wildlife and habitats	Contractor Environmental Officer	Construction and Operation
WASTE MANAGEMENT	• Solid waste generation • Hazardous waste • Improper disposal	• Waste segregation and recycling • Safe storage and disposal • Hazardous waste management	Contractor Environmental Officer	Construction and Operation

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FRAMEWORK

1. PLAN
Define mitigation measures, roles, responsibilities and resources.

2. IMPLEMENT
Implement mitigation measures as per plans and procedures.

3. MONITOR
Monitor compliance and effectiveness of mitigation measures.

4. REPORT
Report monitoring results and incidents.

5. REVIEW
Review and update ESMP based on performance and changes.

ESMP KEY COMPONENTS

- Institutional roles and responsibilities
- Mitigation measures and management actions
- Monitoring and reporting requirements
- Capacity building and training
- Emergency preparedness and response
- Stakeholder communication and grievance redress
- Budget and resource allocation

CHAPTER 10: MITIGATION MEASURES AND ESMP

This chapter presents the proposed mitigation measures and Environmental and Social Management Plan (ESMP) developed for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve. The chapter outlines the measures required to avoid, minimize, control, or manage the environmental and social impacts identified during the ESIA process while enhancing the anticipated positive impacts associated with the project.

The ESMP provides a framework for implementation of environmental and social safeguards during future settlement planning and development activities within the excised areas. Particular emphasis has been placed on protection of wildlife corridors and ecologically sensitive areas, sustainable land use planning, controlled settlement expansion, sustainable grazing management, climate resilience, environmental restoration, and stakeholder participation.

The chapter further identifies institutional responsibilities, monitoring requirements, and environmental management measures necessary for ensuring environmentally sustainable and socially acceptable implementation of the proposed excision process within the project area.

10.1 ENVIRONMENTAL MITIGATION MEASURES

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve presents a number of environmental risks associated with land use change, settlement expansion, ecological disturbance, grazing pressure, wildlife interactions, and climate vulnerability within the project area. This section presents the proposed environmental mitigation measures intended to avoid, minimize, control, restore, or compensate for the identified environmental impacts associated with future settlement planning and development within the excised areas.

The proposed mitigation measures have been developed based on:

- findings of the baseline environmental assessment;
- stakeholder consultations;
- ecological sensitivity analysis;
- applicable environmental regulations;

- and principles of sustainable environmental management within arid and semi-arid ecosystems.

The mitigation measures are intended to support environmentally sustainable settlement development while protecting ecological integrity, biodiversity, grazing systems, water resources, and climate resilience within the wider Marsabit ecosystem.

10.1.1 MITIGATION MEASURES FOR ECOLOGICAL AND BIODIVERSITY IMPACTS

The assessment established that future settlement expansion and infrastructure development may contribute to localized ecological disturbance, vegetation degradation, habitat fragmentation, and biodiversity loss within portions of the project area. To minimize ecological impacts, future settlement planning should avoid environmentally sensitive areas including:

- wildlife movement corridors;
- drainage systems;
- ecological connectivity zones;
- and fragile vegetation landscapes.

Ecological zoning measures should be integrated into future land use planning frameworks to ensure that environmentally sensitive areas are identified, protected, and maintained as conservation or ecological buffer zones within the settlements.

Vegetation clearing during future infrastructure development should be minimized as much as possible and unnecessary destruction of indigenous vegetation should be avoided. Where vegetation disturbance occurs, environmental restoration and revegetation programmes should be undertaken using indigenous and drought-resistant plant species suitable for the arid environment. The ESIA further recommends implementation of community-based environmental conservation programmes aimed at promoting:

- tree planting;
- ecosystem restoration;
- soil conservation;
- and sustainable natural resource management within the settlements.

Continuous environmental monitoring should also be undertaken to assess long-term ecological changes and effectiveness of mitigation measures within the project area.

10.1.2 MITIGATION MEASURES FOR WILDLIFE CORRIDOR AND CONNECTIVITY IMPACTS

Wildlife movement corridors and ecological connectivity zones identified within portions of the project area should be formally protected and integrated into future settlement planning systems.

Settlement expansion, infrastructure development, and fencing should be restricted within identified wildlife movement routes and ecological transition areas to maintain landscape permeability and ecological connectivity within the wider Marsabit ecosystem.

The ESIA recommends establishment of ecological buffer zones along identified wildlife corridors and environmentally sensitive areas to reduce disturbance of wildlife movement systems.

Roads, infrastructure, and future public utilities should be planned in a manner that minimizes fragmentation of ecological systems and avoids obstruction of important wildlife movement routes wherever possible.

Awareness programmes should also be implemented to strengthen community understanding regarding the importance of wildlife corridors, ecological connectivity, and environmental conservation within the settlements.

Collaboration between local communities, Kenya Wildlife Service (KWS), county government institutions, and conservation stakeholders should be strengthened to support long-term ecological management and corridor protection within the project area.

10.1.3 MITIGATION MEASURES FOR HUMAN-WILDLIFE CONFLICT IMPACTS

The proposed excision may increase interaction between wildlife and human settlements if future settlement expansion occurs within ecological interface zones and wildlife movement areas.

To minimize human-wildlife conflicts, future settlement planning should maintain adequate separation between residential areas and identified wildlife corridors wherever possible. Ecological buffers and controlled settlement zoning should be used to reduce wildlife movement through densely populated settlement areas.

Communities should be sensitized on wildlife conservation and appropriate conflict prevention measures including:

- proper livestock management;

- avoidance of settlement expansion into sensitive wildlife areas;
- and reporting procedures for wildlife incidents.

The ESIA further recommends strengthening coordination between local communities and Kenya Wildlife Service (KWS) to improve wildlife conflict response mechanisms and environmental awareness programmes within the settlements.

Protection of grazing systems and water resources through sustainable land management will also reduce competition between livestock and wildlife during drought periods and minimize future conflict risks.

10.1.4 MITIGATION MEASURES FOR LAND USE AND SETTLEMENT IMPACTS

The assessment established that future settlement expansion and changing land use patterns may increase pressure on grazing systems, ecological areas, and infrastructure within the project area. To minimize these impacts, controlled settlement zoning and participatory land use planning frameworks should be developed and implemented within the excised areas. Settlement planning should clearly define:

- residential areas;
- grazing zones;
- ecological conservation areas;
- public utility areas;
- and infrastructure corridors.

Unplanned settlement expansion and encroachment into environmentally sensitive areas should be prohibited through enforcement of land use regulations and development controls. Land subdivision and fencing should be regulated to prevent fragmentation of communal grazing systems, obstruction of livestock mobility routes, and interference with wildlife movement corridors. The ESIA further recommends preservation of communal grazing systems and integration of sustainable rangeland management principles into future settlement planning frameworks.

10.1.5 MITIGATION MEASURES FOR GRAZING SYSTEM IMPACTS

Pastoralism remains the dominant livelihood system within the project area and sustainable grazing management will therefore be critical for long-term environmental sustainability. To minimize grazing pressure and rangeland degradation, the ESIA recommends:

- protection of communal grazing areas;
- rotational grazing practices;
- controlled livestock stocking levels;
- and restoration of degraded pasture areas within the project area.

Overgrazing within fragile ecological zones and drainage systems should be discouraged through community awareness and participatory grazing management systems. The assessment further recommends integration of drought adaptation measures and climate-smart rangeland management approaches to improve resilience of pastoral systems to climate variability and environmental stress. Community participation in grazing management and natural resource conservation should be strengthened to support sustainable utilization of rangeland resources within the settlements.

10.1.6 MITIGATION MEASURES FOR WATER RESOURCE AND DRAINAGE IMPACTS

The project area experiences seasonal water scarcity and fragile drainage conditions typical of arid and semi-arid ecosystems. Future settlement growth and infrastructure development may increase pressure on limited water resources and alter natural drainage systems within portions of the landscape.

To minimize water-related impacts, future development activities should avoid obstruction of seasonal drainage systems and natural water flow channels. Drainage systems and riparian areas should be protected from settlement encroachment, waste disposal, and infrastructure obstruction. The ESIA further recommends implementation of:

- water harvesting systems;
- improved water storage infrastructure;
- groundwater protection measures;
- and sustainable water resource management practices within the settlements.

Communities should also be sensitized on water conservation and sustainable utilization of water resources particularly during drought periods.

10.1.7 MITIGATION MEASURES FOR CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION IMPACTS

The project area is highly vulnerable to climate variability, prolonged droughts, vegetation degradation, and environmental stress. Future settlement development may increase climate vulnerability if sustainable environmental management measures are not implemented. To strengthen climate resilience, the ESIA recommends integration of climate-sensitive land use planning and environmental management systems into future settlement development processes. Environmental restoration initiatives including:

- tree planting;
- restoration of degraded vegetation areas;
- soil conservation;
- and protection of ecological corridors

should be promoted to improve ecosystem resilience and carbon sequestration within the project area. The assessment further recommends promotion of:

- clean energy alternatives;
- sustainable natural resource utilization;
- climate adaptation awareness programmes;
- and climate-resilient infrastructure planning

within the settlements.

Continuous monitoring of environmental conditions and climate-related risks should also be undertaken to support adaptive environmental management within the project area.

10.1.8 MITIGATION MEASURES FOR WASTE MANAGEMENT AND POLLUTION

Future settlement growth and increasing socio-economic activities may contribute to increased domestic waste generation and localized environmental pollution within portions of the project area. To minimize pollution risks, proper waste management systems should be established within the settlements including:

- designated waste collection points;
- environmentally acceptable waste disposal methods;

- and community awareness on environmental sanitation.

Open dumping of waste within drainage systems, grazing areas, and ecological zones should be prohibited to prevent contamination of soil and water resources. Sanitation infrastructure should also be improved within residential areas and public institutions to reduce public health risks and environmental pollution. The ESIA further recommends strengthening environmental awareness programmes focusing on:

- waste management;
- environmental hygiene;
- pollution prevention;
- and sustainable settlement management practices.

10.1.9 ENVIRONMENTAL MONITORING AND ADAPTIVE MANAGEMENT

Effective implementation of the proposed mitigation measures will require continuous environmental monitoring, institutional coordination, and adaptive management throughout future implementation phases. Environmental monitoring programmes should focus on:

- ecological conditions;
- vegetation changes;
- wildlife movement;
- grazing pressure;
- water resource conditions;
- and settlement expansion trends within the project area.

Monitoring results should be periodically reviewed to assess the effectiveness of mitigation measures and identify emerging environmental risks requiring corrective action. The ESIA further recommends strengthening collaboration between:

- county government institutions;
- Kenya Wildlife Service (KWS);
- National Environment Management Authority (NEMA);
- local communities;
- and environmental stakeholders

to support coordinated environmental management and long-term sustainability within Karare II, Kamboe, Parkishon, and Kambinye settlements.

10.1.10 OVERALL ENVIRONMENTAL MANAGEMENT APPROACH

Overall, the proposed environmental mitigation measures are intended to ensure that future settlement development within the excised areas proceeds in an environmentally sustainable manner while minimizing ecological degradation and supporting long-term climate resilience within the wider Marsabit ecosystem. Implementation of:

- controlled settlement zoning;
- wildlife corridor protection;
- ecological restoration;
- sustainable grazing management;
- water resource conservation;
- and participatory environmental management systems

will be essential in minimizing adverse environmental impacts and enhancing long-term ecological sustainability within the project area.

The assessment therefore concludes that the identified environmental impacts are manageable provided that the proposed mitigation measures and environmental safeguards are effectively implemented, monitored, and continuously strengthened throughout future implementation phases.

10.2 SOCIAL MITIGATION MEASURES

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve is expected to generate various social impacts associated with settlement formalization, land tenure changes, infrastructure development, livelihood transformation, and increasing socio-economic activities within the project area. While the project is expected to result in substantial positive socio-economic benefits, certain social risks may emerge if future settlement development and land administration processes are not properly planned and managed.

This section presents the proposed social mitigation measures intended to minimize adverse social impacts while enhancing the anticipated positive socio-economic outcomes associated with the proposed excision process. The mitigation measures have been developed based on findings from

the socio-economic baseline assessment, stakeholder consultations, institutional engagements, and public participation activities undertaken during the ESIA process.

10.2.1 MITIGATION MEASURES FOR LAND TENURE AND SETTLEMENT CONFLICTS

The assessment established that future land adjudication and settlement formalization processes may create risks associated with land ownership disputes, settlement boundary conflicts, and competing land claims within the project area. To minimize these risks, future land registration and adjudication processes should be implemented transparently and through participatory approaches involving local communities, traditional leaders, local administration, county government institutions, and relevant land management agencies.

Land demarcation and allocation processes should be undertaken fairly and consistently to minimize social tensions and ensure equitable access to land ownership opportunities within the settlements. Community grievance handling mechanisms should also be established to address disputes relating to land ownership, settlement boundaries, grazing access, and future development activities within the project area.

Continuous stakeholder engagement and community sensitization should further be undertaken throughout future settlement planning and land administration processes to improve awareness, strengthen transparency, and reduce risks of social conflict within the settlements.

10.2.2 MITIGATION MEASURES FOR VULNERABLE GROUPS

The proposed excision process may disproportionately affect vulnerable groups including women, elderly persons, youth, persons with disabilities, and economically disadvantaged households if future planning and land administration processes are not implemented inclusively.

To minimize social exclusion risks, vulnerable groups should be adequately represented in stakeholder engagement forums, land allocation discussions, settlement planning processes, and future decision-making structures within the project area. Future socio-economic development programmes should promote equitable access to land ownership opportunities, infrastructure services, healthcare, education, water supply systems, and livelihood support programmes.

Women and female-headed households should particularly be supported through inclusive participation frameworks and equitable consideration during future land adjudication and

settlement planning activities. Community awareness programmes focusing on gender equity, social inclusion, and protection of vulnerable populations should also be strengthened within the settlements.

10.2.3 MITIGATION MEASURES FOR POPULATION GROWTH AND SETTLEMENT EXPANSION

Formal recognition of the settlements may encourage future migration and increasing population growth within the project area. Without effective planning controls, increasing settlement density may contribute to pressure on infrastructure systems, natural resources, public services, and social systems within the settlements.

To minimize these impacts, controlled settlement zoning and structured spatial planning frameworks should be developed and implemented within the excised areas. Future settlement expansion should be guided by approved land use plans clearly identifying residential zones, infrastructure corridors, ecological conservation areas, grazing zones, and public utility spaces.

Unplanned settlement growth and overcrowding should be discouraged through enforcement of development regulations and settlement planning controls. Future infrastructure planning should also be aligned with projected population growth trends to ensure sustainable provision of healthcare services, education facilities, roads, water supply systems, sanitation infrastructure, and other public services within the settlements.

10.2.4 MITIGATION MEASURES FOR LIVELIHOOD AND GRAZING CONFLICTS

Pastoralism remains the dominant livelihood system within the project area and future settlement expansion may increase pressure on communal grazing systems and livestock mobility routes within the landscape. To minimize livelihood-related conflicts, communal grazing areas and traditional livestock movement routes should be identified, protected, and integrated into future land use planning frameworks.

Participatory grazing management systems should be promoted to support equitable access to grazing resources and minimize conflicts between pastoral households, settlement expansion activities, and infrastructure development within the project area. The ESIA further recommends promotion of climate-resilient livelihood strategies, livestock productivity improvement

programmes, drought adaptation measures, and livelihood diversification opportunities aimed at strengthening socio-economic resilience among local communities.

Community awareness programmes focusing on sustainable grazing management and responsible natural resource utilization should also be strengthened within the settlements.

10.2.5 MITIGATION MEASURES FOR HUMAN-WILDLIFE CONFLICT RISKS

Future settlement expansion and increasing human activities within ecological interface zones may increase interaction between wildlife and human settlements if not properly managed. To minimize human-wildlife conflict risks, settlement planning should avoid encroachment into identified wildlife corridors and environmentally sensitive ecological areas.

Communities should continuously be sensitized on wildlife conservation, safe livestock management practices, wildlife conflict prevention approaches, and reporting procedures for wildlife incidents. Coordination between local communities and Kenya Wildlife Service (KWS) should also be strengthened to improve wildlife conflict response mechanisms and community awareness regarding coexistence between settlements and wildlife within the wider Marsabit ecosystem.

Protection of grazing systems and water resources through sustainable land management approaches will further reduce competition between livestock and wildlife during drought periods and minimize future conflict risks within the project area.

10.2.6 MITIGATION MEASURES FOR PUBLIC HEALTH AND SANITATION IMPACTS

Future population growth and settlement expansion may place additional pressure on healthcare services, sanitation systems, and waste management infrastructure within the project area. To minimize public health risks, future development planning should prioritize investment in healthcare facilities, sanitation infrastructure, waste management systems, and clean water supply services within the settlements.

Proper waste management systems should be established to minimize environmental pollution and reduce public health risks associated with poor waste disposal practices. Community awareness programmes focusing on environmental hygiene, sanitation, waste management, and disease prevention should also be implemented to improve household health conditions and environmental cleanliness within the settlements.

Improvement of sanitation infrastructure and environmental health systems will be essential for reducing communicable disease risks and improving long-term community wellbeing within the project area.

10.2.7 MITIGATION MEASURES FOR SOCIAL COHESION AND COMMUNITY RELATIONS

Changes in land ownership systems, settlement planning processes, and socio-economic development may potentially create social tensions and disputes within the settlements if not properly managed. To strengthen social cohesion, continuous stakeholder engagement and participatory decision-making processes should be maintained throughout future implementation phases of the proposed excision process.

Traditional leadership structures, community elders, local administration, and community organizations should be actively involved in conflict resolution, community mobilization, environmental management, and settlement planning activities within the project area. Accessible grievance redress mechanisms should also be established to address emerging social concerns and disputes in a transparent and timely manner.

Community sensitization programmes promoting peaceful coexistence, environmental stewardship, social inclusion, and participatory development should further be strengthened within the settlements.

10.2.8 MITIGATION MEASURES FOR CULTURAL HERITAGE AND INDIGENOUS KNOWLEDGE

Although no major gazetted cultural heritage sites were identified within the proposed excision areas, the landscape remains culturally significant to local pastoral communities. Future development activities should therefore respect local cultural values, indigenous knowledge systems, and traditional resource management practices within the project area.

Continuous community consultation should be undertaken during future infrastructure development and settlement planning activities to ensure culturally sensitive implementation approaches. Indigenous environmental knowledge and traditional grazing management practices should also be integrated into future environmental planning and sustainable land management initiatives within the settlements.

Chance-find procedures should further be implemented during future infrastructure development activities to ensure protection of any previously undocumented cultural or heritage resources encountered during implementation.

10.2.9 MITIGATION MEASURES FOR SECURITY AND ADMINISTRATIVE CHALLENGES

Increasing settlement development and population growth may place additional pressure on existing administrative and security systems within the project area. To minimize security-related challenges, future settlement planning should incorporate adequate provision for administrative infrastructure, security facilities, access roads, and public service delivery systems within the settlements.

Coordination between county government institutions, local administration, security agencies, and community leadership structures should be strengthened to support effective governance, social stability, and coordinated development planning within the project area. Community participation in local governance and development planning processes should also be strengthened to improve accountability and institutional coordination within the settlements.

10.2.10 STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION

Stakeholder engagement should remain a continuous process throughout future implementation phases of the proposed excision process and subsequent settlement development activities. Communities, local institutions, conservation agencies, county government departments, and vulnerable groups should continue participating in environmental management, land use planning, infrastructure development, and monitoring activities within the project area.

Regular consultation forums should be established to communicate project progress, address emerging social concerns, monitor implementation of mitigation measures, and strengthen community ownership of future development initiatives within the settlements. Continuous disclosure of relevant project information and strengthening of community feedback mechanisms will further support transparency and inclusive decision-making processes.

10.2.11 OVERALL SOCIAL MANAGEMENT APPROACH

Overall, the proposed social mitigation measures are intended to ensure that future settlement development within the excised areas proceeds in a socially inclusive, sustainable, and conflict-sensitive manner while improving long-term socio-economic wellbeing within the project area.

Implementation of participatory land use planning, inclusive stakeholder engagement, protection of vulnerable groups, sustainable livelihood management, public health improvement measures, and strengthened governance systems will be essential in minimizing adverse social impacts and enhancing positive socio-economic outcomes associated with the proposed excision process.

The assessment therefore concludes that the identified social impacts are manageable provided that the proposed mitigation measures, stakeholder engagement mechanisms, and social management frameworks are effectively implemented throughout future project implementation phases.

10.3 WILDLIFE CORRIDOR PROTECTION MEASURES

The baseline ecological assessment, GIS analysis, stakeholder consultations, and institutional engagements undertaken during the ESIA process confirmed the existence of wildlife movement corridors and ecological connectivity zones traversing portions of the proposed excision areas within Karare II, Kamboe, Parkishon, and Kambinye settlements. These corridors continue to play an important role in facilitating seasonal wildlife movement, ecological connectivity, grazing dispersal, and ecosystem functionality within the wider Marsabit landscape.

Future settlement expansion, infrastructure development, fencing, increasing human activities, and changing land use patterns may however interfere with wildlife movement systems if not properly planned and managed. This section therefore presents the proposed wildlife corridor protection measures intended to minimize obstruction of wildlife movement routes, reduce habitat fragmentation, strengthen ecological connectivity, and promote coexistence between local communities and wildlife within the project area.

10.3.1 IDENTIFICATION AND MAPPING OF WILDLIFE CORRIDORS

All identified wildlife movement corridors and ecological connectivity zones within the proposed excision areas should be formally identified, mapped, and integrated into future land use planning frameworks. The mapping process should be undertaken collaboratively involving:

- Kenya Wildlife Service (KWS);
- county government institutions;
- environmental agencies;
- local communities;
- and relevant conservation stakeholders.

Spatial planning and settlement development activities should utilize the mapped ecological corridors to guide future infrastructure development, settlement zoning, and environmental management decisions within the project area.

The mapped wildlife corridors should further be periodically reviewed and updated based on environmental monitoring findings, wildlife movement patterns, and changing ecological conditions within the wider landscape.

10.3.2 INTEGRATION OF WILDLIFE CORRIDORS INTO SETTLEMENT PLANNING

Future settlement planning within Karare II, Kamboe, Parkishon, and Kambinye areas should integrate wildlife corridor protection as a core component of land use planning and environmental management systems.

Residential expansion, infrastructure development, commercial activities, and public utility projects should avoid identified wildlife movement routes and ecologically sensitive areas wherever possible. Controlled settlement zoning measures should therefore be implemented to ensure that settlement development occurs in a manner that minimizes obstruction of wildlife movement systems.

The ESIA further recommends incorporation of ecological buffers and open ecological spaces within future settlement layouts to maintain landscape permeability and ecological continuity within the wider Marsabit ecosystem.

Settlement planning regulations should also restrict uncontrolled development within designated ecological corridors and wildlife interface zones.

10.3.3 RESTRICTION OF FENCING WITHIN WILDLIFE CORRIDORS

Uncontrolled fencing and land subdivision may significantly obstruct wildlife movement and contribute to fragmentation of ecological systems within the project area. To minimize these impacts,

fencing within identified wildlife movement corridors and ecological connectivity zones should be regulated and controlled.

Future land adjudication and settlement planning processes should discourage installation of impermeable fencing systems within wildlife movement areas and livestock mobility routes. Where fencing is necessary, environmentally sensitive fencing approaches that allow limited wildlife movement and maintain ecological connectivity should be encouraged.

The ESIA further recommends community awareness programmes on the ecological impacts of uncontrolled fencing and the importance of maintaining wildlife mobility within the landscape.

10.3.4 PROTECTION OF ECOLOGICAL BUFFER ZONES

Ecological buffer zones should be established around identified wildlife corridors, seasonal drainage systems, and ecologically sensitive landscapes within the project area. The buffer zones will help minimize direct human disturbance, settlement encroachment, infrastructure pressure, and environmental degradation within critical wildlife movement areas.

The width and management requirements of ecological buffers should be determined based on:

- ecological sensitivity;
- wildlife movement characteristics;
- settlement patterns;
- and environmental monitoring findings within the project area.

Activities likely to degrade ecological integrity within the buffer zones including:

- settlement expansion;
- vegetation clearing;
- waste disposal;
- and intensive grazing pressure

should be controlled and regulated through future land use management systems.

10.3.5 VEGETATION CONSERVATION AND ECOLOGICAL RESTORATION

Vegetation cover within wildlife corridors and ecological transition zones should be protected to maintain habitat functionality and ecological connectivity within the wider landscape.

Future development activities should minimize unnecessary clearing of indigenous vegetation within identified wildlife movement areas. Where vegetation disturbance occurs, ecological restoration and revegetation programmes should be undertaken using indigenous and drought-resistant plant species adapted to the arid ecosystem conditions within Marsabit County. Community-based environmental conservation programmes focusing on:

- tree planting;
- restoration of degraded ecological zones;
- soil conservation;
- and sustainable rangeland management

should further be promoted to strengthen long-term ecological resilience and wildlife habitat quality within the project area.

10.3.6 SUSTAINABLE GRAZING MANAGEMENT WITHIN CORRIDOR AREAS

Pastoralism and livestock grazing remain dominant livelihood activities within the project area and grazing systems often overlap with wildlife movement zones and ecological corridors. To minimize ecological degradation and competition between wildlife and livestock, sustainable grazing management measures should be implemented within wildlife interface areas.

The ESIA recommends:

- controlled grazing practices;
- rotational grazing systems;
- protection of degraded pasture areas;
- and preservation of communal livestock movement routes

within the settlements.

Overgrazing within ecologically sensitive areas and wildlife corridors should be discouraged through participatory grazing management systems and continuous community awareness programmes.

Integration of climate-smart rangeland management approaches will further support long-term sustainability of both wildlife habitats and pastoral livelihood systems within the wider landscape.

10.3.7 INFRASTRUCTURE PLANNING AND WILDLIFE CORRIDOR PROTECTION

Future infrastructure development including roads, public utilities, institutional facilities, and settlement expansion should be planned in a manner that minimizes fragmentation of wildlife movement systems and ecological connectivity within the project area.

Road alignments and infrastructure corridors should avoid critical wildlife movement routes and environmentally sensitive areas wherever possible. Infrastructure planning should also incorporate ecological considerations capable of minimizing:

- wildlife disturbance;
- habitat fragmentation;
- and obstruction of ecological connectivity.

Construction activities within or near ecological corridors should further be subjected to environmental management measures aimed at minimizing vegetation destruction, soil disturbance, and disruption of wildlife movement patterns.

10.3.8 COMMUNITY AWARENESS AND STAKEHOLDER COLLABORATION

Long-term protection of wildlife corridors within the project area will require strong collaboration between local communities, conservation agencies, county government institutions, and environmental stakeholders. Continuous environmental awareness programmes should therefore be implemented to improve community understanding regarding:

- ecological connectivity;
- wildlife conservation;
- environmental stewardship;
- and sustainable land use management within the settlements.

Traditional leadership structures, local administration, community organizations, and grazing management committees should also be involved in wildlife corridor protection and environmental monitoring activities within the project area. The ESIA further recommends strengthening collaboration between:

- Kenya Wildlife Service (KWS);
- National Environment Management Authority (NEMA);

- county government institutions;
- local communities;
- and conservation organizations

to support coordinated ecological management and long-term conservation planning within the wider Marsabit ecosystem.

10.3.9 MONITORING OF WILDLIFE CORRIDORS AND ECOLOGICAL CONNECTIVITY

Continuous environmental monitoring should be undertaken to assess the effectiveness of wildlife corridor protection measures and identify emerging ecological risks within the project area. Monitoring activities should focus on:

- wildlife movement trends;
- vegetation condition;
- habitat disturbance;
- settlement expansion;
- grazing pressure;
- and human-wildlife interactions within ecological interface zones.

Monitoring results should periodically inform adaptive environmental management and future settlement planning decisions within the excised areas. The ESIA further recommends regular ecological assessments and stakeholder review meetings to evaluate implementation progress and strengthen long-term environmental management within the project area.

10.3.10 OVERALL WILDLIFE CORRIDOR PROTECTION APPROACH

Overall, the proposed wildlife corridor protection measures are intended to ensure that future settlement development within Karare II, Kamboe, Parkishon, and Kambinye settlements proceeds in a manner that minimizes ecological fragmentation and supports long-term coexistence between human settlements and wildlife conservation objectives within the Marsabit ecosystem. Implementation of:

- ecological zoning;
- controlled settlement planning;
- vegetation conservation;

- ecological buffer protection;
- sustainable grazing management;
- community awareness;
- and continuous environmental monitoring

will be essential for maintaining ecological connectivity and reducing long-term wildlife corridor impacts within the project area. The assessment therefore concludes that wildlife corridor impacts associated with the proposed excision are manageable provided that the proposed corridor protection measures and environmental safeguards are effectively implemented and continuously strengthened throughout future settlement planning and development processes.

10.4 HUMAN-WILDLIFE CONFLICT MITIGATION MEASURES

The proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve may increase interaction between human settlements and wildlife due to the close proximity between settlement areas, grazing systems, wildlife movement corridors, and ecological connectivity zones within the wider Marsabit ecosystem.

Although the project area already contains established settlements and existing human activities, future settlement expansion, infrastructure development, increasing livestock populations, and changing land use patterns may intensify human-wildlife interactions if not properly managed. Potential impacts may include:

- livestock predation;
- wildlife movement near settlements;
- competition over grazing and water resources;
- destruction of property;
- and risks to human safety.

This section therefore presents the proposed human-wildlife conflict mitigation measures intended to minimize conflict between local communities and wildlife while supporting long-term coexistence between settlement development and wildlife conservation objectives within the project area.

10.4.1 PROTECTION OF WILDLIFE MOVEMENT CORRIDORS

One of the most effective approaches for minimizing human-wildlife conflict within the project area is protection of identified wildlife movement corridors and ecological connectivity zones. Future settlement planning and infrastructure development should therefore avoid encroachment into wildlife movement areas and ecologically sensitive landscapes.

Controlled settlement zoning should be implemented to maintain ecological buffers between residential areas and major wildlife movement routes. Settlement expansion within identified ecological corridors should be restricted to minimize wildlife movement through densely populated areas and reduce direct interaction between wildlife and local communities.

The ESIA further recommends integration of ecological corridor protection measures into future land use planning frameworks to support long-term ecological connectivity and minimize wildlife displacement within the wider Marsabit ecosystem.

10.4.2 CONTROLLED SETTLEMENT EXPANSION

Unplanned settlement expansion into wildlife interface zones may significantly increase risks of human-wildlife conflict within the project area. To minimize these risks, future settlement growth should be guided by approved land use plans and controlled spatial planning systems. Settlement development should be concentrated within designated residential zones while avoiding:

- wildlife movement routes;
- grazing dispersal areas;
- drainage systems;
- and ecologically sensitive landscapes.

Future infrastructure development including roads, institutions, and commercial centres should also be planned in a manner that minimizes fragmentation of wildlife habitats and reduces disturbance of ecological systems within the landscape. Controlled settlement planning will therefore be essential in reducing long-term conflict between wildlife conservation and settlement development within the project area.

10.4.3 SUSTAINABLE GRAZING AND LIVESTOCK MANAGEMENT

Pastoralism remains the dominant livelihood activity within Karare II, Kamboe, Parkishon, and Kambinye settlements and livestock grazing frequently overlaps with wildlife movement areas within the wider ecosystem. To minimize competition between wildlife and livestock, sustainable grazing management systems should be implemented within the project area. Grazing activities should avoid ecologically sensitive areas and identified wildlife corridors wherever possible.

The ESIA recommends promotion of:

- rotational grazing systems;
- controlled livestock stocking levels;
- protection of communal grazing areas;
- and preservation of traditional livestock mobility routes

within the settlements.

Improved livestock management practices including secure livestock enclosures, improved herding systems, and protection of vulnerable livestock particularly during night hours should also be promoted to reduce risks of livestock predation by wildlife species.

10.4.4 COMMUNITY AWARENESS AND ENVIRONMENTAL EDUCATION

Community awareness and environmental education programmes will play an important role in minimizing human-wildlife conflict within the project area. Local communities should continuously be sensitized on:

- wildlife behaviour;
- wildlife conservation importance;
- conflict prevention approaches;
- and environmentally sustainable settlement practices.

Awareness programmes should particularly focus on:

- safe livestock management;
- avoidance of settlement encroachment into ecological corridors;
- reporting procedures for wildlife incidents;

- and coexistence between pastoral livelihoods and wildlife conservation within the Marsabit ecosystem.

Environmental awareness initiatives should involve:

- local administration;
- community elders;
- grazing management committees;
- youth groups;
- women groups;
- and conservation stakeholders

to strengthen community ownership of wildlife conservation and environmental management initiatives within the project area.

10.4.5 STRENGTHENING COLLABORATION WITH KENYA WILDLIFE SERVICE (KWS)

Effective management of human-wildlife conflicts within the project area will require close coordination between local communities and Kenya Wildlife Service (KWS). The ESIA recommends strengthening communication and collaboration between KWS, county government institutions, local administration, and community leadership structures to improve:

- wildlife conflict response mechanisms;
- environmental awareness programmes;
- ecological monitoring;
- and conflict reporting systems within the settlements.

Rapid response mechanisms for handling wildlife incidents should also be strengthened to improve community confidence and reduce escalation of conflict situations within the project area. Regular stakeholder forums involving conservation agencies and local communities should further be established to discuss emerging wildlife management concerns and improve long-term coexistence strategies within the wider landscape.

10.4.6 PROTECTION OF WATER RESOURCES AND GRAZING AREAS

Competition over water and pasture resources during drought periods may increase movement of wildlife toward settlement areas and intensify human-wildlife conflicts within the project area. To minimize these impacts, sustainable management of water resources and grazing systems should be strengthened through:

- protection of communal grazing areas;
- water harvesting initiatives;
- restoration of degraded pasture areas;
- and sustainable rangeland management practices.

Future development activities should avoid degradation of critical grazing and water resource areas used by both livestock and wildlife within the landscape. The ESIA further recommends promotion of climate-resilient resource management systems to reduce environmental stress and improve long-term ecological stability within the project area.

10.4.7 FENCING AND INFRASTRUCTURE MANAGEMENT

Uncontrolled fencing and poorly planned infrastructure development may obstruct wildlife movement and contribute to increased wildlife encounters near settlements. To minimize these risks, fencing within wildlife interface zones and ecological corridors should be regulated and environmentally controlled.

Impermeable fencing systems that completely obstruct wildlife movement should be discouraged within identified ecological connectivity zones. Infrastructure planning should further integrate ecological considerations to minimize habitat fragmentation and reduce disturbance of wildlife movement systems.

Roads and future public infrastructure should avoid major wildlife movement routes wherever possible and incorporate environmentally sensitive planning approaches capable of minimizing ecological disturbance within the project area.

10.4.8 MONITORING AND ADAPTIVE MANAGEMENT

Continuous monitoring of human-wildlife interactions should be undertaken to evaluate the effectiveness of mitigation measures and identify emerging conflict risks within the settlements.

Monitoring activities should focus on:

- wildlife movement patterns;
- livestock predation incidents;
- settlement expansion trends;
- grazing pressure;
- and conflict-prone areas within the project landscape.

Monitoring results should periodically inform adaptive management measures and future settlement planning decisions within the excised areas. The ESIA further recommends regular environmental review meetings involving:

- local communities;
- Kenya Wildlife Service (KWS);
- county government institutions;
- environmental agencies;
- and conservation stakeholders

to evaluate implementation progress and strengthen long-term human-wildlife conflict management within the wider Marsabit ecosystem.

10.4.9 OVERALL HUMAN-WILDLIFE CONFLICT MANAGEMENT APPROACH

Overall, the proposed human-wildlife conflict mitigation measures are intended to support sustainable coexistence between human settlements and wildlife conservation within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Implementation of:

- wildlife corridor protection;
- controlled settlement planning;
- sustainable grazing management;
- community awareness programmes;
- ecological conservation measures;
- and collaborative conflict management systems

will be essential in minimizing future human-wildlife conflict risks within the project area.

The assessment therefore concludes that human-wildlife conflict impacts associated with the proposed excision are manageable provided that the proposed mitigation measures and environmental safeguards are effectively implemented and continuously strengthened throughout future settlement development and environmental management processes.

10.5 CLIMATE ADAPTATION AND MITIGATION MEASURES

The project area is located within an arid and semi-arid environment that is highly vulnerable to the impacts of climate variability and climate change including prolonged droughts, erratic rainfall patterns, water scarcity, land degradation, declining pasture productivity, and increasing environmental stress. Communities within Karare II, Kamboe, Parkishon, and Kambinye settlements are predominantly dependent on pastoralism and natural resource-based livelihoods which are highly sensitive to changing climatic conditions.

Future settlement expansion, increasing population growth, changing land use patterns, and pressure on natural resources may further increase climate vulnerability within the project area if appropriate adaptation and mitigation measures are not implemented. This section therefore presents the proposed climate adaptation and mitigation measures intended to strengthen environmental resilience, reduce climate-related vulnerability, minimize greenhouse gas emissions, and support sustainable settlement development within the wider Marsabit ecosystem.

10.5.1 CLIMATE-SENSITIVE LAND USE PLANNING

Future settlement planning within the excised areas should integrate climate-sensitive land use management principles to reduce environmental vulnerability and improve long-term resilience to climate-related risks. Settlement expansion and infrastructure development should avoid ecologically fragile areas including:

- drainage systems;
- degraded rangelands;
- wildlife corridors;
- and environmentally sensitive landscapes vulnerable to erosion and environmental degradation.

Controlled settlement zoning should be implemented to regulate future development activities and minimize pressure on natural ecosystems and climate-sensitive resources within the project area.

Land use planning frameworks should also integrate ecological conservation measures, grazing management systems, and climate adaptation considerations to ensure environmentally sustainable settlement development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

10.5.2 VEGETATION RESTORATION AND AFFORESTATION MEASURES

Vegetation degradation and declining vegetation cover contribute significantly to environmental vulnerability and reduced ecosystem resilience within arid and semi-arid ecosystems. To strengthen climate resilience and environmental stability, vegetation restoration and tree planting initiatives should therefore be promoted within the project area. Community-based afforestation and revegetation programmes should focus on:

- indigenous drought-resistant tree species;
- restoration of degraded grazing areas;
- protection of ecological corridors;
- and rehabilitation of environmentally sensitive landscapes.

Tree planting activities should be integrated into:

- schools;
- public institutions;
- settlement centres;
- road corridors;
- and degraded communal lands

to improve carbon sequestration, reduce soil erosion, enhance microclimatic conditions, and strengthen ecosystem resilience within the landscape.

The ESIA further recommends strengthening community participation in environmental restoration programmes and natural resource conservation initiatives within the settlements.

10.5.3 SUSTAINABLE GRAZING AND RANGELAND MANAGEMENT

Pastoralism remains the dominant livelihood activity within the project area and grazing systems are highly vulnerable to climate variability and prolonged drought conditions. Unsustainable grazing practices may further accelerate land degradation and reduce resilience of rangeland ecosystems within the landscape. To strengthen climate adaptation within pastoral systems, sustainable grazing management approaches should be implemented including:

- rotational grazing systems;
- controlled livestock stocking levels;
- restoration of degraded pasture areas;
- and protection of communal grazing systems.

Overgrazing within environmentally sensitive areas and drought-prone landscapes should be discouraged through participatory grazing management frameworks and community awareness programmes.

The ESIA further recommends integration of climate-smart pastoral management approaches and drought adaptation strategies to improve long-term resilience of livestock production systems within the project area.

10.5.4 WATER RESOURCE CONSERVATION AND CLIMATE RESILIENCE

Water scarcity remains one of the most significant climate-related challenges affecting communities within the project area. Future population growth and settlement expansion may further increase pressure on limited water resources within the landscape.

To improve climate resilience and water security, sustainable water management systems should be implemented within the settlements. These should include:

- rainwater harvesting systems;
- improved water storage infrastructure;
- groundwater protection measures;
- protection of seasonal drainage systems;
- and promotion of efficient water utilization practices.

Future development activities should avoid obstruction or degradation of natural drainage systems and water recharge areas within the project area.

Community awareness programmes on water conservation and climate adaptation should also be strengthened to improve household resilience to drought conditions and seasonal water shortages within the settlements.

10.5.5 PROMOTION OF CLIMATE-RESILIENT INFRASTRUCTURE

Future infrastructure development within Karare II, Kamboe, Parkishon, and Kambinye settlements should integrate climate-resilient design and environmental sustainability principles.

Infrastructure systems including:

- roads;
- drainage systems;
- water supply facilities;
- public buildings;
- and sanitation infrastructure

should be designed to withstand climate-related risks such as flooding, erosion, prolonged drought conditions, and extreme temperatures.

Drainage infrastructure should particularly be designed to maintain natural water flow patterns and reduce risks of soil erosion and environmental degradation within settlement areas.

The ESIA further recommends use of environmentally sustainable construction approaches and locally appropriate materials capable of improving long-term infrastructure resilience within the project area.

10.5.6 PROMOTION OF CLEAN ENERGY AND LOW CARBON DEVELOPMENT

Although the proposed excision is not expected to generate substantial greenhouse gas emissions, future settlement growth and increasing socio-economic activities may contribute to increasing dependence on fuelwood, charcoal, and fossil fuel-based energy systems within the project area.

To minimize greenhouse gas emissions and environmental degradation, promotion of clean energy alternatives should be encouraged within the settlements. Community awareness programmes should promote:

- energy-efficient technologies;
- solar energy systems;
- clean cooking technologies;
- and sustainable energy utilization practices.

Reduction of dependence on fuelwood and unsustainable biomass utilization will further contribute to:

- reduced vegetation degradation;
- improved air quality;
- and enhanced climate resilience within the wider landscape.

The ESIA further recommends integration of renewable energy solutions into future public infrastructure development and community facilities within the project area.

10.5.7 COMMUNITY CLIMATE AWARENESS AND CAPACITY BUILDING

Effective climate adaptation within the project area will require strengthening community awareness and institutional capacity regarding climate change, environmental conservation, and sustainable natural resource management. Continuous environmental education and climate awareness programmes should therefore be implemented focusing on:

- drought adaptation strategies;
- sustainable grazing management;
- water conservation;
- ecosystem restoration;
- climate-resilient livelihoods;
- and environmental stewardship within the settlements.

Community participation in climate adaptation planning and environmental management initiatives should also be strengthened to improve local ownership and sustainability of adaptation measures within the project area.

Traditional knowledge and indigenous climate adaptation practices should further be integrated into future climate resilience strategies and environmental management systems within the settlements.

10.5.8 ENVIRONMENTAL MONITORING AND ADAPTIVE CLIMATE MANAGEMENT

Continuous monitoring of environmental conditions and climate-related risks should be undertaken to assess the effectiveness of adaptation and mitigation measures within the project area. Monitoring activities should focus on:

- vegetation condition;
- water resource availability;
- grazing pressure;
- land degradation trends;
- climate vulnerability indicators;
- and settlement expansion patterns within the landscape.

Monitoring results should periodically inform adaptive environmental management and future climate resilience planning within the settlements. The ESIA further recommends strengthening collaboration between:

- county government institutions;
- environmental agencies;
- local communities;
- conservation organizations;
- and development stakeholders

to support coordinated climate adaptation and environmental management within the wider Marsabit ecosystem.

10.5.9 OVERALL CLIMATE ADAPTATION AND MITIGATION APPROACH

Overall, the proposed climate adaptation and mitigation measures are intended to strengthen environmental resilience, reduce climate vulnerability, minimize greenhouse gas emissions, and support environmentally sustainable settlement development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

Implementation of:

- climate-sensitive land use planning;
- vegetation restoration programmes;

- sustainable grazing management;
- water conservation measures;
- climate-resilient infrastructure planning;
- clean energy promotion;
- and community climate awareness initiatives

will be essential in improving long-term climate resilience and environmental sustainability within the project area.

The assessment therefore concludes that climate-related impacts associated with the proposed excision are manageable provided that the proposed adaptation and mitigation measures are effectively implemented and continuously strengthened throughout future settlement planning and development processes.

10.6 INSTITUTIONAL RESPONSIBILITIES

Effective implementation of the proposed mitigation measures and Environmental and Social Management Plan (ESMP) for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve will require coordinated involvement of various institutions, government agencies, local communities, and stakeholders.

Institutional responsibilities are important in ensuring that:

- environmental and social safeguards are properly implemented;
- mitigation measures are effectively monitored;
- stakeholder concerns are addressed;
- and long-term environmental sustainability is maintained within the project area.

The proposed institutional framework therefore identifies the roles and responsibilities of key institutions and stakeholders involved in implementation, monitoring, regulation, coordination, and oversight of environmental and social management measures associated with the proposed excision process.

10.6.1 ROLE OF THE PROPONENT

The Rebuilding Pastoralist Livelihoods Organization (REPAL), as the project proponent, will have overall responsibility for ensuring implementation of the Environmental and Social Management Plan (ESMP) and compliance with environmental and social safeguard requirements associated with the proposed excision process.

The proponent will be responsible for:

- coordinating implementation of mitigation measures;
- facilitating stakeholder engagement activities;
- supporting environmental monitoring programmes;
- ensuring compliance with regulatory requirements;
- and coordinating collaboration with relevant government institutions and stakeholders.

The proponent will further be responsible for ensuring that environmental and social considerations are integrated into future planning, community engagement, and implementation processes associated with the project.

10.6.2 ROLE OF THE NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

The National Environment Management Authority (NEMA) will serve as the lead environmental regulatory agency responsible for environmental oversight and compliance monitoring for the proposed project in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended).

NEMA will be responsible for:

- reviewing and approving the ESIA report;
- issuing environmental approval conditions;
- monitoring compliance with environmental regulations;
- conducting environmental inspections and audits;
- and enforcing implementation of environmental safeguards and mitigation measures within the project area.

The Authority will further provide regulatory guidance regarding environmental management, environmental monitoring, and compliance reporting during future implementation phases.

10.6.3 ROLE OF KENYA WILDLIFE SERVICE (KWS)

Kenya Wildlife Service (KWS) will play a critical role in management of wildlife conservation concerns and protection of ecological connectivity within the project area.

KWS will be responsible for:

- supporting identification and protection of wildlife corridors;
- monitoring wildlife movement patterns;
- advising on human-wildlife conflict management measures;
- participating in ecological monitoring activities;
- and supporting community awareness programmes on wildlife conservation and environmental stewardship.

The institution will further collaborate with local communities, county government institutions, and environmental stakeholders in promoting sustainable coexistence between settlement development and wildlife conservation objectives within the wider Marsabit ecosystem.

10.6.4 ROLE OF MARSABIT COUNTY GOVERNMENT

Marsabit County Government will play an important role in implementation of land use planning, infrastructure development, environmental management, and socio-economic development activities within the excised settlements. The County Government will be responsible for:

- supporting settlement planning and zoning;
- coordinating infrastructure development;
- facilitating delivery of public services;
- supporting environmental conservation initiatives;
- and strengthening local governance systems within the project area.

Relevant county departments including:

- lands;
- environment;
- water;
- livestock;
- physical planning;

- and public health

will further support implementation of sector-specific mitigation measures and development programmes within the settlements.

10.6.5 ROLE OF THE MINISTRY OF LANDS AND PHYSICAL PLANNING

The Ministry of Lands and Physical Planning and relevant county land administration offices will be responsible for supporting land adjudication, land registration, settlement planning, and spatial planning activities within the excised areas.

The institutions will further support:

- land demarcation processes;
- development of settlement plans;
- land administration;
- and regulation of future land use development within the project area.

The Ministry will also collaborate with county government institutions and local communities to minimize land ownership disputes and promote sustainable settlement planning within the settlements.

10.6.6 ROLE OF COMMUNITY LEADERSHIP STRUCTURES

Local community leadership structures including:

- chiefs;
- village elders;
- grazing committees;
- community organizations;
- youth groups;
- and women groups

will play an important role in implementation of environmental and social mitigation measures within the project area. Community leadership structures will support:

- stakeholder engagement;
- community mobilization;
- conflict resolution;

- environmental awareness activities;
- grazing management;
- and monitoring of settlement development within the settlements.

Their participation will further strengthen local ownership of environmental conservation initiatives and improve sustainability of mitigation measures within the project area.

10.6.7 ROLE OF LOCAL COMMUNITIES

Local communities within Karare II, Kamboe, Parkishon, and Kambinye settlements will be central participants in implementation and sustainability of environmental and social management measures associated with the proposed excision process. Communities will be responsible for supporting:

- environmental conservation initiatives;
- sustainable grazing management;
- protection of wildlife corridors;
- participatory land use planning;
- and implementation of environmentally sustainable settlement practices within the project area.

Community participation in environmental monitoring, conflict management, and natural resource conservation activities will also be important in strengthening long-term environmental sustainability within the wider landscape.

10.6.8 ROLE OF OTHER GOVERNMENT INSTITUTIONS

Other relevant government institutions including:

- Kenya Forest Service (KFS);
- Water Resources Authority (WRA);
- Ministry of Health;
- National Land Commission (NLC);
- and local security agencies

will support implementation of sector-specific mitigation measures and environmental management activities within the project area.

These institutions will contribute to:

- environmental conservation;
- water resource management;
- public health improvement;
- land administration;
- security coordination;
- and sustainable infrastructure planning within the settlements.

Inter-agency collaboration will therefore be important in ensuring coordinated implementation of environmental and social safeguards within the project area.

10.6.9 ROLE OF CIVIL SOCIETY ORGANIZATIONS AND DEVELOPMENT PARTNERS

Civil society organizations, community-based organizations, and development partners may support implementation of environmental conservation, climate adaptation, livelihood improvement, and community awareness programmes within the project area.

These stakeholders may provide:

- technical support;
- environmental education;
- capacity building;
- community mobilization;
- and support for sustainable natural resource management initiatives within the settlements.

Collaboration with non-governmental organizations and development partners may further strengthen institutional capacity and improve implementation of community-based environmental management programmes within the project area.

10.6.10 COORDINATION AND MONITORING MECHANISMS

Effective implementation of the ESMP will require strong coordination between the various institutions and stakeholders involved in the project. Regular coordination meetings and stakeholder engagement forums should therefore be established to:

- review implementation progress;
- discuss emerging environmental and social issues;
- evaluate monitoring findings;
- and strengthen institutional collaboration within the project area.

Environmental and social monitoring programmes should further be coordinated collaboratively between:

- the proponent;
- regulatory agencies;
- county government institutions;
- conservation agencies;
- and local communities.

Monitoring reports and environmental compliance findings should periodically inform adaptive management and corrective action measures within future implementation phases.

10.6.11 OVERALL INSTITUTIONAL FRAMEWORK

Overall, the proposed institutional framework is intended to ensure coordinated implementation of environmental and social safeguards associated with the proposed excision process while strengthening accountability, regulatory compliance, stakeholder participation, and long-term environmental sustainability within the project area.

Effective collaboration between:

- REPAL;
- NEMA;
- KWS;
- Marsabit County Government;
- local communities;
- and other stakeholders

will be essential for successful implementation of mitigation measures, protection of ecological systems, sustainable settlement planning, and promotion of socially inclusive development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

The assessment therefore concludes that the proposed institutional framework provides an adequate basis for implementation, monitoring, and long-term management of environmental and social impacts associated with the proposed project.

10.7 ENVIRONMENTAL AND SOCIAL MONITORING PLAN

The Environmental and Social Monitoring Plan (ESMP Monitoring Framework) has been developed to ensure effective implementation of the proposed mitigation measures and environmental safeguards associated with the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve. The monitoring plan is intended to provide a systematic framework for tracking environmental and social performance, assessing effectiveness of mitigation measures, identifying emerging risks, and supporting adaptive environmental management throughout future implementation phases.

The monitoring programme focuses on key environmental and social components including:

- ecological conservation;
- wildlife corridor protection;
- human-wildlife conflict management;
- settlement expansion;
- grazing systems;
- climate resilience;
- infrastructure development;
- stakeholder engagement;
- and socio-economic wellbeing within the project area.

Monitoring activities will involve collaboration between:

- the project proponent;
- National Environment Management Authority (NEMA);
- Kenya Wildlife Service (KWS);
- Marsabit County Government;
- local communities;
- and other relevant stakeholders.

Table 10-1: Environmental and Social Monitoring Plan

Environmental / Social Aspect	Potential Impact / Concern	Monitoring Indicator	Monitoring Method	Frequency	Responsibility	Means of Verification
Wildlife Corridors and Ecological Connectivity	Obstruction or narrowing of wildlife movement routes	Status and condition of wildlife corridors	Field inspections, GIS analysis, ecological surveys	Quarterly	KWS, REPAL, County Environment Office	Monitoring reports, GIS maps, field records
Wildlife Movement Patterns	Reduced ecological connectivity and altered wildlife movement	Wildlife movement observations and conflict reports	Wildlife tracking, community reporting, field monitoring	Quarterly	KWS	Wildlife monitoring reports
Human-Wildlife Conflicts	Livestock predation and wildlife encounters near settlements	Number of reported wildlife conflict incidents	Community reporting systems, KWS records	Monthly	KWS, Local Administration	Incident records, KWS reports
Vegetation Cover	Vegetation degradation and habitat disturbance	Vegetation cover condition and regeneration levels	Vegetation surveys, site inspections	Biannually	County Environment Department, REPAL	Environmental monitoring reports
Environmental Restoration Programmes	Failure of restoration initiatives	Number of trees planted and survival rates	Site inspections and vegetation assessments	Quarterly	REPAL, Community Groups	Tree planting records, field reports
Grazing Systems	Overgrazing and pasture degradation	Condition of grazing areas and pasture availability	Grazing assessments, field inspections	Quarterly	Livestock Department, Grazing Committees	Grazing monitoring reports
Soil Erosion and Land Degradation	Increased soil erosion and environmental degradation	Presence of erosion features and degraded land areas	Site inspections and environmental assessments	Quarterly	County Environment Department	Inspection reports
Settlement Expansion	Uncontrolled settlement growth and encroachment into sensitive areas	Settlement growth trends and land use changes	GIS mapping, field inspections	Biannually	County Physical Planning Department	Spatial plans, monitoring reports

Environmental / Social Aspect	Potential Impact / Concern	Monitoring Indicator	Monitoring Method	Frequency	Responsibility	Means of Verification
Encroachment into Ecological Zones	Settlement expansion into wildlife corridors and drainage systems	Number of encroachment cases identified	Site inspections and GIS analysis	Quarterly	County Government, NEMA	Inspection records
Land Use Planning Compliance	Non-compliance with approved settlement zoning	Compliance with approved land use plans	Development control inspections	Quarterly	County Physical Planning Department	Inspection reports
Drainage Systems and Watercourses	Obstruction or degradation of drainage systems	Condition of drainage systems and riparian areas	Field inspections and environmental assessments	Quarterly	Water Department, NEMA	Monitoring reports
Water Resource Availability	Water scarcity and pressure on water resources	Water availability and functionality of water infrastructure	Water resource monitoring and community consultations	Quarterly	Water Department	Water monitoring records
Waste Management	Poor waste disposal and environmental pollution	Waste disposal practices and sanitation conditions	Site inspections and sanitation surveys	Monthly	County Public Health Department	Inspection reports
Public Health and Sanitation	Increased sanitation and health risks	Incidence of sanitation-related health concerns	Health surveillance and inspections	Quarterly	Ministry of Health, Public Health Department	Health reports
Air Quality and Dust	Dust generation from roads and settlement activities	Dust levels and community complaints	Site observations and stakeholder consultations	Quarterly	County Environment Office	Monitoring records
Noise Disturbance	Noise pollution from settlement and infrastructure activities	Number of noise-related complaints	Community consultations and inspections	Quarterly	County Government	Complaint records
Climate Adaptation Measures	Weak implementation of climate resilience measures	Number of climate adaptation initiatives implemented	Project reviews and environmental assessments	Biannually	REPAL, County Environment Department	Progress reports

Environmental / Social Aspect	Potential Impact / Concern	Monitoring Indicator	Monitoring Method	Frequency	Responsibility	Means of Verification
Tree Planting and Carbon Sequestration	Declining vegetation and reduced carbon storage	Number of trees planted and survival rates	Field inspections and monitoring surveys	Quarterly	REPAL, Community Groups	Tree planting records
Sustainable Energy Use	Continued dependence on unsustainable biomass energy	Adoption of clean energy technologies	Household surveys and stakeholder consultations	Annually	County Energy Office	Survey reports
Vulnerable Groups Inclusion	Exclusion of women, youth, and vulnerable households	Level of participation of vulnerable groups	Stakeholder engagement reviews	Quarterly	REPAL, Local Administration	Attendance records
Stakeholder Engagement	Inadequate community participation	Number of consultation meetings held	Stakeholder consultations and attendance reviews	Quarterly	REPAL	Meeting minutes and attendance registers
Grievance Redress Mechanisms	Unresolved community grievances and conflicts	Number of grievances reported and resolved	Grievance register review	Monthly	REPAL, Local Administration	Grievance records
Land Ownership and Boundary Conflicts	Increased land disputes	Number of land-related disputes reported	Community consultations and administrative records	Quarterly	Lands Department, Local Administration	Conflict resolution records
Livelihood Improvement Programmes	Limited socio-economic benefits to local communities	Number of livelihood support initiatives implemented	Programme monitoring and stakeholder consultations	Biannually	County Government, REPAL	Programme reports
Infrastructure Development	Pressure on public infrastructure and services	Status of roads, schools, health facilities, and water infrastructure	Infrastructure inspections	Biannually	County Government	Infrastructure assessment reports

Environmental / Social Aspect	Potential Impact / Concern	Monitoring Indicator	Monitoring Method	Frequency	Responsibility	Means of Verification
Cultural Heritage Protection	Disturbance of culturally significant areas	Number of reported cultural heritage concerns	Community consultations and site inspections	Quarterly	County Government, Community Leaders	Monitoring records
Institutional Coordination	Weak implementation coordination among institutions	Number of inter-agency coordination meetings held	Stakeholder review meetings	Quarterly	REPAL, County Government	Meeting reports
ESMP Compliance	Failure to implement mitigation measures	Level of implementation of ESMP actions	Environmental audits and compliance inspections	Biannually	NEMA, REPAL	Audit reports
Environmental Awareness Programmes	Low environmental conservation awareness	Number of awareness activities conducted	Programme reviews and community feedback	Quarterly	REPAL, Environmental Agencies	Awareness programme reports
Monitoring and Reporting	Inadequate environmental reporting systems	Number of monitoring reports prepared and submitted	Documentation review	Quarterly	REPAL	Monitoring reports

10.8 ESMP IMPLEMENTATION SCHEDULE

The implementation of the Environmental and Social Management Plan (ESMP) for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve will require a phased and coordinated approach involving multiple institutions and stakeholders. The implementation schedule has therefore been developed to guide timely execution of mitigation measures, environmental monitoring activities, stakeholder engagement processes, ecological conservation measures, and institutional coordination throughout future project implementation phases.

The schedule categorizes mitigation and monitoring activities into:

- immediate actions;
- short-term activities;
- medium-term implementation measures;
- and long-term environmental management interventions.

Implementation of the ESMP will be continuous throughout future settlement planning, infrastructure development, land administration, and environmental management processes within the project area.

Table 10-2: ESMP Implementation Schedule

ESMP Activity / Mitigation Measure	Implementation Phase	Timeline	Responsible Institution(s)	Expected Output
Approval and disclosure of ESIA and ESMP	Pre-Implementation	Immediately after ESIA approval	REPAL, NEMA	Approved ESIA and disclosed ESMP
Stakeholder sensitization and community awareness programmes	Pre-Implementation and Continuous	Continuous throughout implementation	REPAL, Local Administration, County Government	Improved stakeholder awareness and participation
Establishment of grievance redress mechanisms	Pre-Implementation	Before implementation activities commence	REPAL, Local Administration	Functional grievance handling system

ESMP Activity / Mitigation Measure	Implementation Phase	Timeline	Responsible Institution(s)	Expected Output
Mapping and demarcation of wildlife corridors	Pre-Implementation	Within first 3 months	KWS, County Government, REPAL	Protected and mapped ecological corridors
Preparation of settlement zoning and land use plans	Short-Term	Within 6–12 months	County Physical Planning Department, Lands Department	Approved land use and settlement plans
Protection of environmentally sensitive areas	Continuous	Continuous	County Government, NEMA, KWS	Protected ecological zones
Environmental awareness and conservation programmes	Continuous	Quarterly and continuous	REPAL, Environmental Agencies	Improved environmental stewardship
Tree planting and ecological restoration initiatives	Short-Term and Continuous	Commence within first 6 months and continue annually	REPAL, Community Groups, County Environment Department	Improved vegetation cover and ecosystem restoration
Sustainable grazing management programmes	Continuous	Continuous	Livestock Department, Grazing Committees	Reduced overgrazing and improved pasture management
Protection of drainage systems and watercourses	Continuous	Continuous	Water Department, County Government	Protected drainage systems and reduced erosion
Establishment of water conservation and harvesting systems	Medium-Term	Within 1–2 years	Water Department, REPAL	Improved water availability and climate resilience
Promotion of climate adaptation	Continuous	Continuous	County Government, REPAL,	Improved climate resilience

ESMP Activity / Mitigation Measure	Implementation Phase	Timeline	Responsible Institution(s)	Expected Output
and resilience measures			Environmental Agencies	
Promotion of clean energy and sustainable energy use	Medium-Term	Within 1–3 years	County Energy Department, Development Partners	Increased adoption of clean energy systems
Monitoring of wildlife movement and ecological connectivity	Continuous	Quarterly	KWS, REPAL	Improved wildlife corridor management
Human-wildlife conflict awareness and response programmes	Continuous	Continuous	KWS, Local Administration	Reduced human-wildlife conflicts
Monitoring of settlement expansion and land use changes	Continuous	Biannual	County Physical Planning Department	Controlled settlement growth
Infrastructure planning and development coordination	Medium-Term	Within 1–5 years	County Government	Improved infrastructure and public services
Public health and sanitation improvement programmes	Medium-Term	Within 1–3 years	Public Health Department, County Government	Improved sanitation and public health conditions
Waste management system establishment	Medium-Term	Within 1–2 years	County Government, Public Health Department	Improved waste management systems
Protection of communal grazing systems	Continuous	Continuous	Livestock Department, Community Committees	Sustained pastoral livelihood systems

ESMP Activity / Mitigation Measure	Implementation Phase	Timeline	Responsible Institution(s)	Expected Output
Monitoring of environmental degradation and erosion	Continuous	Quarterly	County Environment Department	Improved environmental monitoring
Monitoring of socio-economic conditions and vulnerable groups	Continuous	Biannual	REPAL, County Government	Improved social inclusion and livelihood monitoring
Community participation and consultation forums	Continuous	Quarterly	REPAL, Local Administration	Sustained stakeholder engagement
Institutional coordination meetings	Continuous	Quarterly	REPAL, County Government, NEMA, KWS	Improved inter-agency coordination
Environmental audits and ESMP compliance reviews	Continuous	Annually	NEMA, REPAL	Improved ESMP compliance
Review and updating of ESMP implementation measures	Long-Term	Every 2–3 years	REPAL, NEMA, County Government	Updated environmental management framework
Long-term environmental monitoring and adaptive management	Long-Term	Continuous throughout project lifecycle	All Relevant Institutions	Sustainable environmental and social management

10.9 ESMP BUDGET

Implementation of the Environmental and Social Management Plan (ESMP) for the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve will require adequate financial resources to support implementation of mitigation measures, environmental monitoring activities, ecological conservation programmes, stakeholder engagement processes, institutional coordination, and environmental awareness initiatives within the project area.

The ESMP budget presented in this section provides estimated costs for implementation of key environmental and social management activities identified during the ESIA process. The budget estimates are indicative and may be reviewed and updated during future implementation phases depending on actual project requirements, institutional arrangements, and prevailing economic conditions.

The budget covers:

- environmental conservation activities;
- wildlife corridor protection measures;
- climate adaptation initiatives;
- stakeholder engagement programmes;
- environmental monitoring activities;
- community awareness programmes;
- and institutional coordination mechanisms necessary for sustainable environmental and social management within the project area.

Table 10-3: ESMP Budget Estimate

ESMP Activity / Mitigation Measure	Estimated Cost (KES)	Implementation Period	Responsible Institution(s)
Stakeholder engagement and public consultation forums	1,200,000	Continuous	REPAL, County Government
Environmental awareness and community sensitization programmes	1,000,000	Continuous	REPAL, NEMA, Community Groups

ESMP Activity / Mitigation Measure	Estimated Cost (KES)	Implementation Period	Responsible Institution(s)
Mapping and protection of wildlife corridors	1,500,000	Short-Term	KWS, County Government
Ecological monitoring and environmental inspections	1,200,000	Continuous	NEMA, County Environment Department
Tree planting and ecological restoration programmes	2,000,000	Continuous	REPAL, Community Groups
Protection of environmentally sensitive areas	1,000,000	Continuous	County Government, KWS
Sustainable grazing management initiatives	1,200,000	Continuous	Livestock Department, Grazing Committees
Climate adaptation and resilience programmes	1,500,000	Medium-Term	County Government, REPAL
Water conservation and water harvesting initiatives	2,000,000	Medium-Term	Water Department
Human-wildlife conflict mitigation programmes	1,300,000	Continuous	KWS, Local Administration
Community grievance handling mechanisms	500,000	Continuous	REPAL, Local Administration
Public health and sanitation awareness programmes	800,000	Medium-Term	Public Health Department
Waste management and environmental sanitation programmes	1,000,000	Medium-Term	County Government
Monitoring of settlement expansion and land use changes	1,000,000	Continuous	County Physical Planning Department
Capacity building and institutional coordination meetings	900,000	Continuous	REPAL, County Government

ESMP Activity / Mitigation Measure	Estimated Cost (KES)	Implementation Period	Responsible Institution(s)
Environmental audits and compliance reviews	1,200,000	Annual	NEMA
Monitoring and evaluation reporting	800,000	Continuous	REPAL
Contingency (approximately 10%)	1,510,000	As Required	REPAL

Total Estimated ESMP Budget: KES 16,610,000.00

The proposed ESMP budget is intended to support effective implementation of environmental and social mitigation measures throughout future implementation phases of the proposed excision process. The budget should be reviewed periodically and adjusted where necessary to accommodate emerging environmental management needs, monitoring requirements, and institutional priorities within the project area.

Implementation of the proposed ESMP budget will require coordinated support from:

- the project proponent;
- county government institutions;
- national regulatory agencies;
- conservation institutions;
- development partners;
- and local communities

to ensure sustainable environmental management and long-term socio-economic resilience within Karare II, Kamboe, Parkishon, and Kambinye settlements.



CHAPTER 11

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

The Environmental Impact Assessment has identified potential impacts associated with the proposed project. With proper mitigation and effective environmental and social management, the significant adverse impacts can be minimized to acceptable levels, while positive impacts can be enhanced. The project is environmentally and socially viable and can contribute to sustainable development.

RECOMMENDATIONS

IMPLEMENT MITIGATION MEASURES

Strictly implement all mitigation measures and commitments outlined in the ESMP throughout all project phases.

EFFECTIVE ESMP IMPLEMENTATION

Ensure adequate resources, institutional capacity, and clear roles and responsibilities for successful ESMP implementation.

MONITORING AND REPORTING

Conduct regular monitoring and reporting to track environmental and social performance and ensure compliance.

STAKEHOLDER ENGAGEMENT

Maintain continuous engagement and communication with stakeholders and address concerns promptly.

COMPLIANCE AND CONTINUOUS IMPROVEMENT

Comply with all applicable legal and regulatory requirements and continuously improve environmental and social performance.



"Sustainable project implementation today ensures a better environment and quality of life for future generations."

WAY FORWARD

- Proceed with project implementation
- Implement ESMP and mitigation measures
- Monitor, evaluate, and report regularly
- Engage stakeholders throughout the project
- Promote sustainable development outcomes

CHAPTER 11: CONCLUSION AND RECOMMENDATIONS

11.1.1 CONCLUSION

This Environmental and Social Impact Assessment (ESIA) has comprehensively evaluated the potential environmental and social implications associated with the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve in Marsabit County. The assessment was undertaken through detailed baseline studies, field investigations, ecological assessments, stakeholder consultations, institutional engagements, GIS analysis, and review of relevant environmental, social, legal, and policy frameworks applicable to the proposed project.

The assessment established that the proposed excision seeks to address a long-standing land use and administrative inconsistency arising from the existence of permanent human settlements and socio-economic infrastructure within land that remains legally gazetted as part of the Marsabit National Reserve. Over several decades, the settlements have evolved into established socio-economic centres supporting residential communities, schools, health facilities, administrative offices, religious institutions, livestock production systems, and local economic activities that no longer function as core wildlife habitat within substantial portions of the proposed excision areas.

The ESIA findings indicate that the proposed excision is expected to generate significant positive socio-economic impacts within the project area. The most notable benefits include improved land tenure security, enhanced settlement planning, improved access to public services and infrastructure, increased investment opportunities, strengthened governance systems, improved socio-economic resilience, and enhanced opportunities for sustainable development within the settlements. The project is also expected to improve integration of the settlements into county and national development planning frameworks, thereby facilitating improved delivery of public infrastructure and social services to local communities.

The assessment further established that the proposed project may result in environmental and ecological impacts associated with changing land use patterns, settlement expansion, pressure on grazing systems, vegetation disturbance, wildlife corridor interference, human-wildlife interactions, and increasing climate-related environmental vulnerability within portions of the landscape. However, the assessment determined that these impacts are generally moderate and manageable

provided that the proposed mitigation measures and Environmental and Social Management Plan (ESMP) are effectively implemented.

Particular ecological sensitivity was identified within:

- wildlife movement corridors;
- ecological connectivity zones;
- seasonal drainage systems;
- grazing dispersal areas;
- and environmentally fragile landscapes within portions of the project area.

These ecological systems remain important for maintaining environmental stability, wildlife movement, pastoral livelihood systems, and broader ecosystem functionality within the wider Marsabit landscape. The assessment therefore emphasizes the need for continued protection and management of ecologically sensitive areas during future settlement planning and development processes.

The ESIA further established that stakeholder consultations undertaken throughout the assessment process revealed overwhelming community support for the proposed excision process. Communities expressed strong expectations that the project will facilitate improved land ownership security, socio-economic development, infrastructure investment, improved public service delivery, and enhanced livelihood opportunities within the settlements. At the same time, stakeholders emphasized the importance of balancing settlement development with environmental conservation and protection of wildlife movement systems within the landscape.

The assessment therefore concludes that the proposed excision is environmentally and socially acceptable provided that implementation is guided by:

- controlled settlement zoning;
- wildlife corridor protection;
- sustainable land use planning;
- climate-sensitive development approaches;
- sustainable grazing management systems;
- ecological restoration measures;
- and continuous environmental monitoring and stakeholder engagement.

The ESIA further concludes that with effective implementation of the proposed Environmental and Social Management Plan (ESMP), the project presents an important opportunity for promoting socially inclusive and environmentally sustainable settlement development while addressing long-standing land tenure and settlement challenges within Karare II, Kamboe, Parkishon, and Kambinye settlements.

11.1.2 RECOMMENDATIONS

The assessment recommends that all future settlement planning and development activities within the excised areas should be guided by environmentally sustainable land use planning principles aimed at minimizing ecological degradation and protecting environmentally sensitive areas within the wider Marsabit ecosystem.

Protection of:

- wildlife movement corridors;
- ecological connectivity zones;
- seasonal drainage systems;
- and grazing dispersal areas

should be prioritized during future settlement planning and infrastructure development processes. Settlement expansion and infrastructure development should avoid environmentally sensitive areas wherever possible in order to minimize ecological fragmentation and maintain ecosystem functionality within the project area.

The ESIA further recommends implementation of:

- ecological restoration programmes;
- afforestation initiatives;
- soil conservation measures;
- and sustainable natural resource management systems

within degraded sections of the landscape to strengthen ecosystem resilience and environmental sustainability.

Continuous environmental monitoring and periodic environmental audits should also be undertaken to evaluate environmental performance, monitor effectiveness of mitigation measures, and support adaptive environmental management throughout future implementation phases.

1) Wildlife and Ecological Conservation Recommendations

The assessment strongly recommends formal identification, mapping, and protection of wildlife movement corridors and ecological connectivity zones traversing portions of the proposed excision areas.

Future land use planning frameworks should integrate ecological zoning and buffer zone protection measures to minimize obstruction of wildlife movement systems and reduce risks of habitat fragmentation within the wider Marsabit ecosystem.

Collaboration between:

- Kenya Wildlife Service (KWS);
- local communities;
- county government institutions;
- and environmental agencies

should further be strengthened to support coordinated wildlife corridor management, ecological monitoring, and long-term conservation planning within the project area.

The ESIA further recommends implementation of continuous community awareness programmes on:

- wildlife conservation;
- environmental stewardship;
- and coexistence between pastoral livelihoods and wildlife conservation objectives within the landscape.

2) Land Use Planning and Settlement Management Recommendations

The proposed excision areas should be subjected to structured land use planning and settlement zoning processes immediately following completion of the legal excision process.

Settlement planning frameworks should clearly define:

- residential zones;
- grazing areas;

- ecological conservation zones;
- infrastructure corridors;
- public utility areas;
- and community facilities

within the settlements.

Uncontrolled settlement expansion, unregulated land subdivision, and encroachment into environmentally sensitive areas should be prohibited through enforcement of development control regulations and sustainable settlement planning frameworks.

The assessment further recommends protection of communal grazing systems and livestock mobility routes within future land use planning systems to support sustainability of pastoral livelihood systems within the project area.

3) Grazing and Livelihood Management Recommendations

Pastoralism remains the dominant livelihood system within the project area and future settlement development should therefore integrate sustainable grazing and rangeland management approaches.

The ESIA recommends implementation of:

- rotational grazing systems;
- protection of communal grazing areas;
- restoration of degraded pasture lands;
- and climate-smart rangeland management approaches

within the settlements.

Livelihood diversification initiatives and climate-resilient livelihood support programmes should further be promoted to improve socio-economic resilience and reduce environmental pressure on grazing systems within the project area.

The assessment also recommends strengthening community-based grazing management systems and traditional resource management structures to support sustainable utilization of rangeland resources within the settlements.

4) Social and Community Development Recommendations

Future implementation processes should ensure continuous stakeholder engagement, participatory decision-making, and inclusive community participation throughout settlement planning and development phases.

Particular attention should be given to inclusion of:

- women;
- youth;
- elderly persons;
- vulnerable households;
- and marginalized groups

within future planning, land allocation, and development decision-making processes.

The ESIA further recommends strengthening:

- public health infrastructure;
- sanitation systems;
- water supply infrastructure;
- educational facilities;
- and local administrative systems

within the settlements to support improved community wellbeing and socio-economic development.

Community grievance handling mechanisms should also be established and strengthened to facilitate timely resolution of land disputes, social conflicts, and development-related concerns within the project area.

5) Climate Adaptation and Environmental Resilience Recommendations

Given the high climate vulnerability of the project area, future development planning should integrate climate adaptation and environmental resilience measures into all settlement planning and infrastructure development activities.

The ESIA recommends promotion of:

- water harvesting systems;
- sustainable water resource management;
- climate-resilient infrastructure;
- tree planting programmes;

- clean energy solutions;
- and ecosystem restoration initiatives

within the settlements.

Climate-sensitive land use planning and sustainable natural resource management approaches should further be implemented to reduce environmental degradation and strengthen long-term ecosystem resilience within the wider Marsabit landscape.

Community awareness programmes on:

- climate adaptation;
- drought resilience;
- environmental conservation;
- and sustainable resource utilization

should also be strengthened within the project area.

6) Institutional and Governance Recommendations

Effective implementation of the proposed mitigation measures and Environmental and Social Management Plan (ESMP) will require strong institutional coordination and collaboration among relevant stakeholders.

The ESIA therefore recommends strengthening coordination between:

- REPAL;
- NEMA;
- Kenya Wildlife Service (KWS);
- Marsabit County Government;
- local administration;
- local communities;
- and other relevant institutions

to support coordinated implementation of environmental and social management measures within the project area.

Regular inter-agency coordination meetings and stakeholder review forums should further be established to monitor implementation progress, review environmental performance, address emerging concerns, and strengthen accountability during future implementation phases.

Adequate financial and technical resources should also be allocated to support implementation of:

- environmental monitoring programmes;
- ecological conservation initiatives;
- climate adaptation measures;
- and community awareness activities

within the settlements.

Based on the findings of this Environmental and Social Impact Assessment, it is recommended that the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve be allowed to proceed subject to full implementation of the proposed mitigation measures and Environmental and Social Management Plan (ESMP).

The assessment concludes that the anticipated socio-economic benefits associated with improved settlement security, infrastructure development, public service delivery, livelihood improvement, and sustainable development opportunities substantially outweigh the anticipated adverse environmental impacts, most of which are manageable through effective implementation of the proposed environmental and social safeguards.

The proposed excision therefore presents an important opportunity for resolving long-standing settlement and land tenure challenges while promoting environmentally sustainable and socially inclusive development within the project area and the wider Marsabit landscape.

11.2 CONDITIONS FOR SUSTAINABLE EXCISION

11.2.1 PROTECTION OF WILDLIFE CORRIDORS AND ECOLOGICAL CONNECTIVITY

The sustainability of the proposed excision will largely depend on continued protection of wildlife movement corridors, ecological connectivity zones, seasonal drainage systems, and environmentally sensitive areas identified within portions of the project area. Future settlement expansion, infrastructure development, fencing, and land subdivision activities should therefore avoid identified ecological corridors and sensitive landscapes wherever possible in order to minimize habitat fragmentation and maintain ecological functionality within the wider Marsabit ecosystem.

Controlled settlement zoning and ecological buffer protection measures should further be integrated into future land use planning frameworks to support long-term wildlife movement and ecosystem stability within the landscape. Continuous ecological monitoring and collaboration with Kenya Wildlife Service (KWS), environmental agencies, county government institutions, and local communities should also be maintained to strengthen long-term ecological conservation and wildlife corridor management within the project area.

11.2.2 CONTROLLED SETTLEMENT PLANNING AND LAND USE MANAGEMENT

The proposed excision should be followed by preparation and implementation of structured land use plans and settlement zoning frameworks for Karare II, Kamboe, Parkishon, and Kambinye settlements. Settlement planning frameworks should clearly define residential areas, grazing zones, ecological conservation areas, infrastructure corridors, public utility areas, and community development zones in order to minimize unplanned settlement expansion and encroachment into environmentally sensitive areas.

Future development activities within the excised areas should be guided by approved spatial plans and subjected to development control regulations and environmental planning requirements to ensure orderly and environmentally sustainable settlement growth within the project area.

11.2.3 SUSTAINABLE GRAZING AND RANGELAND MANAGEMENT

Pastoralism remains the dominant livelihood system within the project area and sustainability of communal grazing systems will therefore be essential for long-term environmental and socio-economic stability within the landscape. The ESIA recommends implementation of rotational grazing systems, restoration of degraded pasture lands, protection of communal grazing areas, and climate-smart rangeland management approaches within the settlements.

Livestock mobility routes and grazing dispersal systems should further be protected within future land use planning frameworks to minimize overgrazing, land degradation, and conflicts over grazing resources within the project area. Community participation in grazing management and sustainable natural resource utilization should also be strengthened to support long-term resilience of pastoral livelihood systems within the settlements.

11.2.4 CONTINUOUS STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION

Stakeholder engagement should remain a continuous process throughout future implementation phases of the proposed excision process and subsequent settlement development activities. Local communities, traditional leadership structures, women groups, youth groups, conservation agencies, county government institutions, and vulnerable households should continue participating in land use planning, environmental management, conflict resolution, infrastructure development, and environmental monitoring processes within the settlements.

Continuous community awareness programmes focusing on environmental conservation, climate adaptation, sustainable resource utilization, and wildlife conservation should also be strengthened to improve local ownership of environmental management initiatives and promote socially inclusive development within the project area.

11.2.5 STRENGTHENING HUMAN-WILDLIFE CONFLICT MANAGEMENT

Long-term sustainability of the proposed excision will require effective management of human-wildlife interactions within ecological interface zones surrounding the settlements. The ESIA therefore recommends strengthening collaboration between Kenya Wildlife Service (KWS), local communities, county government institutions, and environmental stakeholders to support wildlife conflict response mechanisms, ecological monitoring, community awareness programmes, and sustainable coexistence between settlement development and wildlife conservation systems within the wider Marsabit ecosystem.

Settlement expansion into wildlife corridors and ecologically sensitive wildlife movement areas should further be restricted to minimize future human-wildlife conflict risks within the project area.

11.2.6 CLIMATE-RESILIENT DEVELOPMENT AND ENVIRONMENTAL RESTORATION

Future development planning within the excised settlements should integrate climate adaptation and environmental resilience measures to reduce vulnerability to drought, land degradation, water scarcity, and climate-related environmental stress within the project area. The ESIA recommends implementation of vegetation restoration programmes, tree planting initiatives, water harvesting systems, sustainable water resource management measures, and climate-resilient infrastructure planning within the settlements.

Protection of drainage systems, restoration of degraded ecological areas, and promotion of sustainable natural resource utilization practices will further be important in improving long-term environmental resilience and ecological stability within the wider Marsabit landscape.

11.2.7 INSTITUTIONAL COORDINATION AND ENVIRONMENTAL GOVERNANCE

Effective implementation of environmental and social safeguards associated with the proposed excision will require strong institutional coordination and environmental governance systems involving REPAL, National Environment Management Authority (NEMA), Kenya Wildlife Service (KWS), Marsabit County Government, local administration, and local communities.

Regular inter-agency coordination mechanisms and environmental monitoring systems should therefore be established to support implementation of mitigation measures, compliance monitoring, conflict management, and adaptive environmental management within the project area. Adequate financial and technical resources should further be allocated to support implementation of environmental conservation programmes, stakeholder engagement activities, ecological monitoring, and climate adaptation initiatives within the settlements.

11.2.8 ENVIRONMENTAL MONITORING AND ADAPTIVE MANAGEMENT

Continuous environmental and social monitoring should be undertaken throughout future implementation phases to evaluate effectiveness of mitigation measures and identify emerging environmental and socio-economic concerns within the project area. Monitoring programmes should focus on wildlife corridor condition, settlement expansion trends, grazing pressure, ecological degradation, human-wildlife interactions, climate vulnerability, and socio-economic conditions within the settlements.

Monitoring findings should periodically inform adaptive management measures and future planning decisions to ensure environmentally sustainable implementation of the proposed excision process and strengthen long-term environmental resilience within the landscape.

11.2.9 COMPLIANCE WITH ENVIRONMENTAL AND LEGAL REQUIREMENTS

All future settlement planning, infrastructure development, and land administration activities within the excised areas should comply with applicable environmental laws, land use regulations, physical

planning requirements, wildlife conservation legislation, and county development policies. Future development projects within the settlements should also be subjected to environmental screening and approval processes in accordance with the Environmental Management and Coordination Act (EMCA), 1999 (as amended), and other relevant legal and policy frameworks.

Compliance with environmental and legal requirements will be essential in ensuring sustainable implementation of the proposed excision process and protection of environmental resources within the project area.

11.2.10 OVERALL SUSTAINABILITY CONDITION

The ESIA concludes that the proposed excision can proceed sustainably provided that ecological conservation measures are integrated into future settlement planning, wildlife corridors and environmentally sensitive areas are protected, sustainable grazing management systems are implemented, stakeholder participation is maintained, climate adaptation measures are strengthened, and environmental monitoring and institutional coordination mechanisms are continuously implemented throughout future development phases.

The long-term sustainability of the proposed excision will therefore depend on balancing socio-economic development objectives with environmental conservation priorities within the wider Marsabit ecosystem while ensuring socially inclusive and environmentally responsible settlement development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

11.3 PROPOSED MONITORING AND FOLLOW-UP ACTIONS

Implementation of the proposed excision of Karare II, Kamboe, Parkishon, and Kambinye settled areas from the Marsabit National Reserve will require continuous environmental and social monitoring to ensure effective implementation of mitigation measures, compliance with environmental safeguards, and long-term sustainability of settlement development within the project area. Monitoring and follow-up actions will therefore be necessary for evaluating the effectiveness of the Environmental and Social Management Plan (ESMP), identifying emerging environmental and socio-economic concerns, supporting adaptive management, and strengthening institutional accountability throughout future implementation phases.

The proposed monitoring and follow-up framework is intended to provide continuous environmental oversight and support sustainable management of ecological systems, wildlife corridors, grazing resources, settlement expansion, and socio-economic development within the wider Marsabit ecosystem.

11.3.1 ENVIRONMENTAL MONITORING

Continuous environmental monitoring should be undertaken throughout future implementation phases to assess environmental changes associated with settlement development, land use change, grazing pressure, ecological disturbance, and climate-related environmental stress within the project area. Monitoring programmes should focus on wildlife corridor condition, vegetation cover, ecological connectivity, drainage systems, grazing systems, land degradation trends, and settlement expansion patterns within the landscape.

Regular ecological assessments and environmental inspections should be undertaken collaboratively involving National Environment Management Authority (NEMA), Kenya Wildlife Service (KWS), Marsabit County Government, local communities, and environmental stakeholders to evaluate environmental performance and effectiveness of mitigation measures within the settlements. Monitoring findings should further inform adaptive environmental management and future settlement planning decisions within the project area.

11.3.2 WILDLIFE CORRIDOR AND HUMAN-WILDLIFE CONFLICT MONITORING

Continuous monitoring of wildlife movement corridors and ecological connectivity zones should be undertaken to ensure that future settlement development does not significantly obstruct wildlife movement systems within the wider Marsabit ecosystem. Monitoring activities should assess wildlife movement patterns, settlement encroachment into ecological corridors, grazing pressure within wildlife interface zones, and changes in ecological connectivity within the landscape.

Human-wildlife conflict incidents including livestock predation, wildlife encounters, and competition over grazing and water resources should also be continuously documented and monitored in collaboration with Kenya Wildlife Service (KWS), local administration, and local communities. The monitoring process should support early identification of emerging conflict hotspots and implementation of appropriate corrective measures aimed at minimizing long-term human-wildlife conflicts within the project area.

11.3.3 SETTLEMENT DEVELOPMENT AND LAND USE MONITORING

Future settlement expansion and infrastructure development within the excised areas should be continuously monitored to ensure compliance with approved land use plans, settlement zoning frameworks, and environmental management requirements. Monitoring activities should focus on settlement growth trends, land subdivision patterns, infrastructure development, encroachment into environmentally sensitive areas, and compliance with development control regulations within the settlements.

GIS analysis, field inspections, and periodic land use assessments should be undertaken to monitor spatial development trends and support environmentally sustainable settlement planning within Karare II, Kamboe, Parkishon, and Kambinye settlements.

11.3.4 GRAZING SYSTEM AND LIVELIHOOD MONITORING

Pastoral livelihood systems and communal grazing areas should be continuously monitored to evaluate grazing pressure, pasture condition, livestock mobility patterns, and environmental sustainability within the project area. Monitoring should focus on condition of grazing areas, overgrazing trends, degradation of pasture resources, and conflicts relating to grazing access and natural resource utilization within the settlements.

The monitoring process should further support implementation of sustainable grazing management systems and climate-resilient pastoral livelihood strategies aimed at reducing land degradation and strengthening socio-economic resilience within the wider landscape.

11.3.5 CLIMATE CHANGE AND ENVIRONMENTAL RESILIENCE MONITORING

Given the climate vulnerability of the project area, continuous monitoring of climate-related environmental conditions should be undertaken to evaluate resilience of ecosystems and communities to drought, environmental degradation, and climate variability within the landscape. Monitoring programmes should assess vegetation regeneration, water resource availability, drought impacts, soil erosion trends, and effectiveness of climate adaptation measures implemented within the settlements.

Monitoring findings should support adaptive climate management and strengthening of environmental resilience initiatives within the wider Marsabit ecosystem. Continuous environmental

restoration and climate adaptation efforts should also be reviewed periodically to assess their effectiveness in improving long-term ecosystem stability and reducing climate vulnerability within the project area.

11.3.6 SOCIAL MONITORING AND STAKEHOLDER ENGAGEMENT

Continuous social monitoring should be undertaken to assess socio-economic conditions, stakeholder concerns, effectiveness of community participation mechanisms, and social impacts associated with future settlement development within the project area. Monitoring activities should focus on stakeholder participation levels, land ownership disputes, vulnerable group inclusion, public health conditions, infrastructure access, livelihood conditions, and effectiveness of grievance handling mechanisms within the settlements.

Stakeholder engagement should remain continuous throughout future implementation phases and regular consultation forums should be established to communicate project progress, address emerging community concerns, evaluate implementation of mitigation measures, and strengthen community participation within the project area.

11.3.7 COMPLIANCE MONITORING AND ENVIRONMENTAL AUDITS

Regular compliance monitoring and environmental audits should be undertaken to ensure implementation of the Environmental and Social Management Plan (ESMP) and compliance with environmental approval conditions and regulatory requirements applicable to the proposed excision process.

The National Environment Management Authority (NEMA) should periodically undertake environmental inspections and compliance audits to evaluate implementation of mitigation measures and identify areas requiring corrective action within the project area. Environmental audit findings should further inform continuous improvement of environmental management systems and adaptive implementation of mitigation measures throughout future development phases.

11.3.8 INSTITUTIONAL COORDINATION AND REPORTING

Effective monitoring and follow-up actions will require strong institutional coordination among REPAL, NEMA, Kenya Wildlife Service (KWS), Marsabit County Government, local administration,

local communities, and other environmental stakeholders involved in implementation of the proposed project.

Regular inter-agency coordination meetings and environmental review forums should therefore be established to review monitoring findings, discuss emerging environmental and social issues, evaluate implementation progress, and strengthen institutional collaboration within the project area. Periodic environmental and social monitoring reports should also be prepared and submitted to relevant regulatory agencies and stakeholders to support accountability, transparency, and adaptive environmental management within the settlements.

11.3.9 CORRECTIVE ACTIONS AND ADAPTIVE MANAGEMENT

Monitoring findings should continuously inform corrective actions and adaptive management measures throughout future implementation phases of the proposed excision process. Where monitoring identifies environmental degradation, settlement encroachment into ecological areas, increasing human-wildlife conflicts, non-compliance with mitigation measures, or emerging socio-economic concerns, appropriate corrective interventions should immediately be implemented to minimize adverse impacts and restore environmental sustainability within the project area.

Adaptive management approaches should further allow periodic review and updating of mitigation measures, environmental management systems, and monitoring frameworks based on changing environmental conditions, implementation experiences, and emerging development challenges within the settlements.

11.3.10 OVERALL MONITORING AND FOLLOW-UP FRAMEWORK

The proposed monitoring and follow-up framework is intended to ensure continuous environmental oversight, effective implementation of mitigation measures, compliance with environmental safeguards, and long-term sustainability of settlement development within Karare II, Kamboe, Parkishon, and Kambinye settlements.

The ESIA therefore recommends that environmental and social monitoring remain a continuous process throughout future implementation phases in order to strengthen environmental governance, improve stakeholder participation, support adaptive management, and ensure environmentally sustainable and socially inclusive development within the wider Marsabit ecosystem.

CHAPTER 12: REFERENCES

1) African Development Bank (AfDB). (2022). **Climate Change and Green Growth Strategy for Africa**. African Development Bank Group, Abidjan.
2) Food and Agriculture Organization (FAO). (2017). **Guidelines for Sustainable Rangeland Management in Drylands of Africa**. FAO, Rome.
3) Food and Agriculture Organization (FAO). (2019). **Climate-Smart Agriculture Sourcebook**. FAO, Rome.
4) Government of Kenya. (1999). **Environmental Management and Coordination Act (EMCA), 1999**. Government Printer, Nairobi.
5) Government of Kenya. (2003). **Environmental (Impact Assessment and Audit) Regulations, 2003**. Government Printer, Nairobi.
6) Government of Kenya. (2012). **The Wildlife Conservation and Management Act, 2013**. Government Printer, Nairobi.
7) Government of Kenya. (2012). **The Land Act, 2012**. Government Printer, Nairobi.
8) Government of Kenya. (2012). **The National Land Commission Act, 2012**. Government Printer, Nairobi.
9) Government of Kenya. (2012). **The Physical and Land Use Planning Act, 2019**. Government Printer, Nairobi.
10) Government of Kenya. (2016). **Climate Change Act, 2016**. Government Printer, Nairobi.
11) Government of Kenya. (2018). **National Climate Change Action Plan (NCCAP) 2018–2022**. Ministry of Environment and Forestry, Nairobi.
12) Government of Kenya. (2020). **Kenya National Biodiversity Strategy and Action Plan (NBSAP)**. Ministry of Environment and Forestry, Nairobi.
13) Intergovernmental Panel on Climate Change (IPCC). (2021). **Climate Change 2021: The Physical Science Basis**. Cambridge University Press, Cambridge.
14) International Finance Corporation (IFC). (2012). **IFC Performance Standards on Environmental and Social Sustainability**. IFC, Washington DC.
15) International Union for Conservation of Nature (IUCN). (2018). **Guidelines for Conserving Connectivity through Ecological Networks and Corridors**. IUCN, Gland, Switzerland.

16) Kenya National Bureau of Statistics (KNBS). (2019). **2019 Kenya Population and Housing Census Volume I: Population by County and Sub-County**. KNBS, Nairobi.

17) Kenya National Bureau of Statistics (KNBS). (2020). **Statistical Abstract 2020**. KNBS, Nairobi.

18) Kenya Wildlife Service (KWS). (2020). **Human-Wildlife Conflict Management Strategy for Kenya**. KWS, Nairobi.

19) Marsabit County Government. (2018). **Marsabit County Integrated Development Plan (CIDP) 2018–2022**. Marsabit County Government.

20) Marsabit County Government. (2023). **Marsabit County Integrated Development Plan (CIDP) 2023–2027**. Marsabit County Government.

21) Ministry of Environment and Forestry. (2020). **National Environment Action Plan (NEAP)**. Government of Kenya, Nairobi.

22) National Environment Management Authority (NEMA). (2014). **General Environmental Impact Assessment and Audit Guidelines**. NEMA, Nairobi.

23) National Environment Management Authority (NEMA). (2020). **Guidelines for Strategic Environmental Assessment and ESIA Processes in Kenya**. NEMA, Nairobi.

24) Republic of Kenya. (2010). **Constitution of Kenya, 2010**. Government Printer, Nairobi.

25) United Nations Development Programme (UNDP). (2021). **Climate Risk and Vulnerability Assessment for Kenya's Arid and Semi-Arid Lands**. UNDP, Nairobi.

26) United Nations Environment Programme (UNEP). (2019). **Integrated Environmental Assessment for Sustainable Development**. UNEP, Nairobi.

27) United Nations Framework Convention on Climate Change (UNFCCC). (2015). **Paris Agreement**. United Nations, Bonn.

28) World Bank. (2017). **Environmental and Social Framework (ESF)**. World Bank, Washington DC.

29) World Bank. (2021). **Climate Risk Profile: Kenya**. World Bank Group, Washington DC.

30) World Resources Institute (WRI). (2019). **Restoration Opportunities Assessment Methodology**. WRI, Washington DC.