Environmental, social and economic assessment of the fencing of the Aberdare Conservation Area

Executive Summary, September 2011

KENYA WILDLIFE SERVICE

KENYA Forest Service

KFWG

UNEP

RHINO ARK

A report for: The Kenya Wildlife Service, Kenya Forest Service, Kenya Forests Working Group, United Nations Environment Programme and Rhino Ark

Acknowledgements

Acronyms and Abbreviations

ACA	Aberdare Conservation Area
BCR	Benefit Cost Ratio
BCS	Biotope Consultancy Services
CBA	Cost Benefit Analysis
CFA	Community Forest Association
EIA	Environmental Impact Assessment
EMCA	Environment Management and Coordination Act
GIS	Geographical Information System
GPS	Geographical Position System
GWh	Gigawatt Hour
Ha	Hectare
KEFRI	Kenya Forestry Research Institute
KenGen	Kenya Electricity Generating Company
KFS	Kenya Forest Service
KFWG	Kenya Forests Working Group
KG	Kilogramme
KM	Kilometre
KPLC	Kenya Power and Lighting Company
Kshs	Kenya Shillings
Kwh	Kilowatt Hour
KWS	Kenya Wildlife Service
NDVI	Normalized Difference Vegetation Index
NPV	Net Present Value
NTFP	Non Timber Forest Products
PA	Per Annum
PELIS	Plantation Establishment and Livelihood Systems
PES	Payment for Environmental Services
RA	Rhino Ark
UNEP	United Nations Environment Programme
USD	United States Dollar
WRUAs	Water Resource Users Associations
WRMA	Water Resources Management Authority

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Introduction

This study was carried out to assess the environmental, social and economic effects of the electrified fence around the Aberdare Conservation Area – a length of fence of nearly 400 km. The construction of the fence took nearly twenty years of planning, fund raising and mobilization of government, donor, private partners and adjacent communities' resources. A study carried out by Butynski (1999) identified a physical barrier as a necessity for the ACA to:

a) Prevent wildlife from moving out of the ACA, therefore reducing human-wildlife conflicts
b) Protect the significantly important habitats, species and overall diversity the ACA offers by reducing encroachment, over exploitation of the ACA's natural resources and
c) Allow management authorities to control and better manage the ACA resources in a sustainable manner

The electrified fence was expected to allow for the regeneration of species, protection of one of Kenya's main water sources and protection for the fence-adjacent communities from marauding wild animals. The value of the fence can therefore be seen in terms of:

a) Human life and property
b) Water – for human and economic uses
c) Land values
d) Tourism
e) Carbon credits
f) Natural environment

With the completion of the fence in August 2009, Rhino Ark and partner institutions commissioned Biotope Consultancy Services (BCS) in February 2010 to carry out an environmental, social and economic assessment of the fencing of the Aberdare Conservation Area (ACA). The specific objectives of the consultancy were to:

a) Carry out an assessment of the fencing of the Aberdare Conservation Area in order to guide its future management as well as management of the ecosystem.
b) Provide an in-depth review of fencing as a tool to help sustainably manage a conservation area adjoining settlements, such as the Aberdare Conservation Area.
c) Assess the land use and land cover changes within ACA and adjoining areas from 1988 (inception of the ACA project) to the year 2010 (completion of the project).
d) Assess the effect of the fence on vegetation within ACA and adjoining areas.
e) Assess the effects of the fence on human encroachment (settlement and cultivation) and fires on the Aberdare ecosystem.
f) Assess the effect of the fence on land use/cover recovery in the ACA and adjoining areas and the effects on hydrological characteristics of rivers emanating from the ACA.
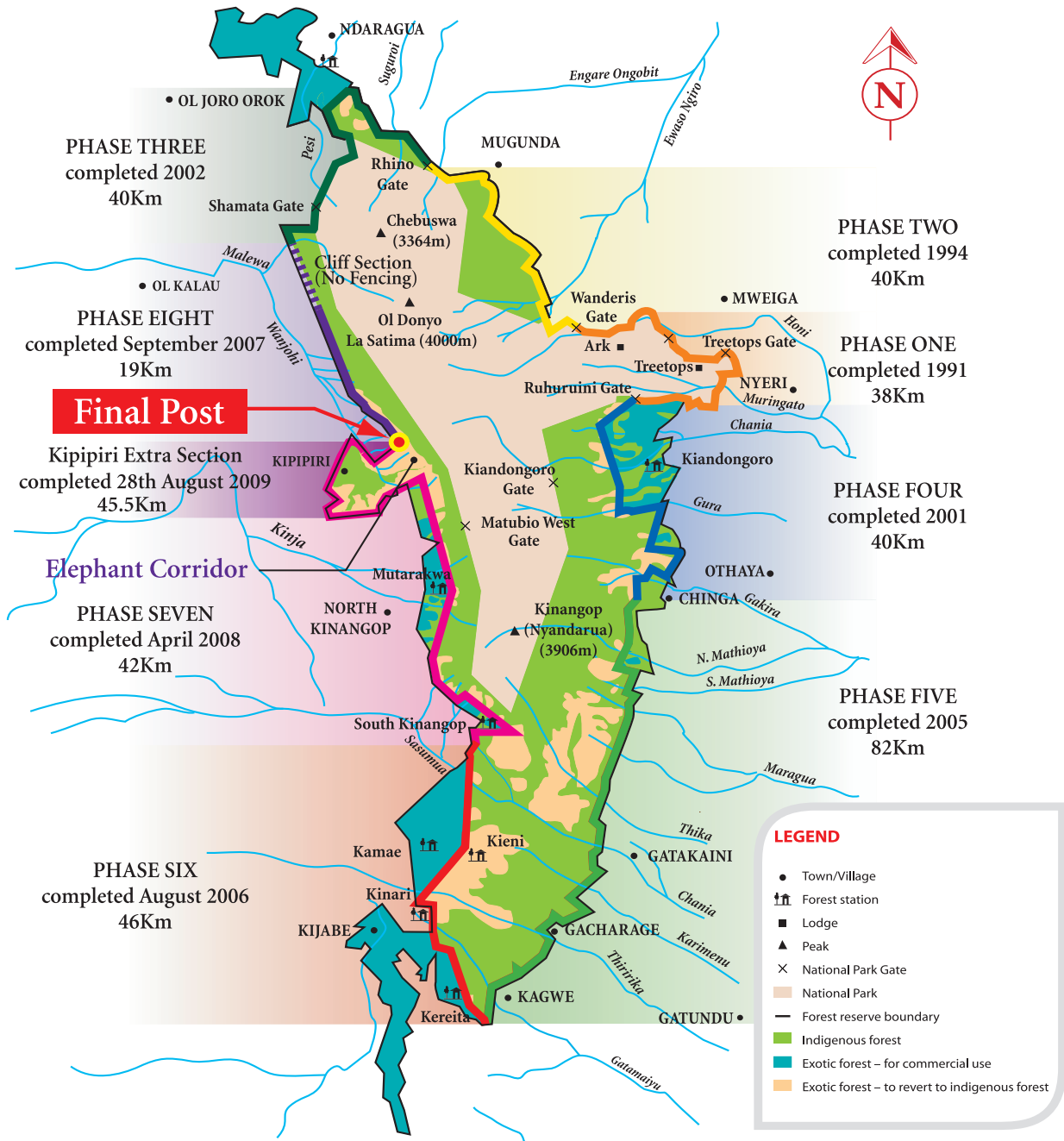
g) Assess the impact of the fence on trends in human-wildlife conflicts.
h) Assess the effect of the fence on fauna within ACA and adjoining areas.
i) Assess the effect of the fence on tourism.
j) Assess the effects of the fence on socio-economic activities e.g. charcoal production, logging, grazing, fuel wood collection and other livelihood-related activities.
k) Perform economic analysis and CBA for the ACA fencing project.
l) Recommend an institutional framework to sustainably manage the ACA.

A number of methodologies and approaches were adopted for the study. Literature review of pertinent policy and previous research was carried out. This was particularly useful in providing some vital baseline data, government policies and issues surrounding different ecosystem management tools and local community involvement and benefit-sharing for their roles in conservation work.

Remote sensing and Geographical Information Systems (GIS) were used to study land use/cover changes for 1987 (before the fence construction), 2000, 2005 and 2010. A total of nine transects were made around the fence and as close as possible to the transect positions made by Butynski (1999). These transects enabled inventory of flora and fauna species sighted in and outside the electrified fence. Hydroclimatological data from the Water Resources Management Authority (WRMA) was obtained but it was inconsistent and inadequate. The aim of this sub-component of the study was to assess whether there was a response, positive (+ve) or negative (-ve), of selected ACA Rivers to ecosystem degradation and subsequent recovery.

Socio-economic data was obtained from structured questionnaires, which were administered to a sample of 250 fence-adjacent

> " Nairobi accounts for about 60% of Kenya's GDP. The energy, water and some raw materials used to drive economic activities in the City and environs are derived from the Aberdare ecosystem. The conservation of the ACA and sustainable utilization of its resources are therefore crucial if Nairobi is to continue with this significant contribution to the National economy "

PHASE THREE
completed 2002
40Km

PHASE TWO
completed 1994
40Km

PHASE EIGHT
completed September 2007
19Km

PHASE ONE
completed 1991
38Km

Final Post

Kipipiri Extra Section
completed 28th August 2009
45.5Km

PHASE FOUR
completed 2001
40Km

Elephant Corridor

PHASE SEVEN
completed April 2008
42Km

PHASE FIVE
completed 2005
82Km

PHASE SIX
completed August 2006
46Km

LEGEND
- Town/Village
- Forest station
- Lodge
- Peak
- × National Park Gate
- National Park
- — Forest reserve boundary
- Indigenous forest
- Exotic forest – for commercial use
- Exotic forest – to revert to indigenous forest

communities, in addition to stakeholder meetings, which were held in each of the ACA's five districts (former Thika, Muranga North, Nyeri, Kiambu and Nyandarua), focus group discussions and key informant interviews. Separate questionnaires were also administered to the Foresters in each district, KWS personnel and other key institutional stakeholders. Discussions were held with a number of organizations and institutions who depend for their operations on resources from the ACA, such as KenGen and Nyayo Tea Zone Corporation, among others.

The methodology used to calculate economic returns was cost-benefit analysis, a standard method used for evaluating interventions and projects. It consists of impact analysis followed by valuation of the identified impacts. All direct, indirect and external effects are incorporated into the impact analysis. The objective is to compare the present value of a stream of benefits to a stream of costs. Discounting is used to calculate the present value of future costs and benefits. Most commonly, the discount rate used is an interest rate taken from financial markets. Evaluation can be based on a number of decision criteria – internal rate of return (IRR), benefit-cost ratio (BCR), external rate of return (ERR) and net present value (NPV). The IRR is used to measure private benefits using market prices while the ERR is used to measure public benefits using economic prices.

CHAPTER 1

Key findings

School children participate in an annual commemorative Fence Run

The following are the key findings of this study:

1.1 ACA-wide findings

i) An increase in mountain forest cover from about 62,000ha in 2005 to 74,800ha in 2010, an increase of 20.6%. This increase can be attributed to the effects of the fence and associated fence management guidelines as well as government policy interventions. These findings are supported by the higher normalized difference vegetation index (NDVI) detected in the 2010 image compared to that of 2005.

ii) A decrease of the open areas (which include grassland

vi) In spite of the positive changes noted above, the management of the fence so that it meets the original objectives of diminishing or eliminating altogether the problems that led to its construction is hampered by inadequate resources (human and capital) and lack of a management structure that involves the key stakeholders.

vii) There is weak monitoring of illegal activities in several sections, or phases, of the fence. This is attributed to inadequate personnel (such as rangers) and resources to police the forest reserve. There is need for enhanced engagement of stakeholders and especially members of Community Forest Associations (CFAs) in policing the ecosystem in addition to recruitment of more rangers. Incidences of weak enforcement and lack of compliance