



Rehabilitation of the Mau Forest Ecosystem

**A Project Concept prepared by the Interim Coordinating Secretariat,
Office of the Prime Minister, on behalf of the Government of Kenya**

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Acronyms

CBD	Convention on Biological Diversity
CBO	Community-based Organization
CFAs	Community Forest Associations
EIA	Environmental impact assessment
FAO	United Nations Food and Agriculture Organization
GoK	The Government of Kenya
ha	Hectares
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
M&E	Monitoring and Evaluation
MEMR	Ministry of Environment and Mineral Resources
MFC	Mau Forests Complex
MFW	Ministry of Forestry and Wildlife
MOF	Ministry of Finance
MOU	Memorandum of Understanding
MoWI	Ministry of Water and Irrigation
MW	Mega-watts
NAL-KARI	Kenya Agricultural Research Institute
NCC	Narok County Council
NEMA	National Environment Management Authority
NGOs	Non-governmental Organizations
MRBMI	Mara River Basin Management Initiative
NORAD	Norwegian Agency for Development Cooperation
NRM	Natural Resource Management
NTFP	Non-timber Forest Products
PES	Payment for Environmental Services
PFM	Participatory Forest Management
REDD	Reduced emissions from deforestation and land degradation
SOK	Survey of Kenya
SSOK	Soil Survey of Kenya
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development

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Executive summary

The Mau Forests Complex (MFC) is considered the most important of the five main watershed areas in Kenya because of its economic, social and environmental contribution to the country. These watershed areas are commonly referred to as “Water Towers”. The Mau forests ecosystem has a high and rapidly growing population. The forest is under increasing threat from irregular and ill-planned settlements, encroachments and illegal forest resource exploitation. Over the last decades, approx. 25% of Mau forest has been lost to excisions and encroachment.

Currently, most of the forest areas are under the management and responsibility of the Kenya Forest Service. The exception is the Maasai Mau forest which is a Trust Land Forest under the management of the Narok County.

Continued destruction of the forests is leading to a water crisis: perennial rivers are becoming seasonal, storm flow and downstream flooding are increasing, in some places the aquifer has dropped by 100 meters while wells and springs are drying up. In addition there are global concerns resulting from loss of biodiversity, and increased carbon dioxide emissions as a result of forest cover loss. Poor soil and water resources conservation practices of the deforested land is causing soil erosion and decreasing crop yields in an area of high agricultural potential; on the commercial tea estates, yields are being affected by micro-climatic changes.

In recent years, the Government of Kenya (GoK) has taken significant steps towards addressing the threat of rapid ecological degradation of its forest resources. A new forest policy and law were adopted in 2005. The forest law has placed significant emphasis on co-management of forest resources with local communities and the private sector and lays the foundation for the strict control of logging and human settlements. As a further sign of its commitment, the Government established a 30-member Task Force (reporting to the Prime Minister) whose responsibility was to study and make recommendations to GoK on the immediate, short- and long-term options for restoring the entire Mau Forests Complex. The Task Force completed its work and submitted recommendations to the Government in March 2009. GoK is committed to reversing the continued environmental destruction of the Mau in line with its medium and long-term national development plans, articulated in “Vision 2030”¹.

This Project Concept identifies key priority interventions to be undertaken by GoK in line with the Task Force recommendations to restore the Mau forest ecosystem and provide a sustainable basis for future conservation and management of this vital resource. The sustainability of the ecosystem will be secured by moving the Mau Forests Complex from a single-asset system, where timber extraction, charcoal and human settlements are seen as the only real value of the forest, to a multiple-asset approach, which recognizes the wide variety of values of the ecosystem and diversifies revenue streams by capitalizing on most, if not all, of the ecosystem values, thereby maximizing both conservation and economic returns on the investment.

This diversified approach will result in additional non-monetary benefits such as: water sources, biodiversity protection, improved relations among local communities and with other stakeholders, land appreciation, risk reduction and positive public relations. This approach will assist in setting and promoting new standards and models for the sustainable management of other critical forest ecosystems.

¹ Kenya: Vision 2030 and First Medium Term Plan, 2008-2012 (www.planning.go.ke)

I. Introduction

1. The Mau Forests Complex² covers approx. 416,542 ha³. It is the largest closed-canopy montane forest ecosystem in East Africa, and prior to recent deforestation was larger than Mt. Kenya and the Aberdares combined. Historically, the Mau was overlooked when the forest was intact and when land pressure was low. The tourist potential of the Mau has never been exploited despite its proximity to the world-famous wildlife areas of the Maasai Mara National Reserve and the adjoining Serengeti National Park in Tanzania. As land pressure increased, the forest was viewed as an untapped area with high potential agricultural value waiting to be exploited.

2. Twenty years ago, Kenya's closed-canopy forests covered 12,400 km², or approximately two percent of the country. Ten years later remote sensing data indicated that compared to global and African forest cover of 21.4 and 9.25 percent respectively, Kenya's closed canopy forest cover stood at less than 1.7 percent. Today this figure is still falling, and this will have major negative socio-economic effects in the country.

3. The Mau comprises 22 forest blocks⁴, 21 of which are gazetted and are managed by the Kenya Forest Service (KFS - formerly the Forest Department). The exception is the Maasai Mau Trust Land Forest (46,278 ha, with a southern boundary 17 km north of Narok Town) which is trust land managed by the Narok County Council (NCC). In addition, the Mau ecosystem is considered as the most important of the five water towers in Kenya, being the upper catchments of many major rivers⁵, which feed, partially or exclusively, the lakes of Natron, Turkana, Baringo, Naivasha, Nakuru and Victoria. The Mau is arguably of even greater importance than Mt. Kenya since the water that flows from it, is part of the Lake Victoria catchment, which in turn provides water to the White Nile. The trans-boundary significance of the Complex therefore has to be considered not only in terms of providing water to its neighbour Tanzania but also to the whole Nile basin.

4. The importance of the Mau is related to the ecosystem services it provides, such as river flow regulation, flood mitigation, water storage, water purification, recharge of groundwater, reduced soil erosion and siltation, protection of biodiversity, carbon sequestration, carbon reservoir and regulation of microclimate which provides favourable conditions for optimum crop production.

5. The critical role of the Mau is in the water it provides to urban centres and some of the most densely populated regions of Kenya supporting livelihoods and economic development. Africa is facing an unprecedented water crisis: about 25 percent of Africa's population is living in water stressed area and this figure will rise dramatically to an estimated 500 million people by 2050⁶. While some of this will be caused by climate change in arid and semi-arid lands, the water stress in the Mau area is largely the result of land degradation and deforestation whose effects are to be felt far beyond the Mau complex. The water

² The Mau Forests Complex is variously known as the Mau, the Mau Complex, the Mau Forest, the Mau Forest Complex and the MFC.

³ This is the area including the 2001 forest excisions. The original gazetted area was 452,007 ha.

⁴ Including Transmara, Ol Pusimoru, Maasai Mau, Eastern Mau, Mau Narok, South-West Mau, Western Mau, Mt. Londiani, Eburu, Molo and South Molo. In the northern section are the forests of Tinderet, Northern Tinderet, Timboroa, Nabkoi, Kilombe Hill, Metkei, Maji Mazuri, Chemorogok and Lembus.

⁵ Including the Nzoia, Yala, Nyando, Sondu, Mara, Kerio, Molo, Ewaso Ngiro, Njoro, Nderit, Makalia, and Naishi rivers.

⁶ Climate Change 2007. Report on the Intergovernmental Panel on Climate Change.

catchment values and major conservation areas depending upon the Mau are shown in Maps 1 and 2.

6. With a high leaf area index, tropical forests are able to intercept all the water falling on the forest canopy and slowly channel the same to the forest floor and eventually to the ground aquifers. Natural forest reduces the erosive impact of rainfall. Leaf litter prevents erosion and forest soils provide the sponge for the entrapment of water. It has become clear in recent years that the continuous provision of water is directly related to the existence of the natural forest: water towers and montane forests are closely linked but the relation between the two has not always been fully understood or acknowledged. Once the forest has gone, water infiltration is greatly reduced and aquifer level lowered causing springs to dry, and rivers to become highly seasonal. Increased runoff and storm flow frequency and amplitude causes soil erosion and downstream flooding. The social impacts are water shortage, infrastructural damage, poverty, ill-health, conflict and regional insecurity.

II. National Vision and Strategic Planning

7. At the national level, GoK published a sessional paper on Environment and Development a decade ago⁷ in which it set out comprehensive policy guidelines towards achieving sustainable development. It recognized that no strategic approach had been used to integrate environmental concerns into the development planning process until the adoption of the National Environmental Action Plan in 1994. This paper specifically addressed the mountain ecosystems and the biodiversity therein. It stated that the Government would endeavour to develop a policy on sustainable management of mountain ecosystems, and establish and strengthen an institution to manage them and promote integrated watershed development programmes.

8. In 2007, GoK launched its vision for national development over the next 20 or so years⁸. The plan, '**Vision 2030**', is implemented through five-year rolling plans starting in 2008⁹. The current five-year plan sets out environmental objectives with a forest focus:

- a) Increasing forest, tree cover and wood production especially at farm level;
- b) Conserving and rehabilitating the remaining natural forest and woodlands for environmental protection and biodiversity conservation;
- c) Enhancing participatory forest management; and,
- d) Ensuring that the forestry sector makes a contribution to poverty reduction.

9. The plan also covers water catchment management, including the Mau, and recognizes that deforestation has caused severe degradation of the main water towers, reducing river flow and disrupting electricity supply.

10. The vision for the Mau captures the objectives of Vision 2030 but it is achievable only under certain conditions, which include long-term institutional commitment, political will, full community involvement in protection and sustainable forest use, and good governance (including the cessation of the practices that led to the illegal/irregular land allocations in the first place).

⁷ Sessional Paper No. 6 of 1999 on Environment and Development.

⁸ Vision 2030, Ministry of Planning and National Development

⁹ First Medium Term Plan 2008-2012

III. Mau forests: the potential

11. The Mau Forests Complex supports key economic sectors in Rift Valley and western Kenya, including energy, tourism, agriculture and water supply. The Mau Complex is particularly important for two of the three largest foreign currency earners: tea and tourism. The market value of goods and services generated annually in the tea, tourism and energy sectors, to which the Mau has contributed, is in excess of Kshs 20 billion. This figure does not include the vital socio-economic contribution of rural and urban¹⁰ water supply from springs, wells, boreholes and rivers, as well as the support to rural livelihoods (agriculture, livestock production). This figure also does not reflect potential economic development in the catchments of the Mau, in particular the energy sector.

12. The estimated potential hydropower generation in the Mau Complex catchments is approx. 535 MW, representing 41 percent of the current total installed electricity generation capacity in Kenya. In addition, the growing geothermal potential in the area is directly dependent on groundwater. If the water table declines, the geothermal potential diminishes correspondingly. Many of the high potential geothermal sites are around the Mau.

IV. Mau forests: a national crisis in the making

13. The pace and severity of destruction and degradation of Kenya's forests has generated increasing publicity and concern over the past two decades. The cause of this destruction is change of land use from forest to agriculture, and change in ownership from public to private. During the past two decades, there has been extensive encroachment as well as irregular forest land allocation, exacerbating an already serious situation.

14. The Mau Complex is a particularly degraded catchment area in Kenya. Despite its critical role in sustaining current economic development, the Mau has been affected by widespread ill-planned settlements, encroachments and illegal extraction of forest resources. Degazettement of forest reserves (excisions) and continuous widespread encroachments have led to the destruction of over 107,000 ha over the last two decades, representing over 25 percent of the Mau.

15. Out of the approx. 416,542 ha of the protected forests, 61,586.5 ha were excised in 2001¹¹. The excised areas are critical upper catchments areas for the rivers and lakes that are fed by the Mau. The excised areas included both the bamboo forests with high catchment values and biodiversity-rich areas, as well as parts of the summit of the Mau escarpment. The excisions are starting to impact negatively on major natural assets and development investments, including Lake Nakuru National Park, Maasai Mara National Reserve, Sondu-Miriu Hydropower Scheme (60MW), geothermal plants near Naivasha, small hydropower plants in the Kericho tea estates (4MW) and the tea growing areas in Kericho Highlands.

¹⁰ In particular the urban centres of Bomet, Egerton University, Elburgon, Eldama Ravine, Kericho, Molo, Nakuru, Naivasha, Narok, and Njoro

¹¹ Including 54 % (35,301 ha) of the Eastern Mau, 27 % (22,797 ha) of South West Mau and 100% (902 ha) of Molo Forest Reserve

16. The impact of the excisions has not been assessed since no environmental impact assessment (EIA) was carried out despite the requirements for such EIAs in accordance with the 1999 Environment Management Coordination Act.

17. In addition to the excisions, approx. 41,122 ha have been encroached by settlements in the Mau, in particular in Maasai Mau trust land forest, Ol Pusimoru Forest Reserve and South West Mau Forest Reserve. Illegal logging and charcoal production are rampant in and around the encroached areas.

18. The on-going destruction of a vital natural and nationally important asset is a matter of concern to GoK. The increasing environmental and economic problems, if not reversed, may result in breakdown of law and order, ethnic conflicts and threats to internal security.

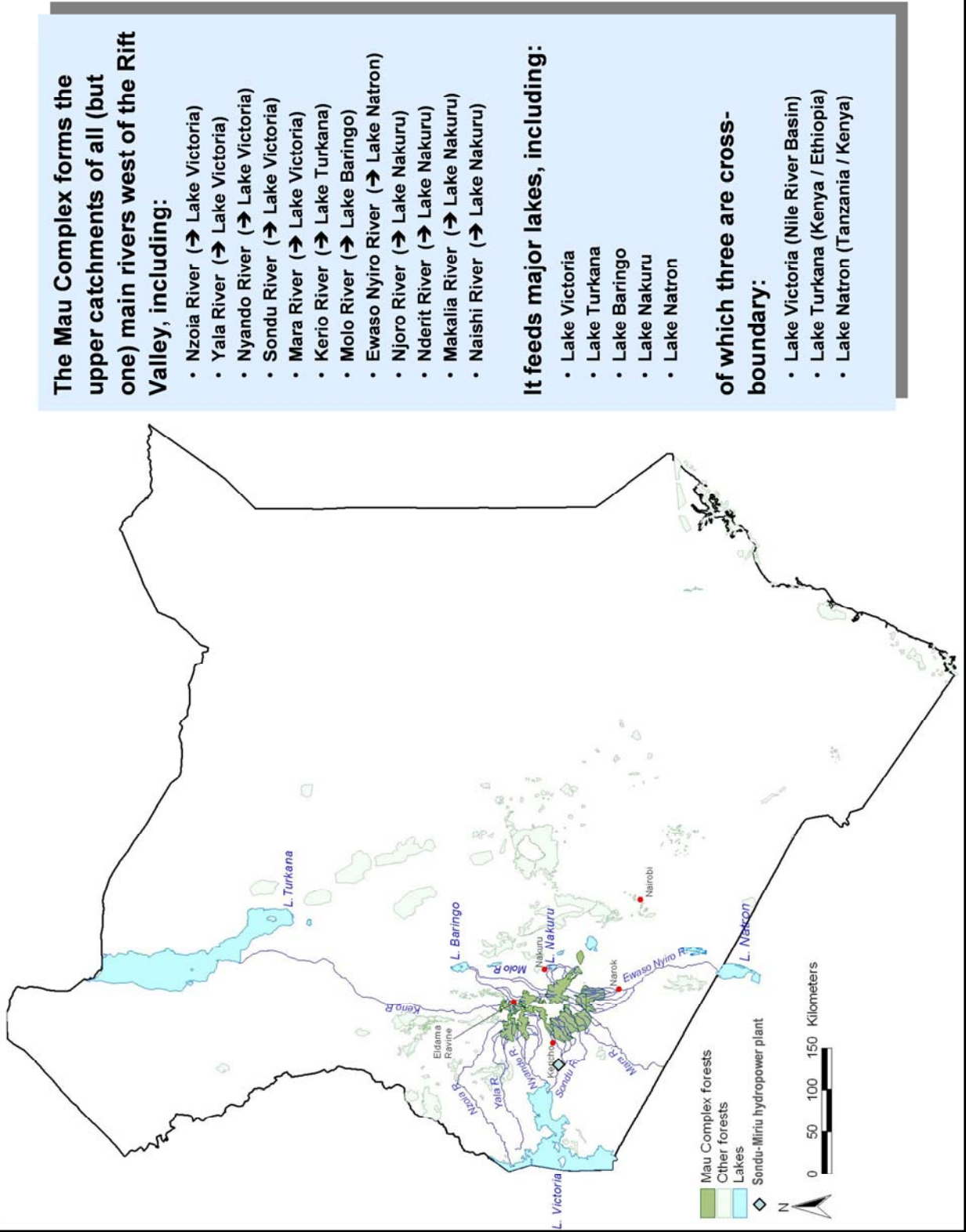
19. Some of the gravest impacts are related to water:

- a) A main aquifer in Nakuru area has lowered by 100 metres in 10 years;
- b) The Sondu River flow is more irregular making it impossible for Sondu-Miriu hydropower plant to run near full capacity in the dry seasons;
- c) The four perennial rivers feeding the Lake Nakuru are now seasonal;
- d) The Mara River level in the dry season is very low, threatening the river-dependant wildlife in the Maasai Mara and the Serengeti ecosystems; and,
- e) Many streams in the Mau Forests Complex have their flows changed significantly or have dried up. Most of the changes have occurred around the years 1996-2001. For example, in Njoro area, 13 of the 32 streams identified by the communities have dried up completely signaling a major threat to the rivers they fed. Twenty-seven other water sources or streams have also dried up completely in Elburgon, Kuresoi, Keringet, Kiptagich and Ol Pusimoru areas.

20. These issues have been compounded by the fact that montane forests have been managed with no apparent scientific principles under the leadership of the former Forest Department, now the Kenya Forest Service. Basic tenets of forest ecosystem watershed management have not been observed and the current management of montane forests is therefore not consistent with the realization that these forests are major water towers.

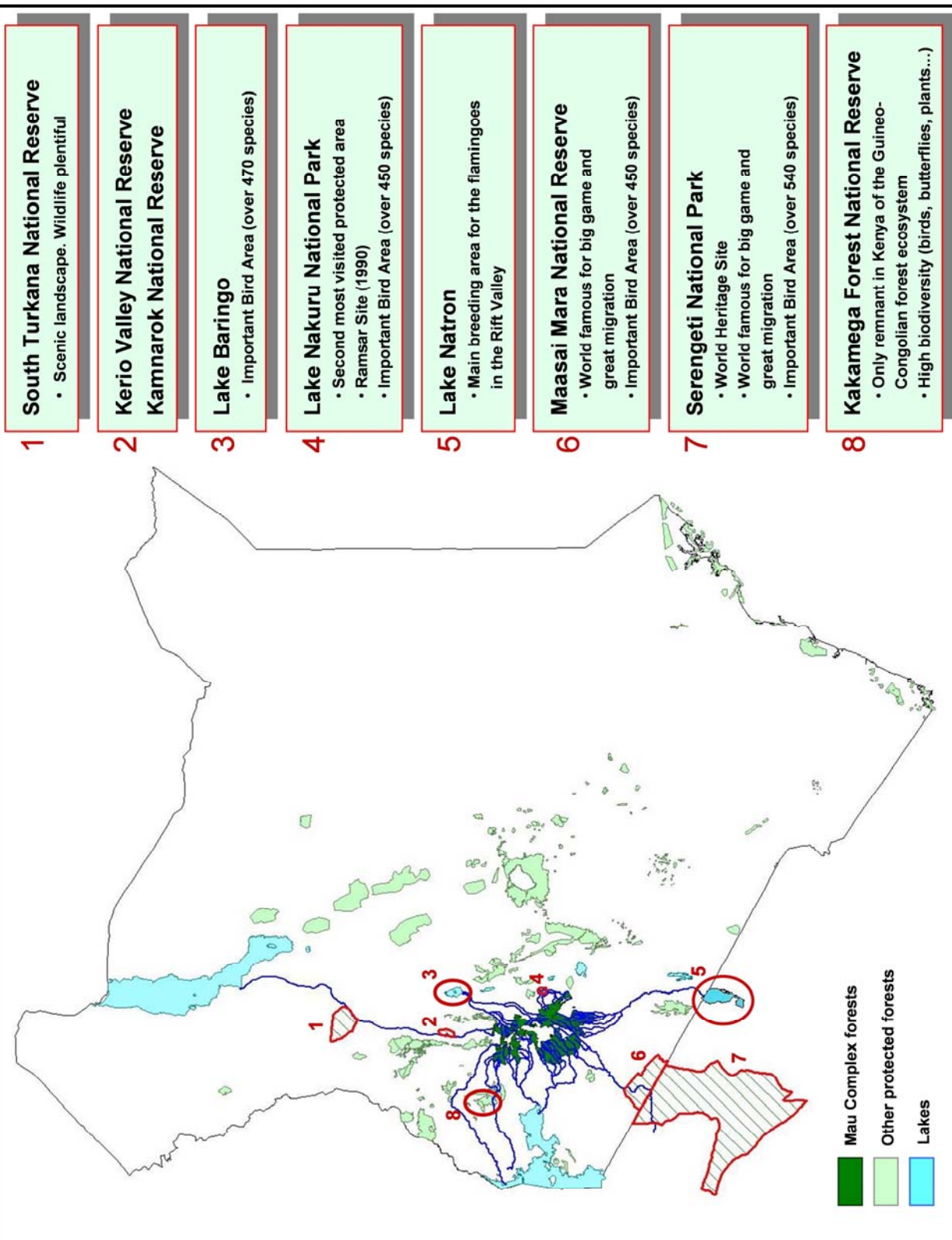
21. Other consequences of degradation have been the closure of industries, loss of employment, reduced agricultural production, food insecurity, loss of livelihoods and loss of revenue to the Treasury due to lower taxation base and poor economic performance. In addition, the Government is expending more resources in law enforcement activities.

Mau Complex: Critical water catchments



Map 1: Mau Complex forests: critical water catchments

Mau Complex: Critical to major conservation areas



Map 2: Mau Complex forests: critical water catchments to major conservation areas

V. GOK's response to address the crisis

22. In response to increasing concerns to the problems of the Mau forest, a consultative meeting was organized by GoK in May 2008. Stakeholders included the Prime Minister, Ministers for Forestry and Wildlife, Water and Irrigation, and Lands, as well as Permanent Secretaries, relevant heads of Departments, and Members of Parliament from the Mau Complex area. This was followed by several flights over the Mau Forests Complex by the Prime Minister and relevant Cabinet Ministers, as well as other Government officials and representatives from development partners.

23. In light of the wide range of issues and stakes in the Mau Forests Complex, GoK organized a multi-stakeholder consultative workshop on the conservation of the Mau Forests Complex on 15 July 2008. The Workshop was attended by the Prime Minister and ten Cabinet Ministers¹² as well as over 300 people representing all major interest groups, including communities and private sector. The workshop endorsed the establishment of a multi-stakeholder task force.

24. Consequently, GoK appointed a multi-stakeholder Task Force on the Conservation of the Mau Forests Complex on 31 July 2008. The Terms of Reference for the Task Force were to formulate recommendations to the GoK on:

- a) An effective management structure to stop any further degradation in the Mau Forests Complex;
- b) Providing for the relocation of the people currently residing in the forests;
- c) The restoration of all degraded forests and critical water catchment areas in the Mau Forests Complex; and,
- d) Mobilizing resources to implement the above mentioned objectives and secure the sustainability of the entire ecosystem.

25. The Task Force formed four committees to address the key issues:

- a) Enforcement and Outreach;
- b) Boundaries;
- c) Land Ownership and Resettlement Matters; and
- d) Restoration, Livelihoods and Resource Mobilization.

26. The Task Force concluded its work in March 2009. Its report was endorsed by Cabinet on 30 July 2009.

27. GoK is committed to restore and maintain environmental, social and economic stability. The establishment of the Task Force followed the realization by GoK that the continued destruction of the largest water tower in Kenya will have catastrophic social, economic and environmental effects. Environmental stability and secured provision of ecological services are essential to attaining sustainable development in Kenya and are preconditions to achieving the goals of 'Vision 2030'. UNEP, The World Bank, the African Development Bank (AfDB), the FAO, and other development partners have all agreed with the Government's position that the Mau forest restoration initiative is urgent.

¹² Including Ministers for Forestry and Wildlife, Environment and Mineral Resources, Regional Development Authorities, Local Government, Agriculture and Energy.

VI. Key interventions for the restoration of the Mau

28. The restoration programme for the Mau is a priority for GoK. The Government acknowledges that this is a challenging task that will require substantial resources and political will to secure its effective implementation. The restoration process will require short and medium term interventions. Longer-term interventions will also be needed, although they are not covered in this project concept.

29. It must be noted that any specific project interventions need to be complementary to on-going projects such as the World Bank funded Natural Resource Management project and the NORAD and USAID funded Mara River Basin Management Initiative (MRBMI), two of whose goals are to improve water quality / quantity and to conserve biodiversity in the Mara River basin. By supporting improved forest management in the headwaters of the Mara (South West Mau, Eastern Mau, Ol Pusimoru forest reserves and Maasai Mau trust land forest) and by improving on farm soil and water conservation along the tributaries in the upper Mara River basin, the Mau restoration project will contribute to the MRBMI.

Immediate interventions

30. Building upon the project proposal¹³ developed by the Ministry of Forestry and Wildlife (MFW) for the Mau Forest restoration in November 2008, seven clusters of interventions have been identified for the short-term.

Effective institutional framework

31. A study of the legal and institutional arrangement for the management of the forest was commissioned by the Task Force¹⁴ with support from USAID. Based on the Task Force recommendations, the Government has established an Interim Coordinating Secretariat within the Office of the Prime Minister to coordinate the implementation of the Government recommendations on the rehabilitation and conservation of the Mau Forests Complex.

32. In the longer-term, a Mau Forests Complex Authority will be established to coordinate and oversee the management of the Mau Forests Complex. The Authority will be guided by a Board of Directors. The Board should comprise representatives of main stakeholders, including the economic sectors that are most dependent on the goods and services provided by the Mau Forests Complex such as water, energy, tourism and wildlife, agriculture and forestry.

33. The reform process of Kenya Forest Service has been slow. In line with the Task Force recommendations, the Government needs to implement management changes to secure a successful reform process from Forest Department to Kenya Forest Service.

¹³ Project proposal for the Mau forest restoration, Ministry of Forestry and Wildlife, November 2008

¹⁴ Institutional Framework for Sustainable Conservation and Management of the Mau Forest Complex, ESF Consultants, January 2009.

Strategic Management Plan for Mau Forests Complex

34. The strategic management plan will integrate the ecological requirements for meeting the need of existing strategic plans, including from development authorities and Vision 2030. It will also require a complete assessment of the current status of the Mau ecosystem.

35. Already, much data have been collected. Indeed, in order to carry out its work, the Task Force has collated data on:

- a) Rainfall (1990-1997);
- b) Rainfall distribution map (Kenya Meteorological Dept.);
- c) Topographic maps 1/50,000 (SoK);
- d) Rivers 1/50,000 (SoK);
- e) Contour lines 1/50,000 (SoK);
- f) Digital Elevation Model (UNEP);
- g) Slopes (UNEP);
- h) Soil map (SSoK);
- i) Soil erodibility map (NAL-KARI);
- j) Geology (Mines/Geology Dept);
- k) Landsat satellite images (KFWG, UNEP) for 1973, 1986, 1990, 1995, 2000, 2003, 2005, 2007; and,
- l) 1800 aerial photographs (UNEP, KFWG, DRSRS).

36. In addition, assessment studies were commissioned with support from USAID. These include assessments on the critical catchment areas¹⁵ and on biodiversity hotspots¹⁶. The latter document collates the current information on vegetation and fauna and recommends conservation interventions for the Mau.

37. Updated maps of the following are a prerequisite for the development of a strategic management as well as forest-specific management plans:

- a) Protected natural forests;
- b) Natural forests outside the gazetted areas;
- c) Plantation forests;
- d) Open areas;
- e) Settlement schemes;
- f) Adjudicated sections;
- g) Degraded sites;
- h) Biodiversity and water catchment hotspots;
- i) Resources; and,
- j) Land use and zonation.

Boundary surveys and issuance of title deeds for forest blocks

38. The Survey of Kenya is to carry out the survey and the demarcation on the ground of the legal boundaries as identified by the Task Force. Boundary marking will include “monuments” such as concrete beacons that are clearly visible from one to the other, and

¹⁵ Assessment of the Critical Water Catchment Areas in the 2001 Mau Forests Complex Excision, Moi University, March 2009.

¹⁶ Assessment of Vegetation Cover and Biological Diversity Hotspots in the Mau Forests Complex. National Museums of Kenya, March 2009.

follow precisely the gazetted boundary. The total area to be surveyed includes the 22 forest blocks that form the Mau Forests Complex. At an average cost of between Kshs 2 and 6 million per block, the budget for the surveys and the issuance of a title deed for each of the blocks is Kshs 73 million (Annex 1).

Monitoring and enforcement

39. Routine monitoring is a prerequisite to restoration to prevent new encroachment, charcoal burning or tree felling.

40. Once the surveys are completed, the forest boundaries will be secured to prevent further forest and catchment degradation. Fencing may be required for biological hotspots or where significant human wildlife conflicts occur. Only after securing the boundaries can the activities required for securing the integrity of the Mau be undertaken, such as restoration of degraded areas.

Relocation and resettlement

41. There is consensus within the Government that all people living in the protected forests and many people now living in what was formerly forest will have to be relocated or resettled¹⁷. In the event of resettlement, GoK will provide alternative land, funds for the development of the land and livelihoods. In the process of relocating or resettling people, GoK will take into consideration the vulnerability of the people.

42. The Task Force has also commissioned the development of a Resettlement Framework Policy for the Mau Forests Complex. The finalization of the draft document will be coordinated by the Interim Coordinating Secretariat.

43. An estimated 2,500 households are encroaching in the protected forest areas of the Mau Forests Complex, mainly in South Western Mau (1,683), Ol Pusimoru (300-500) and Maasai Mau (211). They have no documentation to support their occupation of the land and the Government never expressed an intention to set aside those protected forest areas for settlement.

44. In the Maasai Mau Trust Land, an estimated 2,147 households residing inside the Trust Land Forest, due to illegal extension of group ranches beyond their adjudicated boundaries, will be relocated. Resettlement or compensation will be dealt with on a case to case basis.

45. In the 61,586.5 ha of forest land excised in 2001, families living in the most critical catchment areas will have to be relocated from their plots and resettled or compensated as appropriate.

46. It must be noted that many of the landowners have irregular title deeds¹⁸. For example, title deeds were issued when the lands was still gazetted as forest reserve or in disregard of a High Court order restraining the Government from moving ahead with the excision process.

¹⁷ Relocation is removing people from an area. The Government will assist with transport and livelihood support. Compensation will be provided on a case to case basis. Resettlement is a Government supported scheme where the Government provides alternative land for the dispossessed, along with livelihood support.

¹⁸ It is estimated that 99.3 percent of title deeds issued in the 2001 excisions are irregular.

In a large number of cases, the Registry Index Maps and the Preliminary Index Diagrams are erroneous.

Livelihood support and development

47. Immediate livelihood support will be required for the families relocated from the Mau Forests Complex. This issue needs to be clearly considered, in both scale and intent. These needs include water, food, shelter and energy. All these elements could be provided with some assistance from Government and NGOs. Already, organizations like World Vision and WWF are developing water projects including roof catchment, water tanks, spring protection and boreholes and this help could be extended to communities closer to the forest boundaries. Such support will in many cases lessen the resentment felt by those aggrieved by their relocation.

48. Livelihood and rural development will be a critical component of the rehabilitation of the Mau forest ecosystem. New and improved agricultural practices that are compatible with water resources conservation need to be promoted. Economic incentives, including the establishment of markets will be required. Social infrastructure needs to be further developed.

49. Increased farm production and livelihood are likely to lessen the pressure on the forest, and contribute to food security. The agricultural and livestock extension services are weak in the area and need to be strengthened.

50. Even with the 2001 excisions reversed and the deforested land returned to Government, the pressure on the forest will not go away. The high dependency on firewood and charcoal, which provides 80-90 percent of household of energy in rural areas means that fuelwood will continue to be in demand. Therefore any attempt to restore the Mau must be accompanied by efforts to meet wood demand of communities living near the forest. Intensive on farm planting of exotic and agro-forestry trees can alleviate the pressure on the natural forests. The urgent need to increase tree planting on farm is already stressed in Vision 2030. Other on farm livelihoods could be promoted, such as commercial bamboo plantations.

Public awareness and community sensitization

51. One of the current constraints to restoration of the Mau Forest Complex is the limited and conflicting information provided to local communities. There is therefore a need to create awareness and to engage in environmental education for the local communities to highlight the need to conserve the Mau and to share with them the intentions of GoK. Communities have to be sensitised to the fact that the ecological value of the Mau is greater than the value of the wood products too often harvested.

Medium-term interventions

Forest-specific management plans

52. Once relocation and resettlement has been completed, the management plan for the Mau must address not only forest restoration and critical catchments, but also the needs of the local communities living around the forest. Restoration of the forest is the first medium

term action and it must be done in consultation with local communities, who will benefit both directly (employment opportunities) from the restoration process itself and indirectly (ecosystem services including water provision) from the restored ecosystem. A study will also be commissioned to assess sustainable livelihood options in the forest (with particular emphasis on employment opportunities, such as monitoring using community forest guards) and natural resource-based income-generating activities, such as seed collection. This will include raising most of the required seedlings for rehabilitation, the balance being produced through institutional nurseries. Budget and technical support to private and institutional tree nurseries will be necessary.

53. The tea buffer zones (Nyayo Tea Zone) that were established in some forest blocks in the Mau will be reassessed in terms of forest conservation and production.

Restoration / replanting of degraded sites

54. Restoration means restoring as far as possible the ecosystem services of the Mau Forests Complex. This is a long-term goal but needs to be initiated as a medium term action with indigenous tree planting in the critical catchment areas (including riverbank protection inside and outside the forest areas). Activities in the medium-term will concentrate on tree planting in the formerly forested areas. The expected financing will be from Government resources with support from development partners. The budget is provided in Annex I.

55. Survival of the indigenous seedlings can be 80-90 percent. On a large scheme, where communities manage the tree nurseries, the sustainability of the tree nurseries is empirically low. However, if communities are rewarded financially, based on tree survival (e.g. number of trees alive following annual physical audits) through a mechanism such as Carbon Credits, then survival rate can go up considerably. In community tree planting schemes, small amounts can be paid annually on every tree alive but this requires accurate environmental auditing.

Longer term restoration

56. The long term objective is the restoration of the ecological functions and services of the Mau Forests Complex. It is clear that the restoration of ecological functions will not be achieved in the first few years.

57. One of the major findings of the Task Force is that the entire Mau Forests Complex is a critical catchment area. As such the management of all lands, including agricultural land and settlements within the large Mau Forests Complex ecosystem must be revised to be consistent with the water resources conservation requirements.

58. In the protected forest areas, planting 100,000 ha is unlikely to be achieved in the medium term. Restoration of a natural forest also is likely to take 30 years, and possibly considerably longer on degraded land where the fertility is low and topsoil has been removed.

59. Biodiversity restoration will also be achieved in the longer term through natural regeneration and replanting of indigenous trees. GoK, as a party to the Convention on

Biological Diversity (CBD), has responsibility towards the conservation of the biological diversity in the Mau Forests Complex.

60. Reduced emissions from deforestation and land degradation (REDD) will also be a long term objective. A REDD project should attempt to attract funds for carbon sequestration. In order to qualify for REDD, a baseline study is necessary immediately. This can be followed by private sector concessions.

61. The long-term vision therefore entails the restoration of at least 100,000 ha of montane closed-canopy forest plus full protection of the forests from excisions and degradation.

62. The role and potential of ecotourism should be explored, particularly in relation to the forests that are still well preserved. The southern part of the Mau Forests Complex has the potential to be part of the Maasai Mara tourism circuit once an appropriate management framework is in place.

63. Long-term forestry practices to be explored include:

- a) Sustainable non-timber forest products (NTFP) production within the forest (honey, medicinal products);
- b) Sustainable hardwood rotation (e.g. *Vitex keniensis*, *Prunus africana*, *Olea capensis* on a 25-50 year rotation); and,
- c) Sustainable bamboo production and processing.

64. The positive impacts expected from the long-term interventions include:

- a) Restoration of the Mau water tower;
- b) Restoration of springs, perennial river flow, wetlands and aquifer recharge;
- c) Sustainable socio-economic development in the Mau outside the forest and in the downstream areas;
- d) Sustainable socio-economic activities within the forest through ecotourism, non-timber forest product extraction, and sustainable hardwood or bamboo enterprises;
- e) Continuous energy supply from hydroelectric and geothermal sources;
- f) Reduction of downstream flooding events;
- g) Carbon sequestration in the order of 20 million tons¹⁹ over a 25-30 year period from natural forest regeneration/ tree planting, with concomitant benefits to reversal of climate change, such as reduction in emissions from deforestation; and,
- h) Restored microclimate, particularly for the tea industry.

Private sector investment

65. There are numerous opportunities for private sector investment and public-private sector partnership. There is already active involvement of the tea companies in reforestation and in the protection of existing forests. The tea companies have a vested interest in forest protection because there is enough empirical evidence to show that local deforestation has negatively affected the microclimate. In addition, several companies rely on mini-hydropower and actually offload power surplus into the national grid. This power supply depends upon perennial flow in the rivers.

¹⁹ Based on an 325t C ha⁻¹ sequestered from montane forest over a 25 year period (average figure from numerous sources). At maturity, a forest then becomes carbon neutral.

66. There is a need to engage private sector to mobilize resources and even be the main player and contractor on private forest investments including management of KFS plantations.

67. In less critical areas, KFS could permit private investment in exotic plantation forests but in general the emphasis should be on indigenous afforestation with sustainable selective felling over the very long term or possibly the introduction of native hardwood plantations, which would be clear felled and replanted on a regular cycle. Several native species could be considered, in particular Meru Oak, Elgon Olive, Camphor, Hagenia and Red Stinkwood. All these are valuable timber species.

68. Restoration of the bamboo cover may allow private investment in sustainable bamboo production using either the native bamboo (*Yuschania alpina*) or higher-yielding exotic species. Bamboo is highly effective in soil and water conservation and has ever-increasing uses in the manufacture of building material, charcoal, alternative fuel, clothing and fabrics.

VII. Conclusions

69. The ecosystem goods and services in the Mau are threatened more than ever by human activity. Both the Government and more particularly those living within the Mau ecosystem are now paying the price for over 30 years of neglect. Neither the remaining indigenous forests nor the forest plantations can sustain the demand for charcoal and timber. This calls for different approaches, including tremendous increase in tree planting on farms.

70. Success stories with restoration following relocation exist in Kenya. There have been recent successes in both the Mt. Kenya and Aberdare forests. The restoration of the Mau is physically feasible even if it is socially and politically complex, and it is in the national interest that action be taken immediately to avoid irreversible damage to a vital ecosystem. The initiative and long term commitments must come from GoK and the people. For those already living in the forest, they must be made aware of the environmental and socio-economic impacts and that relocation and re-settlement is to their own interest as well as the interest of the nation.

Indicative budget for immediate and medium-term interventions

Activity	Year 1 - USD	Year 2 - USD	Year 3 - USD	TOTAL
Effective Institutional Arrangements				
- Establish a Mau Complex Authority	40,000	97,000		137,000
- Fastrack KFS reforms to start sustainable forest management in the Mau (*)	2,000,000	2,000,000	1,700,000	5,700,000
- Contract the management of Maasai Mau trust land forest			7,000	7,000
Strategic Management Plan for the Mau Forests Complex				
- Develop a strategic management plan for the Mau Forests Complex	80,000			80,000
Public Awareness and Community Sensitization				
- Develop and implement an outreach programme to sensitize and empower communities towards forest conservation	100,000	150,000	150,000	400,000
Boundary Survey and Issuance of Title Deeds				
- Survey and issue title deeds for the 22 blocks of the Mau Forests Complex	1,000,000			1,000,000
- Consolidate boundary data and plans for all forest reserves and establish mechanisms for resolving future forest-land issues		300,000	400,000	700,000
Monitoring and Enforcement				
- Upscale the Joint Enforcement Unit	7,000,000	7,000,000	7,000,000	21,000,000
- Set up the required infrastructure for monitoring and enforcement	3,000,000	2,000,000	1,000,000	6,000,000
Relocation and Resettlement				
- Prepare for relocation, resettlement and repossession, including establishment of dedicated offices, land survey and valuation, and finalize a resettlement framework policy for the Mau	900,000			900,000
- Relocate squatters and settlers from the Mau Forests Complex	1,450,000			1,450,000
- Purchase and develop land for resettlement and compensate bona fide settlers				(**)
Livelihood Support and Development				
- Promote community forest associations	150,000	200,000	200,000	550,000
- Support on-farm tree planting and extension services, including the establishment of institutional and private tree nurseries	1,000,000	1,000,000	1,000,000	3,000,000
- Identify and promote alternative livelihoods	200,000	900,000	900,000	2,000,000
- Promote on-farm energy conservation practices	150,000	100,000	100,000	350,000
Restoration / Rehabilitation of Degraded Areas				
- Carry out resource inventories, including mapping of degraded areas and develop/review forest-specific management plans	314,000	600,000	600,000	1,514,000
- Replace wrongly sited forest plantations and issue concessions for the remaining commercial forest plantations	41,000	700,000	700,000	1,441,000
- Restore at least 85,000 hectares of degraded water catchment areas, including 40,000 hectares through concessioning	10,000,000	10,000,000	10,000,000	30,000,000
- Survey and gazette critical water catchments outside forests	144,000			144,000
- Establish systems to monitor forest and water resources and undertake carbon baseline	2,000,000	1,589,000		3,589,000
Resource Mobilization				
- Develop project proposals and convene meetings with development partners	40,000	20,000	20,000	80,000
- Develop mechanisms to secure financial sustainability	85,000			85,000
Project Management				
- Administration, coordination, monitoring and evaluation of projects	500,000	500,000	500,000	1,500,000
TOTAL	30,154,000	27,059,000	24,277,000	81,490,000

(*) Resources for the completion of the KFS reform are crucial but they have not been factored in this budget, except for the Mau.

(**) The budget required for the resettlement / compensation programme will be determined once the preparation work for relocation, resettlement and repossession is completed and the resettlement framework policy for the Mau is finalized.