

A review of Kenya's national policies relevant to climate change adaptation and mitigation

Insights from Mount Elgon

Paul O Ongugo

David Langat

Vincent O Oeba

James M Kimondo

Benjamin Owuor

Jane Njuguna

George Okwaro

Aaron JM Russell



A review of Kenya's national policies relevant to climate change adaptation and mitigation

Insights from Mount Elgon

Paul O Ongugo

Kenya Forestry Research Institute (KEFRI)

David Langat

Kenya Forestry Research Institute (KEFRI)

Vincent O Oeba

Kenya Forestry Research Institute (KEFRI)

James M Kimondo

Kenya Forestry Research Institute (KEFRI)

Benjamin Owuor

Kenya Forestry Research Institute (KEFRI)

Jane Njuguna

Kenya Forestry Research Institute (KEFRI)

George Okwaro

Kenya Forestry Research Institute (KEFRI)

African Wildlife Foundation

Aaron JM Russell

Center for International Forestry Research (CIFOR)

Working Paper 155

© 2014 Center for International Forestry Research



Content in this publication is licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0), <http://creativecommons.org/licenses/by/4.0/>

ISBN 978-602-1504-45-1

Ongugo PO, Langat D, Oeba VO, Kimondo JM, Owuor B, Njuguna J, Okwaro G and Russell AJM. 2014. *A review of Kenya's national policies relevant to climate change adaptation and mitigation: Insights from Mount Elgon*. Working Paper 155. Bogor, Indonesia: CIFOR.

Cover photo by Benjamin Owuor
Farmlands below Mt. Elgon, Kapchorwa, Kenya

CIFOR
Jl. CIFOR, Situ Gede
Bogor Barat 16115
Indonesia

T +62 (251) 8622-622
F +62 (251) 8622-100
E cifor@cgiar.org

cifor.org

We would like to thank all donors who supported this research through their contributions to the CGIAR Fund. For a list of Fund donors please see: <https://www.cgiarfund.org/FundDonors>

Any views expressed in this publication are those of the authors. They do not necessarily represent the views of CIFOR, the editors, the authors' institutions, the financial sponsors or the reviewers.

Table of contents

Acknowledgments	v
Executive summary	vi
Project context	viii
1 Introduction	1
1.1 Overview of forest and tree cover change in Kenya	1
1.2 Status of forest cover in Mount Elgon, Kenya	2
1.3 Assessment of social, economic, governance and political drivers of forest and tree cover change in Kenya	3
1.4 Impact of forest cover change in Kenya on the environment and local livelihoods	5
2 Climate change adaptation and mitigation: A driver of change in forest governance in Kenya	10
2.1 Implications of climate change	10
2.2 Analysis of policy measures to address forest destruction, degradation and climate change adaptation and mitigation in Kenya	11
2.3 Development of Kenya's environment policy	11
2.4 Key policy developments addressing climate change	12
2.5 Summary overview and policy gaps in relation to climate change	20
2.6 Attempts to harmonize environment policies relevant to climate change	21
2.7 Analysis of national policies affecting climate change activities in the project area	21
3 Conclusion	24
4 References	25

List of figures and tables

Figures

1	Vegetation cover in Kenya.	3
2	Kenya's five water towers.	7
3	Projected climate change impacts on natural vegetation through comparison with climate analogue sites - Mount Elgon.	8

Tables

1	Areas of forest change in Kenya and rate of change between 1990 and 2010.	2
2	Drivers and underlying cause of deforestation and forest degradation.	4
3	Policies and their potential impacts in Mount Elgon Forest ecosystems and environs.	22

Acknowledgments

We are grateful for the contribution made by AdaptEA project team members from Makerere, Patrick Byakagawa, Abwoli Banana and Justine Namaalwa, in the development of the overall structure and approach for this policy review.

Many colleagues from KEFRI played key roles in the development of this policy review. We are very grateful for their individual and group contributions. We are also indebted to KEFRI management under the stewardship of the Director, Dr. Ben Chikamai, for their continued support of the project. At CIFOR many individuals at CIFOR contributed in making this research possible, including the CIFOR Library (searching/sourcing literature), CIFOR ICG team (editing and layout of the working paper), and staff in the Governance, Livelihoods, Finance, Administration, Human Resources, and the Nairobi Hub Offices. The authors would also like to thank two reviewers (Kaisa Korhonen-Kurki and Grace Wong) for their comments on a prior draft of this paper.

This review was completed as part of a research project titled “Adaptation of people to climate

change in East Africa: Ecosystem services, risk reduction and human wellbeing”. The Center for International Forestry Research (CIFOR) is leading the project in collaboration with Makerere University, the Kenya Forestry Research Institute (KEFRI), and the World Agroforestry Centre (ICRAF). Primary funding for this project was provided through a grant from the Rockefeller foundation (2011 CRD 306). Complementary funding was received from two CIFOR-led projects funded by AusAID (63560) and UNITAR (G.EGP.2011.03). Inquiries regarding this project should be directed to the project leader at CIFOR, Aaron Russell (a.russell@cgiar.org).

Finally, many stakeholders contributed to this policy review during a series of national and district stakeholder project inception workshops held in Nairobi and Kampala in 2012, and a preliminary analysis/feedback workshop held with Ugandan and Kenyan district stakeholders in Kitale in 2013. Our failure to mention them all by name does not in any way mean their contribution is not appreciated: to you all, we say thank you.

Executive summary

Kenya's afro-montane forests provide a range of foods, fibers and fodder that are critical for rural households' basic livelihood needs. They protect communities against erosion and landslides, and maintain local climate stability in the face of erratic rainfall, wind gusts and increased temperatures. These areas also host remnant populations of plants and animals that depend on high-altitude climatic/vegetative conditions under threat from climate change. At a larger spatial scale, Kenya's five "water towers" supply and regulate hydrological flows for all but one of Kenya's major rivers, with major impacts on agricultural economies, lake fisheries, hydropower, etc. At a global level, forests cycle nutrients and help to regulate climate change through carbon sequestration. Kenya's afro-montane regions are threatened from continued commercial logging by pulp and wood processing companies, charcoal production and encroachment of forested areas for agriculture and settlements.

In the recent past, Kenya has experienced erratic weather patterns causing prolonged drought and frequent floods. The combination of climate variability and deterioration of forest cover in watersheds has had severe impacts, including loss of human life and livestock, damage to infrastructure, poor crop yields, famines, wildlife migrations, and human migrations and displacements due to major flooding events, all of which have had adverse impacts on livelihoods and the national economic performance. According to the most recent IPCC report on climate change (IPCC 2014), the frequency of occurrence and intensity of episodes of climate variability in East Africa can be expected to increase significantly over the decade. Consequently, Kenya requires clear policies that guide the sustainable use and management of forests and suitable land-use practices that can lead to an increase in carbon stocks and enhanced resilience both of local stakeholder livelihoods and the ecosystem services that these rely on.

The objective of this study is to analyze Kenya's national policies related to climate change adaptation and mitigation, with specific focus on the contexts of the forest and agroforestry-dependent livelihoods and ecosystem services typical of the Mt. Elgon ecosystem. This analysis was built on a review of policy documents, secondary literature and insights from national and district level stakeholder workshops. The policy analysis begins with an overview of changes in forest and tree cover in Kenya, the drivers of deforestation and forest degradation. It then reviews and discusses the implications of policy documents from key sectors on national climate change adaptation and mitigation efforts. The study identifies conflicts between policies, offers appropriate recommendations for mainstreaming climate change adaptation into sectoral and cross-cutting policies, and suggests means for improving their translation into tangible benefits for rural farming communities.

This review identifies a range of overlapping sectoral policies (such as agriculture, energy and forestry) are poorly integrated, and lack investment research to generate data, information and knowledge needed for evidence-based policy formulation or decision making. Furthermore, in the context of climate change, the policies reviewed do not adequately address the vulnerability of communities or their exposure, resilience and adaptive capacity to the impacts of climate change. Similarly, they provide little guidance for the development of landscape level climate change mitigation measures. These findings indicate a need for Kenya to formulate an exclusive and comprehensive climate change policy and legislative framework that creates, or sets out the mandate of, a leading institution, which will spearhead the nation's efforts in climate change adaptation and mitigation. This will make it possible to mainstream climate change through all sectors of Kenya's economy, as reflected in the National Climate Change Response Strategy and the Vision 2030.

Project context

This policy review is a deliverable of the project “Adaptation of people to climate change in East Africa: Ecosystem services, risk reduction and human well-being” funded by the Rockefeller Foundation. The Center for International Forestry Research (CIFOR) led the project, with the following partners: World Agroforestry Centre (ICRAF), Kenya Forestry Research Institute (KEFRI) and Makerere University of Uganda.

The project was motivated by the understanding that climate change will undermine the resilience of both agriculture-based livelihoods and natural resource management regimes in East Africa in a myriad of ways. A major challenge is reducing the vulnerability of people and climate-sensitive sectors, such as water, agriculture and energy, to present climate variability and to ensure that future development activities are appropriate for future climate contexts. By adopting an ecosystem-based adaptation (EbA) approach to research, this project is aimed at informing rural stakeholders and national policy makers in East Africa about the sustainability of different local and national adaptation strategies. The research approach integrates a review of the climate change adaptation policy contexts with local-level analyses of stakeholder vulnerability and of the roles of forest and tree-based ecosystem services in enhancing the resilience of agricultural production. The purpose of this paper is to analyze national policies on climate change adaptation, forest and agroforestry management, and impacts on forest and tree-based ecosystem service.

Climate change policy analysis objectives and methodology

This analysis involved extensive review of reports, policy and legal documents, and peer-reviewed articles in scientific journals. Kenya’s policies for climate change adaptation and mitigation are still at a draft stage and their impacts have yet to be

demonstrated. Therefore, this review focuses initially on a study of key national policy documents from a range of sectors that contribute to the resilience of stakeholders and ecosystems to climate change, with a particular focus on the impacts of forest and tree cover change in Kenya. This review also included a range of crosscutting national policies (i.e. climate change adaptation, environmental management, disaster management, development strategies, poverty reduction, decentralization, gender, etc.).

The findings of the literature-based review were augmented by interviews and focus-group discussions with key national and subnational agency and NGO staff in relevant sectors (i.e. forestry, parks, wildlife, agriculture, water). Stakeholders’ inputs were critical in assessing the impacts of different livelihoods activities around Mount Elgon and their reliance on forest and tree-based ecosystem services, and the impacts of different policies on livelihoods. These stakeholders also provided clear insights into the types of interactions and coordination that takes place in the implementation of different national policies.

Overall, the output of this policy review was to

- provide the context for understanding the institutional frameworks by which local people, government and other institutions are legally able to make claims on forested and agroforested landscape resources;
- highlight policy conflicts and provide clarity on implicit/explicit prioritization of the different policy objectives (e.g. food self-sufficiency vs biodiversity conservation by various government ministries and agencies);
- provide recommendations for how to mainstream climate change adaptation and mitigation into sectoral and crosscutting policies, and suggest how to improve the translation of such policies into tangible benefits for rural farming communities.

1 Introduction

1.1 Overview of forest and tree cover change in Kenya

Kenya shares with other East African countries the problem of having small, fragmented areas of forest under pressure from encroachment and exploitation. It has been suggested that the forest cover in East Africa was more extensive several centuries ago. The decrease in the area of natural forest was partly due to taking land from forest reserves and converting it into commercial farms by white settlers. The clearing of forested land has a long history in Kenya and started in 1897 when forested land was cleared by European settlers for commercial farming and some areas were cleared to support the supply of fuelwood to the Kenya–Uganda railway (Mwangi 1998). These processes continued even after independence; clearly some were based on purely the public interest (such as for settlement of landless people and for public utilities such as schools) (Mathu 2007). However, in the late 1990s and early 2000s, there were several politically motivated excisions of forested land in Mau and Mount Elgon which happened without regard to due process as envisaged in the Environment Management and Coordination Act (EMCA) (1999). In 2001, a total of 67,000 ha were cleared (UNEP et al. 2005; Mathu 2007). Another example occurred during the creation of Nyayo Zone Corporation in 1986, where forested land was cleared in Mount Kenya, Mount Elgon, West and East Mau, Trans Mara, Tinderet, North and South Nandi, Kakamega, Kipkabus, Uplands, Kikuyu escarpment and the Aberdares. The creation of Nyayo Tea Zone Corporation was intended to deter encroachment and support local communities through employment creation. Officially, a ‘100 m’ strip from the forest boundary was nominally used as a guideline. However, this guideline was ignored and resulted in greater deforestation because in some cases, the width of the tea zone strip ranged between 5 and 25 km and by 1990 the total area cleared for tea planting was 11,000 ha (Mathu 2007).

The area of closed canopy forest cover in Kenya is considered to be very low (less than 2%), compared with 9% for sub-Saharan Africa and 21% for the

rest of the world (FSK 2006). The country’s total forested area is 37.6 million ha, of which 2.1 million ha are classified as woodlands, 24.8 million ha as bushlands and 10.7 million ha as wooded grasslands (Table 1).

Of the total forested area, only 1.7 million ha (4.5%) are set aside for management by the Kenya Forest Service (KFS). In addition, approximately 4.6 million ha or 8% of Kenya’s land mass are protected areas for wildlife conservation. Protected areas are declared landscapes/seascapes that have been surveyed, demarcated and declared as national parks and/or reserves and managed by Kenya Wildlife Service (KWS 2014). In addition, a further 9.4 million ha (25%) of tree-covered land is in farmlands, settlements and urban centers. Overall, indigenous forests cover 1.2 million ha (2.2%).

Overall, the area under indigenous forests has declined by 8.1%, indicating an annual decline of 0.4%. Public forest plantations showed a significant decline (37.1%) between 1990 and 2010, resulting in an annual decline rate of 1.8%. By contrast, the area of private forest plantations increased by 1.6%. A similar rate was observed for trees on farms (Table 1). This was due to clearing and poor establishment in planted forests (Nield et al. 2000). The ban on harvesting in public forests from 1999, created a scarcity of wood products and increased the prices of wood products (Cheboiwo and Langat 2006). The resultant high wood products prices acted as an incentive for private farmers to expand the areas under trees (Cheboiwo and Langat 2006).

A recent study by the International Union for Conservation of Nature (IUCN 2000) on the trends in forest cover in Kenya concluded that, despite the stated intention of stipulating that clearing of forest (from government forest reserves) should cease, it continues, and the forests that are cleared are often significant in terms of biodiversity or size, and meet important criteria for the maintenance of biodiversity. It concluded that since 1986, Kenya has lost about 15,000 ha of natural forest due to clearing. Hence, the loss of forest cover poses a serious risk to the national economy, which is heavily dependent

Table 1. Areas of forest change in Kenya and rate of change between 1990 and 2010.

Category of forest resource ^a	Area (000 ha)			Annual change 1990–2010 (000 ha)	% change 1990–2010
	1990	2000	2010		
Indigenous closed canopy forest	1,240	1,190	1,140	–5	–8.1
Indigenous mangroves	80	80	80	0	0.0
Open woodlands	2,150	2,100	2,050	–5	–4.7
Public plantation forests	170	134	107	–3.17	–37.1
Private plantation forests	68	78	90	+1.1	32.4
Subtotal forested land (total of above categories)	3,708	3,582	3,467	–12.05	–6.5
Bushland	24,800	24,635	24,510	–14.5	–1.2
Farms with trees	9,420	10,020	10,385	+48.25	10.2
Total area of Kenya	58,037	58,037	58,037	0	

^a The forest category is based on FAO definitions

Source: FAO Global Forest Resources Assessment 2010.

on agricultural production, and to the population, many of whom are dependent on forest products and services for their basic needs. For example, more than 90% of the country's domestic energy requirements are met from fuelwood, and the source of the most foreign income is tourism, with wildlife contributing a large proportion (KFMP 1994).

Kenya's key water towers supply a significant proportion of Kenya's hydrological ecosystem services, and an analysis of deforestation indicated that the primary actors involved have shifted significantly on Mount Kenya, Aberdare Range, Cherangani Hills and Mount Elgon (Akotsi et al. 2006). Most of the 7,084.24 ha cleared during 2000–2003 were on lands declared as public plantations, but 94.7% of the 9,813 ha cleared between 2003 and 2005 was of natural closed canopy forest (i.e. located within the national parks). Of the 14 deforestation sites identified, 8 were new, implying that the extent of the destruction was increasing (Akotsi et al. 2006). Forests in the other four water towers showed no sign of deforestation between 2003 and 2005, and Mount Kenya specifically showed signs of improvement, although there are reports that deforestation is ongoing in some places (Akotsi et al. 2006).

1.2 Status of forest cover in Mount Elgon, Kenya

Mount Elgon Forest covers 107,821 ha, composed of Mount Elgon National Park (34,116 ha) and Chepkitale and Mount Elgon Forest Reserves (73,705 ha) (MERECP n.d.). The ecosystem forms the upper catchment of Nzoia and Turkwel rivers. It also supplies water to Malakisi River, which crosses farming areas south of the mountains before entering Uganda. Mount Elgon lies on the Kenya–Uganda border. The latter contains globally threatened species, some of which are endemic to the Afromontane region, with others endemic to Mount Elgon. These features make Mount Elgon a major tourist attraction and some parts have been declared as national parks and nature reserves. The pressures of rapid population growth (around 2 million people live in the mountainous areas) and commercial logging is affecting this unique ecosystem (Nield et al. 2000; Gichora et al. 2011; Birdlife International 2012).

Authorized logging has been practised in Mount Elgon since the 1930s. A 1986 Presidential Decree banned all logging in Kenya's natural forests but excluded Mount Elgon, where legal logging continued. In the 1970s,

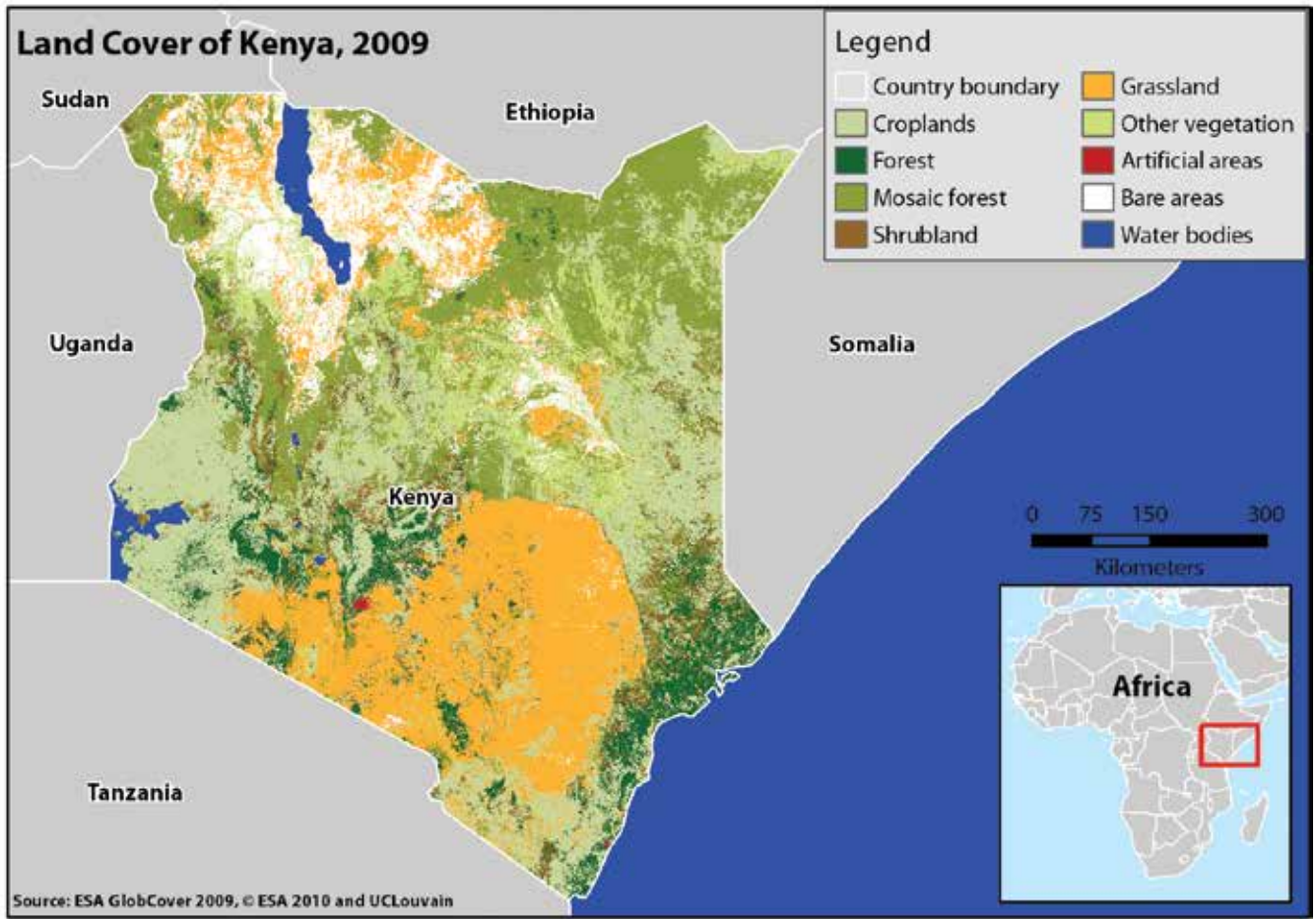


Figure 1. Vegetation cover in Kenya.

land was excised from the Mount Elgon Forest around Chebyuk, where 600 families were settled. In addition, agricultural encroachment and charcoal production are degrading the forest in many areas. In several cases, the forest has been cleared for crop farming on sloping land (unsuitable for agriculture), leaving them susceptible to erosion and landslides. Continued degradation and forest loss in Mount Elgon threatens to undermine the area's crucial role as a water catchment for the surrounding region. A recent survey of Mount Elgon forests showed no significant changes in forest cover between 2005 and 2007 (MERECP n.d.). However, there are reports of resurgence of illegal logging in this forest (Gichora et al. 2011). The Forests Act of 2005 provides for participatory forest management; this approach to forest management is clearly not entrenched in the country. As such, it could take time for the management plans for Mount Elgon Forest to be completed (Gichora et al. 2011).

Consequently, recent data reveal changes in vegetation caused by population growth and conflicts (Indigenous Information Network

2008). In particular, about one-quarter of the indigenous forest cover has been cleared for farming activities. The level of forest disturbance has been considerable, and further deterioration, degradation and deforestation are continuing at an alarming rate, by communities from outside the area that have occupied the forest and are cultivating the land (Indigenous Information Network 2008). In addition, there is continued extraction of indigenous tree species by commercial wood processing companies (Nield et al. 2000).

1.3 Assessment of social, economic, governance and political drivers of forest and tree cover change in Kenya

The continuing decline in Kenya's forest cover is attributed to the following main drivers of deforestation: uncontrolled timber harvesting, conversion of forests to farms and pastures, increased needs of the population, road construction, fires and other related mortality

Table 2. Drivers and underlying cause of deforestation and forest degradation.

Drivers	Underlying causes
1. Agricultural expansion I. Subsistence agriculture II. Commercial agriculture III. Local transmigration	Population pressure; rural poverty; lack of alternative sources of income Rising commodity prices and expanded markets of agricultural produce Agricultural policies urging farmers to produce more cash crops for export Subsidies and incentives for agriculture e.g. tax exemption for fertilizer and farm machinery Insecurity of tenure
2. Excisions	Poor governance; political interference; weak institutional capacity Lack of appreciation of total economic values of forest ecosystems and lack of integration of forest values in national accounting system Insecure land tenure and open-access situation in local authority forests and communal forests
3. Wood extraction I. Commercial logging (legal and illegal) II. Extraction of forest products for subsistence and income (fuelwood, charcoal and poles)	Poor resource pricing – low royalty rates Population growth and rising demand for forest products in the construction industry and wood processing plants Lack of/prohibitive costs of alternative substitutes e.g. electricity vs charcoal or fuelwood High dependence on charcoal and fuelwood for cooking and heating Growing market for forest products hence commercialization of hitherto noncommercial forest produce.
4. Livestock grazing	Persistent droughts Socio-cultural attachment to livestock Lack of livestock management system Forest carrying capacity is not known hence proper prescription is not available to resource managers
5. Infrastructural development	Road expansion to open up remote agricultural areas Demand for housing and growing urbanization
6. Forest fires	Traditional use in vegetation/pasture management and land preparation Inadequate capacity to manage fires Lack of community participation in forest management which induces perceived alienation sabotage Lack of benefit-sharing framework and local people feel alienated from local forest resources
7. Wildlife damage	Increase in population of large herbivores, mostly elephants Human-wildlife conflicts – wildlife habitats encroached

Source: MoF&W 2010

factors (Mahapatra and Kant 2005). While it is known that there is ongoing deforestation in most parts of the world, there is less agreement among scientists, policy makers and forest managers about the underlying causes of deforestation (Gibson et al. 2000). Some have cited population growth (Rudel 1994). Burgess (1992) argued that population density is an important cause of deforestation. Repetto and Gillis (1998) argued that government public policy failure is the driving force for deforestation. Other studies (Pahari et al. 2000; Dolisca et al. 2007) have identified several factors that influence deforestation in developing countries, such as low appreciation of the total economic value of forests, the population density, infrastructure, literacy levels, income per capita, length of residency, migration, energy prices and land tenure (Farm households that occupy land illegally or possess insecure land title deeds are more likely to clear forests for agricultural expansion.) Analyses carried out to establish the relationship between population and deforestation found that the correlation between the logarithm of the population density and the total accumulated forest loss is the most significant, with the correlation factor ranging from 0.71 to 0.91 for various regions of the world (Pahari and Murai 1999).

There is disagreement among researchers on which factors are the primary cause of environmental degradation and “even when agreement has been reached on the importance of a certain factor, researchers have disagreed on its effect” (Gibson et al. 2000). While it is generally agreed that population growth is the main cause of deforestation, Cadwell (1984) suggested that there is no clear linear relationship between population growth and land degradation. Another study in the middle hills of Nepal did not find any direct relationship between population and deforestation in 18 communities (Varughese 2000). He states that there are other variables at play at the local level (i.e. local rules and institutions) which researchers have been unable to clarify.

Over the past three decades in Kenya, large areas of forest reserves have been degazetted as protected areas and officially converted to other uses, mainly agriculture, while the remaining protected indigenous forests managed by KFS and KWS have been degraded by decades of illegal logging of valuable timber tree species, resulting in reduced carbon stocks and degraded biodiversity values. Forests on community lands under the control of local authorities continue to

be degraded and destroyed through overexploitation for timber, poles, charcoal and fuelwood, and through unregulated grazing and clearance for agriculture. A summary of the drivers and underlying causes of deforestation is given in Table 2 (MoW&F 2010; MoEWNR 2013).

1.4 Impact of forest cover change in Kenya on the environment and local livelihoods

The world's forest biomes provide a wide range of benefits to society at both local and national levels, with significant impacts spanning a range of economic sectors, many of which have direct impacts on local communities' and nations' capacities to cope with the impacts of global climate change (Russell et al. 2013). These benefits are grouped by the Millennium Ecosystem Assessment (MEA) (2003) into the following ecosystem service categories: provisioning, regulating, cultural and supporting functions.

Provisioning services are those that are directly consumed by human beings (such as timber, fuelwood, and non-timber forest products (NTFPs) for food, medicines and fodder. These are also referred to as ecosystem goods or direct use values (Turner et al. 1994).

Regulating services are indirect services that determine the resilience of the ecosystems to regulate the impact of external shocks and to adapt to changes in environmental conditions without losing functionality (UNEP 2012). A large proportion of biodiversity value is within the regulating services. These regulating services are important in the delivery of provisioning services (final products and services) over a range of environmental conditions (Perrings 2006), including regulation of hydrology, erosion, local microclimates and soil health.

The cultural services/spiritual values, frequently known as 'non-use' or 'passive use' values, include a range of benefits derived by society that are primarily spiritual, religious, aesthetic and inspirational in nature. While calculations of the 'travel cost' involved in tourists' visits to national parks are becoming common, the cultural values of such parks to local stakeholders are rarely quantified (and probably cannot be quantifiable as they may not be able to access any alternative forest to the local one). Consequently, while recognized as important for society, these values are generally poorly

quantified or conceptualized. Supporting services are those that are necessary for the production of other services, such as primary production, terrestrial-atmospheric nutrient cycling, and soil formation. While clearly critical, many of these services function on spatial and temporal scales, and are difficult to assess or value at the local level. A key exception is with regard to the contributions of forests and trees for sequestration (absorption) of atmospheric carbon, which is the focus of much discussion on global climate change agreements (UNFCCC 2002)¹, as well as those being signed/developed within the private sector between individual carbon-emitting industries that aim to achieve net carbon neutrality through investments in afforestation/conservation activities elsewhere.

1.4.1 Ecosystem services from Kenya's five water towers

About 80% of the Kenyan population lives in rural areas and depends on rain-fed subsistence agriculture (FSK 2006). Of these, an estimated 3 million people live adjacent to forests and thus depend on direct and indirect benefits from forest resources and agricultural activities for their livelihoods (World Bank 2000). Among these forested areas, five areas of particular importance to the nation's economy are Kenya's five 'water towers' that supply a disproportionate amount of the crop production and hydrological services to the country: Mau Escarpment, Mount Kenya, Aberdare Ranges, Cherangany Hills and Mount Elgon (Figure 2). The value and significance of Kenya's water towers for provision of ecosystem services were recognized very early during the colonial period, giving rise to some of Kenya's first environmental conservation regulations, starting with a formal policy in 1957 and a subsequent revision in 1968 (Sessional Paper No. 1) (Mwangi 1998).

The forestry sector provides linkages with agriculture and livestock sectors, which are the backbone of Kenya's economy. It supports agriculture through soil and water conservation and amelioration of environmental (influences local microclimate and windbreaks) and economic benefits, such as generation of jobs in rural areas in small-and medium-scale forest products processing industries – more than 100,000 people directly rely on forests and forest industries for employment and income (FSK 2006). Moreover, the country has a wood products deficit (fuelwood, timber,

pulp and paper and poles) and the situation will be exacerbated by further deforestation and environmental degradation, which will negatively impact on the livelihoods of the local people (Mogaka 2005).

An analysis of agricultural cropping patterns and crop suitability models on Mount Elgon suggests that current climatic conditions result in marginal agricultural production levels (Luedeling et al. 2014). An analysis of climate change projections for Mount Elgon predicts increased average temperatures in 2050 of 1–3 degrees higher than they are today (Luedeling et al. 2014). Consequently, one would expect to see improved agricultural production for key commercial and staple food crops such as maize and coffee grown locally. However, this is not certain, as future projections of both temperature and precipitation around Mount Elgon are highly variable both between the range of scenarios and models available and within each model across the Mount Elgon area (Luedeling et al. 2014). Additional uncertainty in terms of agricultural livelihoods is expected due to the increased variability in rainfall patterns and frequency of extreme rainfall events – phenomena that are not presently included in climate change models of impacts on agricultural production (GoK 2013). It is clear that adaptation strategies and policies promoting livelihood diversification and climate risk mitigation of existing cropping methods are more likely to succeed on average. Interestingly, a comparative analysis of livelihoods in a climate analogue site by Bos et al. (in press) suggests that constraints related to stakeholder land tenure, market access and extension services are likely to have a greater impact on livelihoods than climate change.

The regulating services of Kenya's natural ecosystems are important production factors in the agriculture, forest and fishing sectors, the electricity and water sectors, tourism (hotels and accommodation sector), and the public administration and security sectors, and sustain a large proportion of the country's population (SEI 2009; UNEP 2012). These two sectors contributed between 33–39% to gross domestic product (GDP) between 2000 and 2010 (UNEP 2012). In addition, these sectors have a significant multiplier effect on the rest of the economy's GDP. For example, more than 90% of the country's domestic energy requirements are met by fuelwood, and one of the highest sources of foreign income is tourism, with wildlife (dependent to a significant degree on the presence of large contiguous expanses of forested land) contributing

1 This has been the focus of the United Nations Framework Convention on Climate Change (UNFCCC), first signed in Marrakesh in 2002.

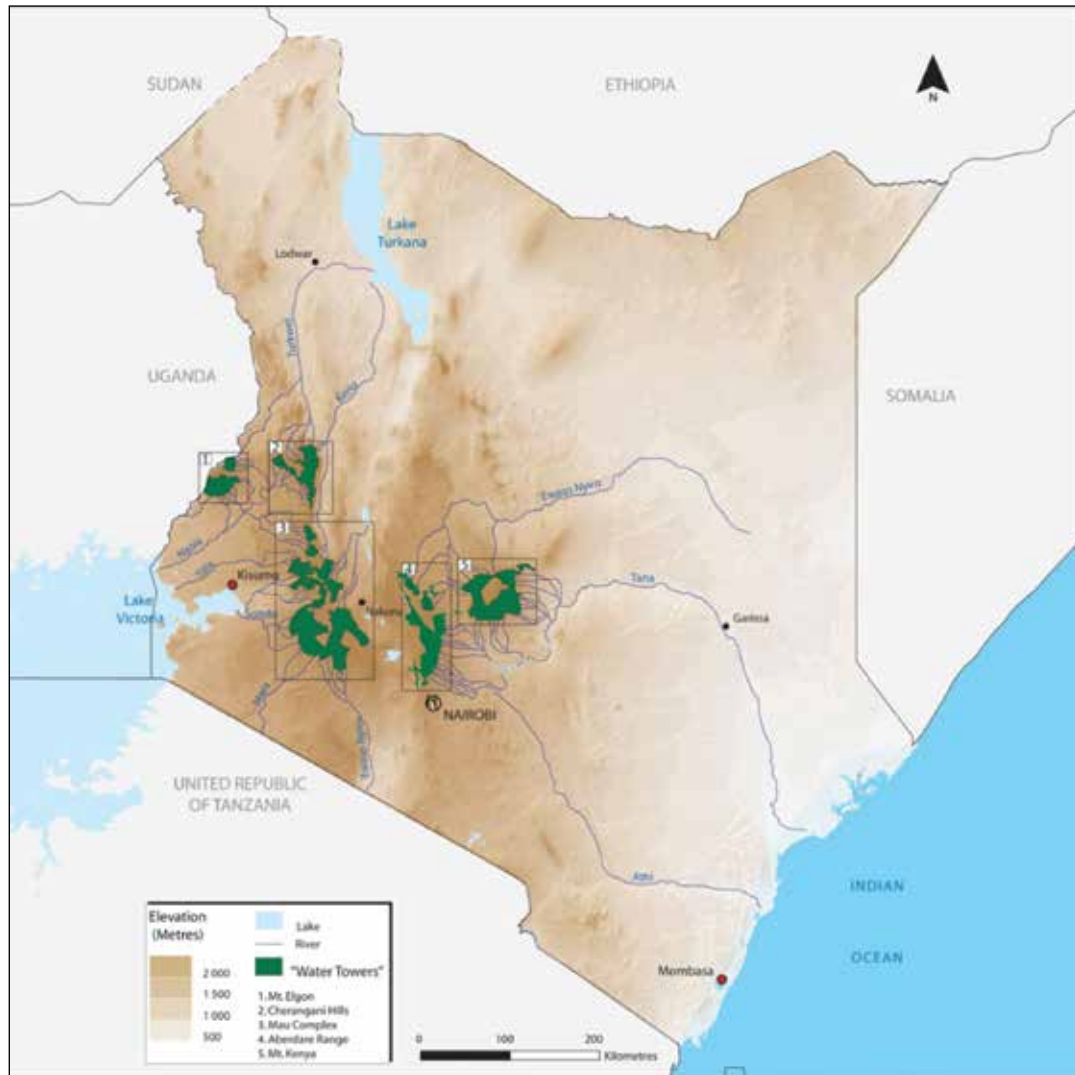


Figure 2. Kenya's five water towers.

Source: UNDP²

a large portion (KFMP 1994). Another way of conceptualizing the benefits of forest-based ecosystem regulatory services is that they minimize risk to the economy and provide a range of insurance values to the economy, particularly during times of market fluctuations, security concerns, and/or industrial exports may challenge certain sectors (UNEP 2012). This insurance value is critical for maintenance of economic resilience in the face of unpredictable variability of environmental and economic conditions and minimization of long-term economic hazards, such as climate change (UNEP 2012).

Kenya's water towers cover over 1 million ha and are the source of all but one of Kenya's major rivers, that in turn flow into Lakes Victoria, Turkana, Baringo, Nakuru, Natron and Naivasha (GoK 2013). "Increased runoff, flash flooding, reduced infiltration, soil erosion, and siltation in the dams and other water reservoirs" are all key impacts on ecosystem regulatory services identified by the GoK (2008) and attributed directly to the past several decades of significant deforestation. These rivers are estimated to generate roughly 57% of Kenya's electricity supply (ICS 2011). In recent years, flooding has resulted in severe damage in many parts of the country, such as the Budalangi floods (along River Nzoia) in western Kenya arising from the Cherangani Hills, and the Kano Plains (along Nyando River) in Nyanza Province,

² Available at: http://www.unep.org/dewa/Portals/67/Images/water_towers.jpg/

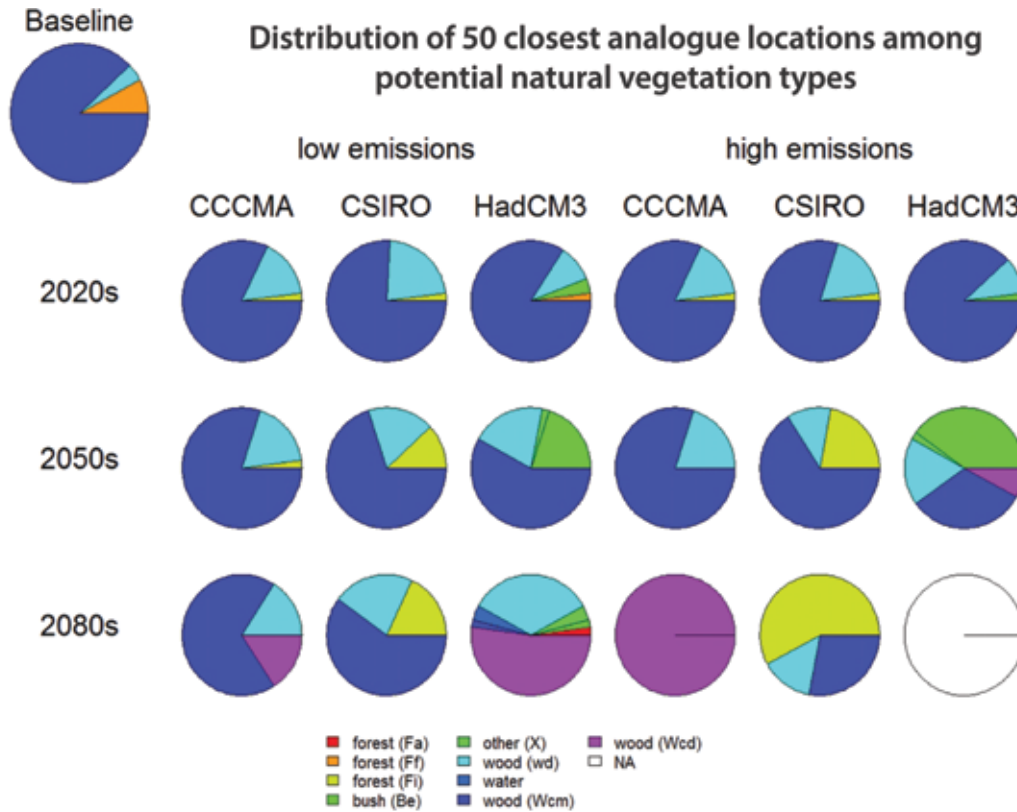


Figure 3. Projected climate change impacts on natural vegetation through comparison with climate analogue sites - Mount Elgon.

Source: Luedeling et al. 2014

arising from the Nandi Hills (GoK 2013). The Tana River floods were attributed to poor land-use practices in the Mount Kenya and Aberdares catchment areas (NEMA 2007). In addition to floods, Kenya has recently experienced prolonged and more frequent droughts, whose impacts are perceived to be increasing in severity with time as forest cover has declined. These include the La Niña events of 1999–2001 and 2006. It is clear that interactions between extreme climatic events and land-use change (such as deforestation) have already resulted in loss of human life and livestock, damage to infrastructure, diminished crop yields, alterations to wildlife migration patterns, and human displacements. One study of the costs of forest resource degradation to the national economy is USD 3.5 million per annum (2005 values) due to flash floods, health hazards and crop failures (Mogaka 2005).

According to Kenya’s Forest Master Plan, the annual sustainable supply of wood was estimated to be 22 million m³ in 1995, while demand stood at 25 million m³ (KFMP 1994). It is estimated that by 2020, annual wood demand will be about 45

million m³, while the supply will be 38 million m³, resulting in a deficit of 7 million m³ every year. This deficit, which is already manifesting itself, will lead to further deforestation and environmental degradation and hence further increases in the emissions of greenhouse gases, which will have devastating effects on the climate and the economy (Harding and Devisscher 2009).

If natural forests are not restored and the process of deforestation halted, it may cause loss of land productivity and exacerbate vulnerability to climate change (ACTS and ACC 2011; GoK 2013). There are concerns that continued deforestation and the eventual degradation of forest ecosystems will jeopardize the country’s natural assets and may undermine the provision of ecosystem services and forest products and pose a serious risk to the country’s economy; the economy depends heavily on agricultural production, and the majority of the local population, are dependent on forests for products and services for their livelihoods (SEI 2009; Otuoma et al. 2011). At the same time, the IPCC (2007) report predicts that areas of aridity in Africa are likely to grow, and that increased

intensity of rainfall events are likely to result in both increased periods of drought and severe flooding.

Boko et al. (2007) anticipate that across Africa, increased temperatures are likely to interact with land-use change trends to further undermine the resilience of

habitats, ecosystems and species that are already under threat from land-use changes such as deforestation and forest degradation. This is supported by analyses of native vegetation analogue sites on Mount Elgon that clearly indicate that the existing native vegetation is likely to undergo change (Figure 3).

2 Climate change adaptation and mitigation: A driver of change in forest governance in Kenya

2.1 Implications of climate change

Climate change is being increasingly recognized as a developmental and environmental issue. We need information about the likely impacts of climate change on human society, the options for responding to climate change, and the trade-offs between policy choices and their effectiveness, benefits, risks and costs (Dessler and Parson 2009). Climate change mitigation and adaptation need to be mainstreamed into all development policies, programs and activities, and funding decisions to achieve sustainable development (Agarwal and Perrin 2008). The first step in mainstreaming climate change is to understand how it is linked to the development challenges of the particular sector under consideration (Agarwal and Perrin 2008). This is essential in developing countries, where development is the priority. However, if climate change were mainstreamed in these development activities through small and cost-effective adjustments, it would be possible to reduce the vulnerability of a planning decision or project to climate change. Such an approach is especially beneficial in cases when climate change could increase the risk of failure or premature replacement and/or retirement of assets (Agarwal and Perrin 2008; WRI 2011).

Human-induced climate change seriously jeopardizes efforts to achieve the Millennium Development Goals related to national poverty alleviation and sustainable development (WRI 2011). The rationale for integrating adaptation into development strategies and practices is that interventions required to increase resilience to climate variability and change generally enhance development objectives. Thus, it is necessary to understand which specific climate change impacts and measures will affect development efforts and how. For example, an increase in fuel prices as a method of decreasing greenhouse gas emissions could impose inequitable burdens on the poor, whereas carbon sequestration measures could aid social policy by enhancing the sustainability of

livelihoods (Adger et al. 2009). Hence, integration of the realms of adaptation and development is a prerequisite for gaining a useful understanding, and may provide new opportunities for integrated policy development (Adger et al. 2009; WRI 2011).

A basic challenge in assessing climate change impacts is projecting how well people and organizations will adapt to the changes. For example, if climate change reduces yields and profits from current farming systems and practices, farmers will need to shift to crops and practices better suited to the new conditions (Dessler and Parson 2009). Similarly, if present settlement patterns, economic activities or management of water, forests or other natural resources are not suited to a changed climate, people can be expected to notice and change their practices to match the new climate (Dessler and Parson 2009). Moreover, people do not need to wait for a change to happen before they adapt to it. If good forecasts of likely future climate change are available, people may look ahead and adapt in advance, either to the specific changes they expect or to the general increase in uncertainty about future climate (Dessler and Parson 2009). Such anticipatory adaptation is especially important for decisions whose consequences extend many decades into the future, such as zoning and settlement policies, and long-term capital investment (Dessler and Parson 2009).

2.1.1 Climate change impacts in Mount Elgon

The impact of climate change in moist forest areas of Kenya is a variable rainfall pattern and increased surface water, resulting in flooding of downstream areas (GoK 2010a; Otuoma et al. 2011). There is evidence that there is high variability in rainfall pattern within the areas surrounding Mount Elgon forest ecosystems due to climate change (GoK 2010a; Kansime et al. 2013). These erratic rainfall patterns have impacted on food production and have had negative economic consequences on the local population (GoK 2010a). Moreover, there is reported increased damage to coffee crop by the coffee berry borer (*Hypothenemus hampei*), the most important

pest of coffee worldwide, which has benefited from the temperature rise in East Africa and is spreading (Jaramillo et al. 2011). The climate change impacts are exacerbated by anthropogenic activities in Afromontane ecosystems (Johansson 2011).

2.2 Analysis of policy measures to address forest destruction, degradation and climate change adaptation and mitigation in Kenya

The first formal regulations were enacted in 1897 to ensure continuous supply of wood energy to the Kenya–Uganda Railway where all forest resources within one mile of the railway line were under the control and management of railway administration and all other forests were placed under the management of the local colonial administration (Logie and Dyson 1962). In 1902, East Africa forest regulations were published and management of forest resources was transferred to the forest department (Logie and Dyson 1962). The country operated on rules and regulations promulgated by the colonial government till 1942 when the Forest Act was enacted (Chapter 385, Laws of Kenya) and this formed the basis for subsequent revisions in 1968, 1982 and 1992) (Mwangi 1998).

The first formal forest policy was formulated in 1957, through White Paper Number 85 and this was subsequently revised by the Government of Kenya as Sessional Paper No. 1 with the primary purpose of forest reservation for water catchment protection, provision of forest products and protection of gazetted forests from destruction, promotion of principles of sustained yield and promotion of the development of a vibrant forest products industry (GoK 1968). In the last two decades, the Government of Kenya has pursued reforms in the forest sector to reflect the socioeconomic environment and meet the environmental challenges (Mathu 2007).

The comprehensive reforms in forest governance that Kenya has introduced over the past five years are aimed at halting or reversing the trend of deforestation and forest degradation and overcoming past deficiencies. The reforms are the result of comprehensive research, collection of detailed data and careful formulation carried out over two decades.

The new policy and legislation covers: forest excision process; public participation in forest resource management; livelihood improvement and benefit-sharing mechanisms; ecosystem and science-led professional management of forest resources; incentives and promotion of sustainable use and management of forest resources using ecosystem management plans; promotion of commercial tree growing and promotion of value-added products; creation of a conservation fund; creation of Kenya Forest Service (KFS); and commitment to supporting the ecosystem services of forests, including their water, biodiversity and climate change values.

In addition to measures resulting from the new forest policy and legislation, policies and laws from other sectors also influence trends in forest degradation and loss. Of particular note are the Agriculture (Farm Forestry) Rules 2009 introduced under the Agriculture Act. These rules are aimed at achieving and maintaining farm forest cover of at least 10% of every agricultural land holding, as a means of preserving and sustaining the environment and thus combating climate change. The Constitution of Kenya 2010 (GoK 2010b) aims to have tree cover of at least 10% of the land area of Kenya (Article 69(1) (b)). The Constitution is therefore expected to have important implications for management of trust lands with significant forest resources. The national land policy aims to streamline land management and administration, review existing land laws and address past problems, including inequalities in access to land, land tenure issues, underuse or abandonment of land, and overexploitation and unsustainable use of land. The Constitution of Kenya 2010 and the national land policy are likely to have far-reaching impacts on the management of forests in trust lands previously managed by district councils.

2.3 Development of Kenya's environment policy

Several steps have been made in building a policy framework to guide the management of the environment in Kenya. First, Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya recognized the need to conserve natural resources for all future generations and expressed concern about the quality of the environment. The national development plans, which have been prepared since the early 1970s, have devoted specific sections to environmental protection and management.

In 1982, the National Environment Secretariat (NES) in the Ministry of Environment and Natural Resources (MENR) (now Ministry of Environment, Water and Natural Resources) collaborated on drafting a National Environment Enhancement and Management Bill. In 1989, the NES, through the Inter-ministerial Committee on the Environment, initiated a sessional paper on the environment. In 1994, a national environment action plan, which was developed to guide the use of natural resources and environmental management, was prepared (GoK 1994).

In 1999, a sessional paper and a bill to manage and coordinate environmental matters were drafted. The bill was passed by parliament as the Environment Management and Coordination Act of 1999, whereas the sessional paper was approved by cabinet but was not presented to parliament for debate and adoption. As a result, to date, Kenya has an environmental law but no approved policy document on the environment.

The need for a comprehensive national environment policy became clear from the gaps identified in the draft sessional paper and environmental challenges that have emerged since 1999. Also clear is the need to manage the natural resources upon which people depend for their livelihoods. The following have been identified as elements to be included in future policy statements:

- the emerging challenges resulting from climate change and unsustainable human settlements
- a clear policy direction for effective implementation of the Environment Management and Coordination Act or a full revision of the Act to bring it into line with emerging environmental issues and challenges
- harmonization of conflicting policies in key sectors such as water, forestry, wildlife, energy and agriculture
- campaigns to boost public awareness of environmental issues and enhance partnerships and stakeholder involvement
- increased environmental protection at the grassroots level and participation of all stakeholders.

2.4 Key policy developments addressing climate change

The Government of Kenya has responded to various national and international challenges through

enactment of various policy, legislation and strategies to address them and meet international obligations. One of these challenges is climate change. The government has given prominence to climate change and has developed policies and strategies to address the challenges associated with it.

The United Nations Framework Convention on Climate Change (UNFCCC) requires that countries report to their national communication (NC) their progress in reducing vulnerability to the impacts of climate change, and many of them have made creditable progress in preparing this section of their NC. Kenya submitted its first NC in 2002. In addition, less developed countries are required to prepare national adaptation programs of action (NAPAs) detailing their vulnerability to the impacts of climate change and the actions they plan to take to ameliorate these impacts. Kenya has completed its national climate change response strategy (NCCRS) and national climate change action plan (NCCAP) (MoEMR 2010; GoK 2013).

Despite this, there are concerns that adaptation preparedness remains inadequate in many African countries, even those that have prepared NAPAs and NCs (Pandey 2002). NAPAs are not easy to implement because they only list the country's priority adaptation needs (in the form of programs/projects) and do not take into account the overarching policy framework, such as mainstreaming of adaptation into national plans. As a result, adaptation programs and projects are often implemented in African countries as stand-alone activities, which render them less effective (GoK 2010a).

In the case of Kenya, the existing guidelines on climate change adaptation are contained in the draft environment policy, which culminated in the Environmental Management and Coordination Act (EMCA) of 1999 and the recently launched NCCAP. The EMCA and draft policy do not have strong provisions on climate change adaptation and mitigation, which can be attributed to the time when they were made. For instance, the policy merely states that a climate change strategy should be developed.

Although the completion of the NCCRS is a positive step toward addressing climate change, Kenya needs strong policies that address both mitigation and adaptation, giving guidance on how to integrate and mainstream these into all national sectors and

institutions. Despite this shortcoming, however, concerns about the possible impacts of climate change triggered strong support for policies, leading to the establishment of the first climate change unit in the Office of the Prime Minister in 2008. The office provided high-level political support to climate change activities, leveraged financial support and harmonized ongoing and future activities on climate change and integrated them into different government departments. The office, which is now under the Ministry of Devolution and Planning, is still faced with the challenges of sufficient funding and qualified staff.

Other environment-related policies are similarly weak. In particular, the energy policy, forest policy and ASAL (arid and semi-arid lands) policy are heavy on environmental management, but issues with climate change go beyond environmental management. The impacts of these policies on the vulnerability of society and ecosystems to climate change and their potential to contribute to global carbon sequestration are reviewed in detail below, along with an analysis of the interactions between these policies.

2.4.1 National climate change response strategy (NCCRS) and national climate change action plan (NCCAP)

The national communication paper formed the basis for initiating the development of the NCCRS. The strategy is the framework that guides the integration of climate concerns into development priorities, government planning and budgeting (MoEMR 2010). The processes of formulating the NCCRS and its implementation action plan were participatory and consultative, and all the key sectors of the economy were addressed; climate change was viewed as a challenge that cuts across all sectors and segments of society in Kenya, hence the need to have inputs from diverse stakeholders. The stakeholders comprised development partners, and representatives from the private and public sector and parliamentary committee dealing with climate change.

The NCCRS highlights various measures for adaptation and mitigation to the impacts of climate change in all sectors of the economy (MoEMR 2010). In agriculture, the strategy proposes the application of a range of innovative technologies such as irrigation, early maturing and high yielding crop varieties, drought and pest-resistant crop varieties, and disease-resistant livestock. The NCCRS also advocates diversification

of livelihoods; adaptation of agricultural technologies from analogue environments; and enhancing early warning systems with drought monitoring and seasonal forecasts for better food security. In the environment and water sectors, the action plan gives priority to protection and rehabilitation of water towers and increased forest cover through farm forestry and afforestation.

The NCCRS includes indicative budgets and plans for line ministries. The NCCRS is meant to guide the government in all activities and interventions aimed at addressing issues related to climate change; it consolidates all the national efforts and focus on climate change adaptation and mitigation. To operationalize the NCCRS, the government in March 2013 finalized the development of the national climate change action plan (NCCAP). This was developed through a consultative process that engaged actors across government, the private sector and civil society. The NCCAP aims to operationalize the NCCRS by providing the analysis and enabling mechanisms to make implementation successful. It will also support efforts toward the implementation of the Kenya Constitution 2010 and the attainment of Vision 2030, and encourages people-centered development, ensuring that climate change actions help the country move toward its long-term development goals. In particular, the NCCAP sets out a vision for a low-carbon climate-resilient development pathway; summarizes analysis of mitigation and adaptation options and recommended actions; recommends an enabling policy and regulatory framework; and sets out the next steps for knowledge management and capacity development, technology requirements, a financial mechanism and a national performance and benefit measurement system (NPBM) (GoK 2013). The climate change policy is being developed and is expected to be anchored to the Constitution of Kenya 2010 and Vision 2030 (GoK 2013).

2.4.2 National environment policy

The draft national environment policy (NEP) of 2008 treats climate change and disaster management as emerging environmental issues. In this policy document, the government seeks to adopt mitigation and adaptation approaches to deal with climate change.

This policy recognizes that many of the natural disasters in Kenya, such as floods, drought, landslides and fires, are climate related and that their negative impacts cut across all key sectors of the economy.

The policy anticipates that as the climate changes further, the frequency and intensity of these extreme weather events will increase. The NEP recommends the following measures for dealing with disasters related to climate change:

- Develop and implement a national climate change strategy.
- Identify and raise awareness of opportunities for adaptation measures through promotion of appropriate technology transfer and capacity building.
- Develop and implement the Kyoto Protocol's Clean Development Mechanism programs and projects that encourage significant levels of investment and technology transfer for sustainable development.
- Develop an integrated, improved early warning and response system for climate change and disaster risks, with a clear strategy for dissemination of information at grassroots level.
- Build and strengthen research capacity on climate change and related environmental issues.

The policy statement contains the building blocks of a legal framework for addressing environmental concerns beyond the current EMCA of 1999. Even though the policy has not been passed by parliament, a national strategy on climate change has been produced and is being implemented as part of various national programs.

To implement the EMCA and harmonize environmental management, the National Environmental Management Authority (NEMA) was created through the Act passed in 2000 and became operational in 2002. The District Environment Officer (DEO) is responsible for the functions of the NEMA at the district level. For many years there have been no clear tenure policies with regard to wetlands and rights over many wetland areas, and these resources have remained a center of controversy in many places, resulting in conflicts, speculation and competition on many occasions predisposing such resources to overexploitation, degradation or neglect. Many wetlands have been converted to private lands and in Transzoia, this is very common and if the trend continues, most of these ecosystems will be privatized and not available for use by local people as a source of quality water (MECDP 1999). The county that is supposed to be the caretaker is not aware and needs to be sensitized. The NEMA is now mandated by the EMCA through district environment committees to ensure wetlands are conserved. EMCA 1999 is given

precedence in cases of inconsistencies arising from other State laws.

The government has attempted to harmonize policy regulations for the management of natural resources in Kenya through the EMCA. However, the implementation and enforcement of the EMCA is hampered by a number of factors. The NEMA has poor human capacity on the ground. For instance, it has only managed to post one officer (DEO) in the districts. In addition, Kenya in general lacks an up-to-date inventory of the amount of land under different uses such as forests, water and infrastructure, among others. Lack of this vital information complicates effective planning, zoning and overall management of both urban and rural areas.

2.4.3 Energy policy

The aim of the energy policy is to help mitigate climate change by encouraging the use of energy-efficient equipment and renewable energy sources. The policy, contained in Sessional Paper No. 4 of 2004, focuses on all forms of energy, including bioenergy. Article 103, Part V of the Energy Act 2006, which came into force on 7 July 2007, covers renewable energy sources, efficient use of energy and conservation of key renewable energy sources. The vision outlined in the sessional paper is to "promote equitable access to quality energy sources and services at least cost while protecting the environment". It covers renewable energy extensively, with one-third of the paper dedicated to renewable energy, and it outlines short-, medium- and long-term energy strategies. The Energy Act 2006 specifically requires the Ministry of Energy to perform the following tasks for biofuels development:

- Formulate a national strategy to coordinate research into renewable energy.
- Provide a framework for the efficient and sustainable production, distribution and marketing of biomass, solar, wind, small hydro, municipal waste, geothermal and charcoal energy sources.
- Promote the use of fast-maturing trees for energy, including biofuels, and the establishment of commercial woodlots including peri-urban plantations.
- Promote the development of appropriate local capacity for the manufacture, installation, maintenance and operation of basic renewable technologies such as bio-digesters, solar systems and hydro turbines.

The policy, while it acknowledges the need to address factors that are potentially detrimental to the environment and abide by international obligations, does not clearly address how climate change issues are to be addressed. The policy makes it mandatory for all energy projects to incorporate disaster preparedness and mitigation strategies and ensure compliance to the EMCA. Though the policy intends to promote tree-growing through agroforestry interventions and efficient charcoal production, it does not show how energy centers will promote tree cover or encourage use of other renewable technologies. If the energy diversification strategy (renewable energy e.g. solar, wind, geothermal and hydropower) in the policy is implemented, it can provide a diversity of clean energy sources and their adoption would lessen the burden on forest resources. However, the policy is lacking on incentives for adoption of renewable energy sources whose costs are prohibitive to the local rural poor.

2.4.4 Forest policy

Forestry issues in Kenya were guided by the forest policy contained in Sessional Paper No. 1 of 1968 until 2007, when the Forests Act 2005 was enacted by the Ministry of Environment and Natural Resources (now Ministry of Environment, Water and Natural Resources) through Sessional Paper No. 1 of 2007 on the forest policy (GoK 2007). The policy has not yet been passed by parliament, but it has noble objectives that support environmental management.

Sessional Paper No. 1 of 2007 on forest policy seeks to address the threats to Kenya's forests and increase the forest cover to acceptable international standards of 10%. The sessional paper espouses the critical role of citizens in management of forest resources through enabling communities to actively participate in forest management through the formation of 'community forest associations' to manage or co-manage public and community forests, by granting user rights to local communities over forest resources. The policy gives prominence to the role of farm forestry to provide tree products and services and encourages integration of trees on farms through provision of incentives, technical extension services, entrenching market-based principles and supporting the development of out-grower schemes. Additionally, the policy aims to achieve sustainable management of natural and riverine forests within farmlands, through application of soil and water conservation technologies. The policy also recognizes

the role of forest in poverty alleviation and protects the rights of customary rights of local communities to sustainably use forest resources. The Kenya Forest Service, introduced PELIS³ to replace the *Shamba* system, and this was welcomed by local communities but it has failed to meet its desired objectives due to administrative failures. If the system is streamlined, it has the potential to improve the livelihoods of the local people (by increased food security and cash income). Additionally, the policy recognizes the role of forests in provision of ecosystems services (provisioning, regulating, supporting and cultural and spiritual functions).

The law enacted from this draft policy – the Forests Act 2005 – has guided forestry development in the country to this day. It is currently undergoing revision to conform to the new political dispensation under the New Constitution of Kenya. The Forests Act 2005 provides an elaborate process of excision of public forest and must involve public participation. Additionally, the Act provides for public consultation and broader community participation in the formulation of forest management plans. An important feature of the Act is its recognition of the potential contribution of sustainable forests to poverty reduction, and to the maintenance of vital environmental services. It provides for broad-based collaboration with forest communities, recognizing their traditional cultures and values (Section 46 (1&2)). Furthermore, it takes a comprehensive approach to forest ecosystems management, using environmental impact assessments and multiyear result-oriented forest management agreements. More specifically, this particular law provides for the introduction and adoption of climate change mitigation strategies.

2.4.5 Rangelands management policy

The rangelands management policy provides guidance for the nearly 80% of the country that is classified as arid and/or semi-arid land (ASALs). Attempts to develop a rangelands management policy started in 1979, but it was not until 2004 that the draft national policy for the sustainable development of ASALs was completed. The main objective of this policy is to provide a coherent and practical framework for the implementation and realization of a new vision for ASAL development in Kenya.

3 PELIS is plantation establishment and livelihood improvement scheme – KFS rebranded Taungya system

This policy addresses many issues that are relevant to climate change, especially in relation to adaptation.

The policy looks at the following key issues:

- the interdependence of ASALs and non-ASAL areas
- sustainable investments to tap into the potential of ASALs
- community participation in ASAL development
- decentralized planning for ASAL development
- diversification of livelihood systems in ASAL areas
- development of local institutions and organizing communities for development
- improvements in ASAL land tenure and land-use plans
- provision of services to mobile pastoralist and agro-pastoralists
- vulnerability of communities to natural hazards and conflict management.

Although the impacts of climate change were not a consideration in the development of the policy, it nevertheless looks at key issues that are relevant to adaptation to climate change.

2.4.6 Gender policy

Kenya developed and passed a gender policy in 2000, which provides a framework for the government to address the current gender inequalities in many spheres of national development. The policy gave rise to the National Commission on Gender and Development, established in 2004, with the mandate of advising the government on gender concerns and achieving gender mainstreaming in national development. This is a strategic and positive approach that, if coordinated properly, could address gender aspects of climate issues, given the vital role that women play in natural resource use and management.

2.4.7 Draft national land policy 2011

The national land policy encourages full participation of citizens to gain better access, use and control of land and land-based resources. It intends to establish a mechanism for sharing the benefits of natural resources by the people of Kenya, and through the use of participatory methods and defined benefit-sharing criteria within clearly delineated areas.

The management policies for land-based resources are harmonized through the EMCA. If the draft land policy is passed into law, the following land

quality conservation principles shall be implemented: 1) intensification of use in high-potential, densely populated areas, through the application of efficient methods; 2) improvement of the condition and productivity of degraded lands in rural and urban areas; 3) dissemination of agricultural research results and experience to the farming communities; 4) application of cost-effective irrigation methods in areas of low agricultural potential; and 5) formulation of a clear policy for comprehensive development of the livestock sector.

2.4.8 Agricultural sector development strategy (ASDS) and Agriculture Act, Cap. 318

In 2010, the Kenyan government adopted the agriculture sector development strategy (ASDS) policy replacing the Strategy for Revitalization of Agriculture, 2004. The ASDS (2010–2020) sets out a detailed plan to make agricultural sector a key driver of economic growth as envisaged under the economic pillar of Vision 2030. Under this plan, agriculture is expected to deliver a 10% annual growth rate. The vision of the document is “a food secure and prosperous nation” and the strategy aims to: increase productivity and income growth; enhance food security and equity, with an emphasis on irrigation to introduce stability in agricultural output, commercialization and intensification of production especially among small-scale farmers; and develop appropriate and participatory policy formulation and environmental sustainability (ASDS 2010). The agricultural policy in Kenya does not mention climate change explicitly but recognizes the likely impacts of climate change on agriculture and in fact highlighted the implementation of the NCCRS as one way to curb climate change and variability in Kenya. Agriculture sector ministries are viewed as components whose synergistic functions should lead to attainment of the objectives set out in the agricultural sector. The argument is that when each of the sector ministries aligns its operations to the tenets of the NCCRS and NCCAP, then the agricultural sector will respond effectively to the challenges of climate change and climate variability (UNECA 2013). The NCCAP has outlined how agriculture sector ministries are expected to align their climate change activities and plans to the NCCRS. Maina et al. 2013, however, observed that there is no clear linkage between the NCCRS and the agricultural sector ministries.

The strategy for revitalizing agriculture, national food policy and national agricultural extension policy aims to transform agriculture to improve its

productivity, commercialization and make it more viable and attractive to more private investors. The strategy is being implemented within the context of various other government reforms. The Kenyan rural development strategy (KRDS), for instance, has set growth targets for each economic sector. Additionally, the poverty reduction strategy papers make the development of agriculture a top priority in the process of poverty reduction.

The Agriculture Act, Cap. 318 of 1986 (revised) is the principal agricultural law. According to Mumma (2003 in Yatich et al. 2007), this Act has provisions on the management of catchments and riparian management to support agriculture. This is, however, contradicted by the Land Survey Act. For instance, while the Water and Agriculture Act has provision for the conservation of riverine and wetlands areas, the Survey Act gives room for land demarcation of such areas without any provision for preservation. Section 14 mandates the Ministry of Agriculture to deal with issues of soil fertility management, which provides the basis for integrating agricultural interventions in area-wide catchment management. The law gives the Minister for Agriculture the authority to prescribe/prohibit land-use systems to control soil erosion and deforestation, and to protect sloping zones and catchment areas from degradation. The Agriculture (Basic Land Usage) Rules penalize offenders for destruction of vegetation on lands with slopes exceeding 35% (Rule 3), and prohibits cultivation in slopes greater than 12% but less than 35% when the soil is not protected against erosion (Rule 5). Despite the presence of these punitive measures in our statute books, policy makers concede that it has failed to prevent land degradation, partly due to lack of resources to monitor and sanction different land uses and the lack of community participation in the enforcement and management of agricultural resources (Mumma 2003 in Yatich et al. 2007). Despite such acknowledged failures and concern about the impacts of environmental degradation on agricultural productivity, the Strategy for Revitalizing Agriculture 2004–2014 is not strong on the need to mitigate degradation caused by unsustainable agricultural activities (Yatich et al. 2007). However, there is a positive development through the gazettelement of the Agriculture (Farm Forestry) Rules 2009 introduced under the Agriculture Act. These rules aim to achieve and maintain farm forest cover of at least 10% of every agricultural landholding, as a means

of preserving and sustaining the environment and combating climate change. The biggest challenge to the implementation of this initiative is the lack of resources and awareness by local farmers and agricultural officers on its implementation and there is little evidence of this being implemented in Mount Elgon. The State Departments of Agriculture, Livestock and Fisheries have developed a policy document that addresses climate change issues in an increasingly urbanized society (GoK 2010c). As citizens migrate to urban areas, environmental and climate change issues become increasingly relevant. The broad objectives of the national policy on urban and peri-urban agriculture and livestock (UPAL) are to promote and regulate sustainable UPAL development, improve incomes, enhance food security, create employment, enhance living standards and reduce poverty. These objectives are to be realized while also concentrating on land use, public health and environmental management.

Specific policy objectives are to:

- Coordinate and review policy and legislation on UPAL development to support the subsector.
- Strengthen and enforce legislation to support UPAL development.
- Enhance and strengthen collaboration and linkages between institutions, players and other agencies dealing with UPAL development activities.
- Develop and strengthen institutional capacities to handle UPAL activities.
- Formulate, develop and promote appropriate technologies for sustainable UPAL development.
- Promote conservation of the environment by management of waste and other pollutants from the UPAL subsector.
- Promote and coordinate marketing of UPAL products through improved markets, transportation and information exchange.

2.4.9 National policy on water resources management and development

Sessional Paper No. 1 of 1999 on the national policy on water resources management and development recognizes the need to apply participatory management options that provide opportunities for poverty alleviation according to the poverty reduction strategy paper (PRSPs), and enhance the aspirations of the national environmental action plan (NEAP), and assist towards the realization of the national action plan. The goals of the policy include rational allocation of water, establishment of an efficient

and effective institutional framework to achieve systematic development, and general management of the water sector.

The policy takes cognizance of the increased anthropogenic activities in catchment areas, which have contributed to siltation of watercourses and reduction in supplies of quality water for domestic, commercial, industrial and agricultural uses to downstream areas. The latter is attributed to inappropriate land-use practices within farmlands adjacent to forested areas. The government believes that the solution lies in judicious use of resources through effective management of river basins that fully recognizes the contribution of forests and soil conservation innovations (Sessional Paper, Section 2.1.2). Additionally, it recognizes the important role of rural communities living in critical catchments, and gives them a pivotal part in decision-making. The 2002 Water Act has operationalized most of the provisions of this policy.

The 2002 Water Act introduced a comprehensive and radical departure in the management of the water sector in Kenya. The provisions provide for: 1) separation of the management of water resources from the provision of water resources; 2) separation of policy-making from day-to-day administration and regulation; 3) decentralization of functions to lower-level state organs; and 4) encouraging nongovernment entities to manage water resources and provide water services. The Act provides for the management, conservation, use and control of water resources, and for the acquisition and regulation of water rights.

Under this Act, the government established two entities to deal with different aspects of the water sector, known as the Water Resources Management Authority (WRMA) and the Water Services Regulatory Boards. The board is responsible for water supply and sewerage, while the authority is mandated to develop guidelines and procedures for water allocation, monitor and reassess the national water management strategy, receive and determine application for permits for water use, regulate and protect water resources from adverse impacts, and manage and protect catchments. The aspect of protection has brought into focus the conflicting roles of public institutions in the management of public goods; catchment areas are within the jurisdiction of KWS and KFS yet the WRMA collects levies without ploughing back the revenue or supporting the key organizations primarily

involved in conservation. The WRMA is thin on the ground and the few officers at the district level are preoccupied with licensing/regulations and do minimal or no work on protection of catchment areas. There is need to harmonize these institutions to play complementary roles in their functions. The national water resources management strategy provides for the creation of water users associations and catchment area advisory committees.

The Water Services Regulatory Board issues licenses to water service-providers, determines standards for water provision, monitors compliance, develops guidelines for fixing tariffs, and develops and monitors the implementation of model performance agreements. Currently, there are decentralized water service boards, which are linked to the National Water Services Regulatory Board. The most significant aspect of the Act is the role of local water users' associations recognized under Section 15(5), which states that they will act as forums for conflict resolution and cooperative management of water resources. With regard to water services, Section 53(2) stipulates that water services shall be provided by a water service provider, which may be a company, nongovernmental organization or other person providing water services, in accordance with an agreement with a licensee.

Community self-help groups providing water services may therefore qualify as water service providers. Given the State-centric premise of the Water Act 2002, the role of the self-help community groups is rather marginal (Yatich et al. 2007). The Act has, however, vested all water resources to the State, centralizing control of water resources in the ministry. This has far-reaching management implications, particularly in providing water services to the rural poor who have only limited access to State-driven systems (Yatich et al. 2007). Matters are made worse by administrative, financial and technical constraints that inhibit government's ability to effectively implement the provisions of the Act.

The most authoritative policy statements are contained in the National Irrigation and Drainage Policy of 2009.

The aims of the policy are to sustainably accelerate development and improve the performance of irrigation, drainage and water storage to contribute to the national goals of wealth creation, food

security and poverty reduction. The policy objectives are as follows:

- Expand land under irrigation and drainage by 40,000 ha per year.
- Increase water harvesting and storage for irrigation.
- Improve the overall performance and service delivery of the sector.
- Mobilize resources and investments in irrigation and increase government financial allocation to irrigation to at least 2% of the annual national budget.
- Improve sector financing and investments by development partners, private sector and stakeholder contributions.
- Create an enabling environment for the participation of farmers, water user groups and all stakeholders in the planning, implementation and management of irrigation.
- Enhance business orientation and commercial farming in irrigated agriculture.
- Build human resource capacity for irrigated agriculture.
- Enhance the use of innovation, research, science and technology in irrigation.
- Promote and adopt a multi-sectoral approach to sustainable irrigation development.
- Promote, coordinate, manage and regulate the activities of stakeholders within the sector.

Although this policy does not provide any statements connecting the water sector to climate change, some of the policy objectives provide mechanisms for addressing the likely effects of climate change on water resources and the design of irrigation schemes.

2.4.10 Wildlife conservation and management policy

Kenya's wildlife policy is embodied in Sessional Paper No. 3 of 1975, A Statement on Future Wildlife Management Policy in Kenya. This policy was a radical departure from the previous approach to wildlife conservation, which emphasized protected areas. The key elements of this policy are as follows:

- It identified the primary goal of wildlife conservation as the optimization of returns from wildlife defined broadly to include aesthetic, cultural, scientific and economic gains, taking into account the income from other land uses.
- It pointed out the need to identify and implement compatible land uses and fair distribution of benefits derived from wildlife

including from both non-consumptive and consumptive uses of wildlife.

- It underscored the need for an integrated approach to wildlife conservation and management in order to minimize human-wildlife conflicts.
- The government assumed the responsibility of paying compensation for damage caused by wildlife.
- The Wildlife (Conservation and Management) Act of 1976 was enacted to provide a legal and institutional framework for the implementation of the policy.

This Act amalgamated the then Game Department and the Kenya National Parks to form a single agency, the Wildlife Conservation and Management Department (WCMD), to manage wildlife. Subsequently, in 1989 through an amendment of the Act, the Kenya Wildlife Service was established to replace the WCMD. An objective relevant to climate change in the current policy encourages an integrated ecosystem-based approach to conserving wildlife resources to be adopted wherever possible to ensure that, as much as possible, all ecosystems are managed in an integrated manner while providing a range of benefits to local people. However, the exclusive approach to park management means that local communities who may be dependent on forest resources for livelihood support in times of crisis are not supported by this Act; the policy expects the benefits of conservation to trickle down to local people. In Mount Elgon National Park, extractive activities are prohibited and when permitted they are only for the collection of herbal medicine under close supervision.

2.4.11 The economic recovery strategy (ERS) for wealth and employment creation and Kenya Vision 2030

The economic recovery policy (ERS) provided the framework for economic growth. Under this development framework, the government pursued strategies to reform governance, raise the production levels of its productive sectors, reduce poverty and create 500,000 jobs annually. The building and construction industry was given prominence, since it was projected to achieve a growth rate of about 18%. Overall, this was promising for the economy, but was pursued without considering the potential impacts of the industry on the natural resource base (Yatich et al. 2007). The ERS is embodied in Kenya's Vision 2030, which aims to achieve Second World economic status

by 2030. In this Vision, environmental concerns are embedded in the social pillar aimed at achieving a “just and cohesive society enjoying equitable social development in a clean and secure environment” (GoK 2008). Even though climate change is not addressed directly in this policy, the plan embraces the principles of sustainable development and has a component on disaster preparedness, risks and management. The Vision recognizes the important role of forest resources and ecosystems in supporting and stimulating national development and that most water towers have undergone degradation and therefore deliberate programs should be put in place to support rehabilitation. The government has entrenched this policy through the budgeting processes and operationalized through key flagship projects. One of the key projects is restoration of key water towers. One of the likely challenges of implementation of restoration activities is the likely perception by the local communities of exclusion because most of the programs are driven by government departments/agencies. The local level organizations e.g. CFAs are at the moment too weak to actively participate. If restoration is not participatory, there is likelihood that community interests will not be included in the programs and may result in increasing marginalization and the affected becoming more vulnerable to climate change.

2.4.12 Draft national disaster management policy 2010

The thrust of the policy is to institutionalize disaster management and mainstream disaster risk reduction in the country’s development initiatives. The policy aims at disaster management that focuses on minimizing risks: loss of life, economic loss and property. Climate change is one of the issues highlighted in the policy (4.1.6). More than 70% of natural disasters in Kenya are related to climate events (flooding, famines, landslides, etc.). The policy calls for preparedness to reduce the causes and negative impacts of climate change. It proposes that government synchronize all the policies and laws and promote environmental safeguards and encourage sustainable management of natural resources. The policy proposes that disaster risk reduction activities are mainstreamed in national and county plans and policies with appropriate budgetary allocation. The policy does not, however, give specific strategies on how to mitigate climate in fragile ecosystems except to urge for collaboration among relevant agencies.

2.4.13 Constitution of Kenya 2010

In 2010, Kenya promulgated a new Constitution, which provides for a participatory system of government. The Constitution establishes a two-tier parliamentary system, comprising a national assembly and a senate, responsible for national and regional representation, respectively. Article 42 of the Constitution deals with issues related to the environment, and claims the right to a clean and healthy environment for all citizens. This includes the right to have an environment protected for the benefit of the present and future generations through legislative and other measures.

In addition, Articles 69 and 70 of the Constitution deal with environmental issues such as climate change mitigation. For example, Article 69 emphasizes the sustainable use, management and conservation of the environment and natural resources in order to ensure equitable sharing of the accruing benefits. It also encourages the people of Kenya to achieve and maintain a tree cover of at least 10% of the land area. The article further encourages the public to participate in the management, protection and conservation of the environment.

Article 70, on the other hand, enforces the right to a clean environment and recognizes actions that may be taken by responsible people in order to ensure a clean and healthy environment. It states that the government may compensate citizens who are deprived of their right to a clean and healthy environment.

2.5 Summary overview and policy gaps in relation to climate change

This analysis has shown that existing policies and legislation are relatively weak and inadequate to deal with climate change issues. Very few sections address climate change and mitigation, and they are not exclusively devoted to climate change mitigation. There is a need for an exclusive and comprehensive climate change policy and legislative framework that creates, or sets out the mandate for, a leading institution to spearhead the nation’s efforts in climate change adaptation and mitigation. In addition, the policy should have a clear and comprehensive implementation framework, to ensure that funds are channeled into projects that address the most vulnerable social groups and regions.

Furthermore, the policies are scattered – even disjointed and contradictory – thereby contributing further to their inadequacy in addressing climate change and mitigation issues. For example, while the policy for forests emphasizes the need to increase tree cover, the livestock (agriculture) policy encourages livestock-keepers to clear trees on rangelands to encourage grass growth. Various actors working in sectors related to the environment have noted the need to harmonize these policies.

2.6 Attempts to harmonize environment policies relevant to climate change

As exemplified in the draft national environment policy and the Environmental Coordination and Management Act of 1999, Kenya has over the years been working to bring together environment policies relevant to climate change. The Act lists all the sectors (actors) in the environment and proposes a centralized body, the National Environment Management Authority (NEMA). The NEMA is a coordination and enforcement body whose impact on environmental and climate change issues is yet to be fully realized, mainly because of its low staffing and funding levels.

Another government attempt to harmonize national policies was Kenya Vision 2030, which is a major national economic development blueprint for strategies running up to 2030. The national economic development vision is based on three pillars: social, economic and political, which are

operationalized through flagship projects funded in a medium-term development framework.

Even though Vision 2030 contains these strong statements about the country's main economic sectors, it only acknowledges the expected impacts that climate change will have on each sector, and hence how climate change will affect the achievement of the vision. No particular policy on climate change has been written specifically towards the achievement of the vision.

Recently, a cleaner production center (CPC) was set up as the clearinghouse for the use of energy-efficient methods and procedures in industrial production processes. Under the CPC arrangement, the use of renewable energy in industrial production is encouraged and even rewarded. However, our observations suggest that the CPC is not fully operational and requires major investment if it is to be effective and fulfill its mandate. In this area too, harmonization of policies remains a challenge that must be addressed if climate change is to be managed effectively.

2.7 Analysis of national policies affecting climate change activities in the project area

To assess the status of the various national policies and how they are being implemented, we have summarized them in Table 3. The aim of this analysis is to identify areas that may require an intervention for the policy to be relevant and applicable to the livelihoods of the communities affected by the policies.

Table 3. Policies and their potential impacts in Mount Elgon Forest ecosystems and environs.

Policy	Activities implemented on Mount Elgon	Key supporting policy activities	Key ecosystem service impacts
Draft forest policy	<ul style="list-style-type: none"> • Forest woodlot development • Encouragement of energy-saving cooking stoves • Tree-growers' support fund • Community participation in management is still in its infancy • Plantation establishment and livelihood improvement scheme (PELIS) • Access rights to forest resources- collection of fuelwood, grazing based on permit system 	<ul style="list-style-type: none"> • Energy policy • Environment policy • Agriculture policy – 10% cover on-farm • Water policy 	<p>Tree planting by farmers and communities</p> <ul style="list-style-type: none"> • Increased flows of ecosystems services • Reduced vulnerabilities to shocks and vagaries of weather • Increased supply of wood for fuel, decreased erosion, decreased forest encroachment, livelihood-income diversification, decreased conflict between communities and government (if on KFS land)
National environment policy	<ul style="list-style-type: none"> • Environmental impact assessment of major activities • Enforcement of environmental law 	<ul style="list-style-type: none"> • All other policies are supportive of the activities 	All policies relate to and respect the intents of the EMCA law
Energy policy (2004)	<ul style="list-style-type: none"> • Support the introduction of energy-efficient stoves • Tree planting for fuelwood provision • Introduction and installation of solar panels – few and isolated households 	All other policies are supportive of the activities	Decreased use of fuelwood and charcoal from forest hence improve forest recovery and flows of ecosystems services
Rangelands management policy	<ul style="list-style-type: none"> • Clearing of trees • Seeding of pasture areas • Use of inorganic herbicides to control tree growth 	<ul style="list-style-type: none"> • Agriculture policy 	Most rangeland management activities exacerbate the negative effects of climate change
Gender and youth policy	<ul style="list-style-type: none"> • Involvement of women and girls in environmental activities such as tree-planting and adoption of energy-saving cooking stoves 	<ul style="list-style-type: none"> • Education policy • Forest policy • Green schools project 	<p>Women and youth have become champions of environmental protection and better natural resource management</p> <p>Tree nurseries are established in schools</p>
Agriculture policy	<ul style="list-style-type: none"> • Introduction of water and nutrient-efficient crop species • Integration of tree crops into agricultural production • Agroforestry tree species taken up by farmers • Food security • Commercialization of agriculture • Fertilizer subsidy scheme 	<ul style="list-style-type: none"> • Forest policy 	<p>New agricultural activities (intensive, organic) support climate change mitigation while old practices (extensive, inorganic, chemicals-based) exacerbate negative impacts because areas are cleared and forests are encroached upon</p> <p>Increase in the number of trees and areas covered by trees on farms</p> <ul style="list-style-type: none"> • Fuelwood available and therefore less dependence on public forests which may result in better provision of ecosystem services

continued on next page

Table 3. Continued

Policy	Activities implemented on Mount Elgon	Key supporting policy activities	Key ecosystem service impacts
Water policy	<ul style="list-style-type: none"> • Soil and water erosion control - practised by a few farmers • Rainwater harvesting – limited adoption due to prohibitive costs • Riverbank protection • Activities by members of water river users association 	<p>Negative impacts:</p> <ul style="list-style-type: none"> • Agriculture policy • Rangelands management policy <p>Positive impacts:</p> <ul style="list-style-type: none"> • Environment policy • Forest policy • Gender policy 	Water policy emphasizes the sustainable management of water catchment areas for improved quality and quantity to support livelihoods of the local population
Wildlife conservation and management policy	<ul style="list-style-type: none"> • Creation of community conservation areas • Fencing off national parks • Limiting access rights for NTFPs by local people – this may increase risks and vulnerabilities to climate change of the local forest-dependent communities • Provision of piped water to communities living next to national parks 	<ul style="list-style-type: none"> • Forest policy • Water policy • Energy policy 	<p>Restriction on access to natural resources increases climate change vulnerability of local people</p> <p>Protection is expected to improve ecosystems services, which is positive to local livelihoods</p> <p>Wildlife conservation activities generally support climate change mitigation</p>
Constitution of Kenya 2010	<ul style="list-style-type: none"> • Creation of new institutions • Community participation in natural resource management • Devolution of governance 	All policies must be adjusted to match the Constitution.	The Constitution is conscious of the environment and most of the activities resulting from it consider the effects of climate change
ASDS & SRA	<ul style="list-style-type: none"> • Promotion of on-farm water harvesting and management (roofs, pans, dams and boreholes) • Introduction of water-saving technologies – canal irrigation, drip irrigation • Increasing forest cover through afforestation and agroforestry through provision of quality tree seed • Diversification of agricultural production e.g. beekeeping, tree-growing, forage production and planting of medicinal plants 	<ul style="list-style-type: none"> • Forest policy • Energy policy • ERS and Vision 2030 	
Water master plan	<ul style="list-style-type: none"> • Protection of water towers • Restoration of degraded catchment areas 	<ul style="list-style-type: none"> • Forest policy • Water policy 	<ul style="list-style-type: none"> • Protection is expected to improve the provision of ecosystems services

3 Conclusion

This review covered the policies and legislation in Kenya that are relevant to climate change adaptation and mitigation. It indicates that there are multiple pieces of legislation, regulations and draft policies that directly or indirectly address issues of climate change. At the moment, there is no clear national policy on climate change except the national climate change strategy and national climate change action plan (2013–2017). However, the new climate change policy is in the process of being developed.

The various policies and institutional frameworks have led to weak coordination in basic approaches to addressing the challenges that the nation faces with regard to climate change and this has been exacerbated by institutional rivalries due to overlapping mandates among the ministries. The policy incoherence identified at the national level is that while Kenya is remarkably committed to tackling challenges posed by climate change,

coordination and management of strategic activities are fragmented between different actors. This poses a threat of interfering with institutional frameworks and possibilities of weak enforcement of policies and legislation at all levels of governance, national and county level. If coordination is not synchronized at all levels, there will be conflicts and paralysis at local levels and this is more so with devolution. There is an urgent need to consolidate all policies, legislation and regulations to reflect the recently developed national strategy on climate change adaptation and mitigation and the national climate change action plan. The current project, Adaptation of people to climate change in East Africa: Ecosystem services, risk reduction and human well-being, will make a major contribution to addressing these issues by engaging with national and subnational policy stakeholders in highlighting the likely impacts of different climate change adaptation scenarios in the context of Mount Elgon.

4 References

- [ACTS] and [ACC] African Centre for Technology Studies and African Conservation Centre. 2011. *Towards a national biodiversity conservation framework: Key findings and policy recommendations*. Proceedings of the International Conference on Biodiversity, Land-use and Climate Change, September 2010, Nairobi, Kenya.
- Adger WN, Dessai S, Goulden M, Hulme M, Lorenzoni I, Nelson DR, Naess LO, Wolf J and Wreford A. 2009. Are there social limits to adaptation to climate change? *Climatic Change* 93(3–4):335–54.
- Agarwal A and Perrin N. 2008. *Climate adaptation, local institutions, and rural livelihoods*. IFRI Working Paper W08I-6. <http://environmentportal.in/files/W08I6%20Arun%20Agrawal%20and%20Nicolas%20Perrin.pdf>
- Akotsi EFN, Gachanja M and Ndirangu JK. 2006. *Changes in forest cover in Kenya's five water towers 2003–2005*. Report by DRSRS and KFWG, Nairobi, Kenya. http://www.unep.org/dewa/Portals/67/pdf/forest_catchment_2005_report.pdf
- Birdlife International. 2012. *Eastern Afromontane biodiversity hotspots: Ecosystem profile*. Final Report.
- Boko M, Niang I, Nyong A, Vogel C, Githeko A, Medany M, Osman-Elasha B, Tabo R and Yanda P. 2007. *Africa Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. In: Parry ML, Canziani OF, Palutik JP, van der Linden PJ and Hanson CE (eds). Cambridge, UK: Cambridge University Press. pp. 433 – 467.
- Burgess JC. 1992. *Economic Analysis of the Causes of Tropical Deforestation*. Discussion Paper No. 92-03. London: London Environmental Economics Centre.
- Cadwell J. 1984. *Desertification: Demographic Evidence, 1973-83*. Occasional Paper No. 37. Canberra: Australian National University.
- Cheboiwo JK and Langat DK. 2006. *Smallholder tree grower's income opportunities from farm forestry in western Kenya*. 3rd KEFRI Scientific Conference 6-9 November 2006.
- Dessler A and Parson EA. 2009. *The Science and Politics of Global Climate: A Guide to Debate*. Cambridge, UK: Cambridge University Press.
- Dolisca F, McDaniel JM, Teeter LD and Jolly CM. 2007. Land tenure, population pressure, and deforestation in Haiti: The case of *Foret des Pins* Reserve. *Journal of Forest Economics* 13(2):277–89.
- [DRSRS]. Department of Resource Surveys and Remote Sensing. 2008. Government of Kenya, Nairobi, Kenya.
- Luedeling E, Kindt R, Bos S, Sang J and Musau J. 2014. *Climate change impacts on ecosystems of Mount Elgon*. AdaptEA Project Technical Report. World Agroforestry Centre, Nairobi, Kenya.
- [FAO] Food and Agriculture Organization of the United Nations. 2010. *Global Forest Resources Assessment 2010. Country Report for Kenya*. Forest Dept, Food and Agriculture Organization of the United Nations. FRA2010/107. Rome, Italy.
- [FSK] Forestry Society of Kenya. 2006. *Kenya forestry in the new millennium and the challenges facing a forester under the Forestry Act No 7 of 2005*. Proceedings of the First Scientific Conference, 10–11 August 2005. Nairobi: Kenya Forestry Society.
- Gibson CC, Mckean MA and Ostrom E. 2000. Explaining deforestation: The role of local institutions. In *People and Forests: Communities, Institutions, and Governance*, Gibson CC, Mckean MA and Ostrom E, eds. 1–26. Cambridge, MA: Massachusetts Institute of Technology.
- Gichora M, Masal F, Klema J and Baart C. 2011. *Forests and woodlands*. In NEMA 2011. *Kenya State of the Environment and Outlook 2010. Supporting the Delivery of Vision 2030*. 84–107.
- [GoK] Government of Kenya. 2013. *Long-term national low-carbon climate resilient development pathway: Climate risk assessment of Kenya's flagship projects. Rehabilitation and protection of indigenous forests in five water towers*. National Climate Change Action Plan.
- GoK/ECN/ISSD/Climatecare. http://www.kccap.info/index.php?option=com_phocadownload&view=category&id=34
- [GoK] Government of Kenya. 2010a. *Revised REDD readiness preparation proposal Kenya*. Submitted to the Forest Carbon Partnership Facility. Kenya Forest Service, Government of Kenya (GoK), Nairobi, Kenya.
- [GoK] Government of Kenya. 2010b. *The Constitution of the Republic of Kenya, 2010*. Government of Kenya (GoK), Nairobi, Kenya.
- [GoK] Government of Kenya. 2010c. *Draft national urban and peri-urban agriculture and*

- livestock Policy*. Government of Kenya (GoK), Nairobi, Kenya.
- [GoK] Government of Kenya. 2008. *Kenya Vision 2030. Towards a globally competitive and prosperous nation*. Nairobi: Government of Kenya, Nairobi, Kenya.
- [GoK] Government of Kenya. 2007. *Sessional paper on forest policy*. Nairobi, Kenya: Government Printer.
- [GoK] Government of Kenya. 2005. *Energy Act 2006*. Nairobi, Kenya: Government Printer.
- [GoK] Government of Kenya. 2005. *Forest Act 2005*. Nairobi, Kenya: Government Printer.
- [GoK] Government of Kenya. 2002. *Water Act 2002*. Nairobi, Kenya: Government Printer.
- [GoK] Government of Kenya. 1999. *EMCA 1999*. Nairobi, Kenya: Government Printer.
- [GoK] Government of Kenya. 1994. *National Environmental Action Plan - NEAP 1994*. Nairobi, Kenya: Government Printer.
- [GoK] Government of Kenya. 1968. *The sessional Paper No.1 on Forest Policy*. Nairobi, Kenya: Government Printer.
- Harding B and Devisscher T. 2009. *Review of the economic impacts of climate change in Kenya, Rwanda and Burundi: Ecosystems Chapter, Regional*. <http://www.rema.gov.rw/ccr/Regional%20ecosystem.pdf>
- [ICS] Interim Coordinating Secretariat. 2011. *Rehabilitation of the water towers towards sustainable development. The case of Mau complex*. Nairobi, Kenya.
- [IPCC] Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014: Impacts, Adaptation, and vulnerability*. Par A: A global and Sectoral aspects. Contribution of working group II to the fifth Assessment Report to the intergovernmental Panel on Climate Change. http://www.ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Frontmatters_Final.pdf
- [IPCC] Intergovernmental Panel on Climate Change. 2007. *Climate Change 2007: A synthesis Report*. http://www.ipcc/pdf/assessment-report/ar4_syr.pdf
- Indigenous Information Network. 2008. *Protected areas in Kenya: The case of Mount Elgon in North-West Kenya: A review of Kenya's implementation of the CBD programme of work on protected areas*. FPP Series on Forest Peoples and Protected Areas. Indigenous Information Network. <http://www.forestpeoples.org/sites/fpp/files/publication/2010/08/kenyareviewcbdparajul08eng.pdf>
- IUCN. 2000. *Forest cover and forest reserves in Kenya: policy and practice*. Nairobi, Kenya: IUCN Eastern Africa Regional Office, Forest and social perspectives in conservation. Working Paper No. 5. 58 p.
- Jaramillo J, Muchugu E, Vega FE, Davis A, Borgemeister C and Olaye AC. 2011. Some like it hot: The influence and implications of climate change on coffee berry borer (*Hypothenemus hampei*) and coffee production in East Africa. *PLoS ONE* 6 (9):1–14. DOI: 10.1371/journal.pone.0024528
- Johansson T. 2011. *Climate change impacts on ecosystem services in the Eastern Afromontane Biodiversity Hotspot*. International Conference on East African Mountains (ICEAM) 2011, Mbale Resort Hotel, Mbale, Uganda, 15 November 2011.
- Kansiime MK, Wambugu S and Shisanya C. 2013. Perceived and actual rainfall trends and variability in Eastern Uganda: Implications for community preparedness and response. *Journal of Natural Sciences Research* 3 (8):179–94. http://www.ku.ac.ke/schools/agriculture/images/stories/docs/research/Perceived_and_Actual_Rainfall_Trends_and_Variability.pdf
- [KFMP] Kenya Forestry Master Plan. 1994. *Development programmes*. Ministry of Environment and Natural Resources 1994. Nairobi, Kenya.
- [KFS] Kenya Forest Service. 2010. Annual Report. 2009/10. Unpublished report.
- [KWS] Kenya Wildlife Service. 2014. Overview of National Parks and Reserves. <http://www.kws.org/parks/index.html>
- Logie JP and Dyson WG. 1962. *Forestry in Kenya: A historical account of the development of forest management in the colony*. Nairobi, Kenya: Government Printer.
- Mahaptra K and Kant S. 2005. Tropical deforestation: A multinomial logistic model and some country-specific policy prescriptions. *Forestry Policy and Economics* 7:1–24.
- Maina I, Newsham A and Okoti M. 2013. *Agriculture and climate change: Climate chaos, policy dilemmas*. FAC Working Paper No. 070.
- Mathu W. 2007. *Forest law enforcement and governance in Kenya*. A paper prepared for the East African community-led regional process in the framework of the Ministerial Declaration, Yaoundé, Cameroon, 16 October 2007 on the Africa forest law enforcement and governance (AFLEG).
- [MERECP] Mount Elgon Regional Ecosystem Conservation Programme. n.d. *Final Report*:

- Activities undertaken between June 2006 and March 2007.* Mount Elgon Regional Ecosystem Conservation Programme. IUCN and World Agroforestry Centre.
- Millennium Ecosystem Assessment. 2003. *People and Ecosystems: A Framework for Assessment and Action.* Washington, DC: Island Press.
- [MoA] Ministry of Agriculture. 2010. *Agricultural Sector Development Strategy 2010–2020.* Government of Kenya (GoK), Nairobi, Kenya.
- [MoE] Ministry of Energy. 2004. Sessional Paper No.4 on Energy, Nairobi, Kenya.
- [MoE] Ministry of Energy. 2002. *Study on Kenya's energy supply and policy strategy for households, small-scale industries and services establishments.* Final Draft Report.
- [MoEMR] Ministry of Environment and Mineral Resources. 2013. *National Climate Change Action Plan (NCCAP) 2013–2017.* Nairobi, Kenya.
- [MoEMR] Ministry of Environment and Mineral Resources. 2012. *Masterplan for the conservation and sustainable management of water catchment areas in Kenya.* Nairobi, Kenya.
- [MoEMR] Ministry of Environment and Mineral Resources. 2010. *National Environment Action Plan (NEAP) 2009–2013.* Government of Kenya [GoK], Nairobi, Kenya.
- [MoEMR] Ministry of Environment and Mineral Resources. 2010. *National Climate Change Response Strategy.* Government of Kenya [GoK], Nairobi, Kenya.
- [MoF&W] Ministry of Forestry and Wildlife. 2013. *An analysis of drivers and underlying causes of forestry cover change in the various forest types of Kenya.* Ruri Consultants, Nairobi, Kenya. <http://www.kenyaforestservice.org/documents/redd/Analysis%20of%20Drivers%20of%20Deforestation%20&forest%20Degradation%20in%20Kenya.pdf>
- Mogaka H. 2005. *Wealth creation based on forest resources: Missed opportunities and emerging prospects.* In Muchiri MN, Kamondo B, Tuwei P and Wanjiku J, eds. 2005. *Recent advances in forestry research and technology development for sustainable forest management: Proceedings of the 2nd KEFRI scientific conference, Muguga, Kenya, 1–4 November 2004.*
- Mwangi E. 1998. Colonialism, self-governance and forestry in Kenya: Policy, practice and outcomes. Research in Public Affairs Working Paper V 590. Kenya, 1–28.
- [NEMA] National Environment Management Authority. 2007. Kenya's Climate Change Technology Needs and Assessment Report under the United Nations Framework Convention on Climate Change. NEMA.
- Nield R, Mugo E and Mwathe K. 2000. *Review of the management of Mt. Elgon Ecosystem.* A report for the Mt. Elgon Integrated Conservation and Development Project. IUCN.
- Otuoma J, Muturi JM, Langat D, Mwanje P, Maina J and Maina G. 2011. *Effect of watershed degradation in South West Mau on hydrological functions in the Sondu River Basin.* Technical Report, KEFRI.
- Pahari K, Murai S and Yasuoka Y. 2000. *Sustainability analysis for human population in relation with global deforestation using remote sensing and GIS in international archives of photogrammetry and remote sensing.* Proceedings of 19th Congress of International Society for Photogrammetry and Remote Sensing, Amsterdam XXXIII(B3):800–4.
- Pahari K and Murai S. 1999. Modeling for prediction of global deforestation in ISPRS. *Journal of Photogrammetry and Remote Sensing* 54(5–6):317–24.
- Pandey N. 2002. Gender economics of the Kyoto Protocol. *Conservation Ecology* 6(1):r14 <http://www.consecol.org/vol6/iss1/resp14/>
- Perrings C. 2006. Ecological economics after the millennium assessment. *International Journal of Ecological Economics* 6:8–22.
- Repetto R and Gillis, M. eds. 1998. *Public Policies and the Misuse of Forest Resources.* Cambridge UK: Cambridge University Press.
- Rudel T. 1994. Population, development and tropical deforestation: A cross national study. In *The Causes of Tropical Deforestation, Brown K and Pearce D, eds.* 96–105. Vancouver, Canada: UBC Press.
- Russell AJM, Locatelli B, Pramova E, Alumai GJ and Behr DC. 2013. *Using forests to enhance resilience to climate change: What do we know about how forests can contribute to adaptation?* Working Paper. Washington DC: Program on Forests (PROFOR).
- [SEI] Stockholm Environmental Institute. 2009. *Economics of climate change in Kenya.* Final report submitted in advance of COP 15 meeting.
- Turner RK, Pearce D and Bateman I. 1994. *Environmental Economics: An Elementary Introduction.* London, UK: Harvester Wheatsheaf.
- [UNECA] United Nations Commission for Africa. 2013. *An assessment of agricultural sector policies and climate change in Kenya: Nexus between climate change related policies, research and practice.*

- [UNEP] United Nations Environment Programme. 2012. *The role and contribution of montane forests and related ecosystems services to the Kenyan Economy*. UNEP, Nairobi.
- [UNEP], [KWS] and [KFWG] United Nations Environment Programme, Kenya Wildlife Service and Kenya Forest Working Group. 2005. *Mau complex under siege: Continuous destruction of Kenya's largest forest*. Nairobi, Kenya.
- [UNFCCC] United Nations Framework Convention on Climate Change. 2002. *Report of the Conference of the Parties on its Seventh Session Held at Marrakesh from 29 October to 10 November 2001*. FCCC/CP/2001/13/Add.1: 1-68. Marrakesh, Morocco.
- Varughese G. 2000. Population and forest dynamics in the hills of Nepal: Institutional remedies by rural communities. In *People and Forests*, Gibson C, Mckean MA and Ostrom E, eds. 193–226. Massachusetts Institute of Technology, MA.
- World Bank 2000. *Third forestry project, Kenya*. Unpublished Mission Report. World Bank. Washington, DC.
- [WRI] World Resources Institute. [UNDP, UNEP, WB and WRI] 2011. *World Resources Report 2010–2011. Decision making in a changing climate*. Washington, DC: World Resources Institute. <http://www.wri.org/node/39606>
- Yatich T, Awiti A, Nyukuri E, Mutua J, Kyalo A, Tanui J and Catacutan D. 2007. *Policy and institutional context for NRM in Kenya: Challenges and opportunities for landcare*. ICRAF Working Paper No. 43. Nairobi: World Agroforestry Centre.

CIFOR Working Papers contain preliminary or advance research results on tropical forest issues that need to be published in a timely manner to inform and promote discussion. This content has been internally reviewed but has not undergone external peer review.

Climate change will impact many sectors of the economy: rural agriculture, biodiversity, hydrology, etc. Farmers are particularly affected since agriculture, livestock, fisheries, horticulture and agroforestry depend on specific soil, rainfall and temperature conditions. Mt. Elgon's ecosystem is well known for its agricultural production hence our choice to study how the implementation of environmental policies affect the livelihoods of local communities.

Kenya's policy context for management of environmental resources and rural livelihoods is muddled, with overlapping and at times inconsistent mandates. Kenya has developed a climate change response strategy paper and a series of "Flagships", which is in the process of being implemented through existing sector-specific policy structures. As many national climate change adaptation and mitigation priorities have only recently been identified, the effectiveness of local level implementation remains to be seen.

This review provides evidence of the impacts of forestry, agricultural and related policy implementation at the local level, with particular insights from the experiences of stakeholders around Mt. Elgon. The hope is that this will assist national policy makers and decentralized governments to learn from the preceding decades of implementation experience in order to improve climate adaptation and mitigation approaches. Climate change will result in additional challenges for governments struggling to address pre-existing sources of vulnerability in rural agricultural livelihoods and challenges to natural resource sustainability around Mt. Elgon. Given the unique forest and land-use drivers that impact on afro-montane ecosystems, policy lessons may be useful for applications to other areas in East Africa.



RESEARCH PROGRAM ON
Forests, Trees and
Agroforestry

This research was carried out by CIFOR as part of the CGIAR Research Program on Forests, Trees and Agroforestry (CRP-FTA). This collaborative program aims to enhance the management and use of forests, agroforestry and tree genetic resources across the landscape from forests to farms. CIFOR leads CRP-FTA in partnership with Bioversity International, CATIE, CIRAD, the International Center for Tropical Agriculture and the World Agroforestry Centre.

cifor.org

blog.cifor.org



Fund

THE
ROCKEFELLER
FOUNDATION



Australian Government
Department of Foreign Affairs and Trade



unitar
United Nations Institute for Training and Research



Center for International Forestry Research (CIFOR)

CIFOR advances human well-being, environmental conservation and equity by conducting research to help shape policies and practices that affect forests in developing countries. CIFOR is a member of the CGIAR Consortium. Our headquarters are in Bogor, Indonesia, with offices in Asia, Africa and Latin America.

