

Review article

Status of forests in Uganda

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Abstract

Trees, forests and woodlands cover about 14% of Uganda's land surface. Over the last 30–40 years, growth in human population and corresponding increase in demand for forest products for domestic and industrial use, expansion of agricultural land, illegal settlements and weak forest management capacity have adversely affected the status of natural forests in Uganda, particularly the biodiversity. Until recently, little attention had been paid to development of commercial forests which should have provided alternative forest products and services to relieve the pressure on natural forests and conserve biodiversity. As a result, Uganda's forests have been degraded, and in some cases, the biodiversity has been eroded. There is a need for regular data collection and monitoring of the status of the forests in terms of areal extent, distribution, plantation species introductions and biodiversity.

Key words: conservation, forest, management, reserves, status, Uganda

Résumé

Arbres, bois et forêts couvrent environ 14% de la superficie terrestre de l'Ouganda. Au cours des 30 à 40 dernières années, la croissance de la population humaine et la demande correspondante de produits forestiers à usages domestique et industriel, l'expansion des terres agricoles, les installations illégales et de médiocres capacités de gestion forestière ont eu des effets néfastes sur l'état des forêts ougandaises, et spécialement sur leur biodiversité. Jusqu'il y a peu, l'on avait accordé que peu d'attention au développ-

ement de forêts commerciales qui auraient dû fournir des produits et des services forestiers alternatifs, afin de soulager la pression exercée sur les forêts naturelles et de préserver la biodiversité. Par conséquent, les forêts ougandaises sont dégradées et, dans certains cas, la biodiversité est touchée. Il faut collecter des données régulières et suivre le statut des forêts en termes d'étendue, de distribution, d'introduction d'espèces plantées et de biodiversité.

Introduction

The term *forest* refers to a type of vegetation dominated by trees most of which at maturity are more than 5 m tall and establishes a minimum tree canopy cover of 30% (National Forestry Authority, 2008). It includes all alpine, tropical high- and medium-altitude forests, woodlands, wetland and riparian forests, plantations and trees, whether on public or private land (Ministry of Water, Lands and Environment, 2001). For an area to be considered a forest, it should have a tree cover of at least 20% or more and the area should not be <0.5 ha in size (National Environment Management Authority, 2004/2005). On the other hand, a woodland is an area predominantly covered with woody plants, trees over 4 m high, shrubs and grasses. When discussing the status of forests in Uganda, woodlands are also included because many forests have extensive woody species coverage. On the other hand, tree cover in grasslands and woodlands may increase because of dynamics in the faunal populations leading to formation of a forest.

Forests that are found on public land are referred to as *forest reserves*. A forest reserve is an area of land that is reserved by law for forestry purposes, including protection

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of ecologically important areas and production of forest goods and services. Forest reserves also include bushlands and grasslands within the reserved land.

Of the total of 4.9 million hectares of forests and woodlands in Uganda, 64% (1, 265, 471 ha) are found outside the Permanent Forest Estate (PFE), (land set aside for forestry activities in perpetuity, managed by private landowners and regulated by local governments). The PFE is 1.9 million ha, of which 61.4% is managed by the National Forestry Authority (NFA), 33.6% is managed by Uganda Wildlife Authority (UWA); 4.7% of the PFE is jointly managed by NFA and UWA and 0.3% by local governments. The central forest reserves (CFRs) were reserved to provide forest products, amenity and recreation, conserve biodiversity, ameliorate climate, stabilize soils, and protect water catchments and steep slopes, riverbanks and lakeshores.

Uganda's forest reserves were gazetted with the aim of ensuring continuous supply of forest goods and services to the people of Uganda. Since the establishment of the Forestry and Scientific Department in 1890, forestland was reserved for research, protection of ecological systems and future supply of forest products. As early as the 1930s, the inadequate supplies of forest products and deteriorating ecological functions were foreseen, and mitigation measures put in place although these measures have not prevented the degradation and loss of forests.

The functions of CFRs remain largely the same as stipulated in the Forestry Policy of 2001 and the National Tree Planting and Forest Act of 2003. However, there have been weaknesses in forest governance associated with implementation of policies and laws. CFRs become the targets for forest crime during periods of political campaigns elections, often with the tacit support of the politicians seeking votes. At the same time, institutional issues of corruption and inadequate capacity to manage forests are still persistent.

The principle of 'Man and the Biosphere' has been applied in the management of Uganda's natural forests in which the forests have been zoned into nature reserves (20% of the forest is protected), protection/buffer zone where low-impact uses are permitted (30%) and the production zone for controlled production of timber and other forest products (50%). Sixty-five CFRs with a total area of 840,100 ha are part of a network of sites of special scientific interest that are critical for biodiversity conservation in Uganda.

Country setting

Uganda is a landlocked country lying astride the equator between latitudes 1°30'South and 4°North and longitudes 29°30' and 35°East (National Environment Management Authority, 2004/2005). It covers an area of about 241,500 km² of the central African plateau north of Lake Victoria. The central part of the country is characterized by a gentle topography of flat-topped hills and broad swampy valleys lying at an altitude of 1000–1500 m above sea level (Howard, 1991). Uganda has a diverse climate influenced by the country's latitudinal position, altitude and topography. Seasonal movements of the Inter-Tropical Convergence Zone determine the general pattern of rainfall. Much of the country receives between 1000 and 1500 mm per annum except in Karamoja in the north-east that receives 750 mm per annum. The mountainous areas of Rwenzori and Elgon and the islands in Lake Victoria receive about 2000 mm per annum. The mean temperatures vary from 18 to 20°C in the highlands of the south-west and eastern borders to 25–30°C in the rift valley and plains of northern Uganda. Climatic conditions favourable to forest formation are found in parts of the southern half of the country where rainfall exceeds 1150 mm per annum and evenly distributed throughout the year. The tropical high forests are found in three distinct geographical zones: the zone lying along the eastern rim of the rift valley escarpment in the west of the country, in a broad belt around the north-western shores of Lake Victoria, and on the scattered mountains (Moroto, Kadam and Elgon) in the east of the country.

The importance of Uganda's forests

Forests are of immense importance to Ugandans. The NFA report of 2008 indicates that in 2004, the total economic value of Uganda's forests, including all marketable and nonmarketable values, was estimated at Uganda shillings (Ushs) 593.24 billion (USD 304 million at the exchange rate of USD 1 = Ushs. 1920), equivalent to about 5.2% of the Gross Domestic Product (GDP). Forests and trees contribute Uganda shillings 332.3 billion (US\$173 million) to the total annual incomes of the households in Uganda. The Forest Sector Review Report (Ministry of Water, Lands and Environment, 2001) indicates that wood and nonwood products removed from the forest for subsistence use are about Ushs. 210 billion (USD 109 million) or 2.75% of the GDP. Thus, the overall contribution of forests is about 6%

of the GDP. Forests and woodlands also provide a number of environmental services and direct benefits to agriculture, water and fisheries sectors. These include the value of watershed and ground water protection, erosion control and carbon sequestration. These benefits are estimated at about Ushs. 112 billion or 1.45% of the GDP.

Uganda's forest types

Uganda's natural forests vary in structure and composition in different parts of the country. The differences are because of the altitudes at which the forests occur, soil types, drainage and past human activities. Many areas presently designated as forest reserves have a long history of human occupancy. Old cultivation plots and fire-maintained grazing lands have been colonized by trees and represent young colonising forest types. In the Lake Victoria region, Kibale and Kasyoha-Kitomi along the western rift valley, many forests have grown up and expanded in the areas that were abandoned in the last century because of rinderpest, sleeping sickness or tribal wars (Dale, 1954; Langdale-Brown, Osmaston & Wilson, 1964; Hamilton, 1984).

Langdale-Brown, Osmaston & Wilson (1964) classified Uganda's forest types into medium altitude-moist-evergreen forest, medium altitude-moist-semi-deciduous forest and high-altitude forest. The medium altitude moist-evergreen forest is structurally complex and rich in species including many lianas, epiphytes and large trees (Howard, 1991). The three sub-types are named after the dominant trees, namely *Peptadeniastrum-Uapaca* type which occurs on Sese Islands in Lake Victoria, *Peptadeniastrum-Albizia-Celtis* which are found on the slightly drier lake shores and

the *Parinari excelsa* type that are found along the western rift valley between 1000 and 1500 m above sea level.

The medium altitude-moist-semi-deciduous forests are found in areas where the dry season is longer and more severe. The four sub-types are *Celtis-Chrysophyllum* forest found in the drier areas to the north of Lake Victoria, *Cynometra-Celtis* forest of lower altitude zones along the western rift, *Albizia-Milicia excelsa* forest to the north of Lake Victoria and the *Albizia-Markhamia* forest which occurs in the mid-west at altitudes of 1200–1500 m. The high-altitude forest occurs above 1500 m and tends to be less species rich than those found at lower altitudes. The forest has broken and irregular canopy characterized by trees of low stature. *Prunus* moist sub-type is found in south-western Uganda and in the Mt. Elgon area. The sub-type merges into *Arundinaria* montane bamboo forest zone at 2300–2750 m and or *Hagenia-Rapanea* forest zone of low trees above 2750 m. On the drier northern slopes of Mt. Elgon and the Karamoja Mountains *Juniperus-Podocarpus* dry montane sub-type is found between 1500 and 2750 m.

The extent and ownership of forests in Uganda

There are 4.9 million hectares of natural forests and woodlands in Uganda, which cover 24% of the land area (National Environment Management Authority, 2002). Eighty-one per cent (3,974,000 ha) of this is woodland, 19% (924,000) is tropical high forest and <1% (35,000 ha) is forest plantations (National Forestry Authority, 2008). Table 1 shows the ownership of Uganda's forested areas, including tropical high forests, woodlands and plantations. The NFA and the UWA manage

Table 1 Areas (hectares) of forest and woodland under different ownership and management categories

Land cover	Government land		Private land	
	Forest reserves	National parks & Wildlife Reserves	Private & Customary land	Total
Tropical high forest	306,000	267,000	351,000	924,000
Woodlands	411,000	462,000	3,102,000	3,975,000
Plantations	20,000	2,000	11,000	33,000
Total forest	737,000	731,000	3,464,000	4,932,000
Other cover types	414,000	1,167,000	13,901,000	15,482,000
Total land	1,151,000	1,898,000	17,365,000	20,414,000

Source: Ministry of Water, Lands and Environment (2001)

almost equal areas of forested land while the woodlands are largely under private ownership.

Early attempts to document the status of forests in Uganda

Attempts to formally document the status of forests in Uganda date as far back as the 1950s when Eggeling & Dale (1951) and the Flora of Tropical East Africa (1952). Other efforts by Synnott (1971) generated a list of plant species (including trees) in some forests of western Uganda. Hamilton (1984) published a book on Deforestation in Uganda and provided useful insights into the status of Uganda's forests. Hamilton noted that despite some taxonomic uncertainties, there were only 450 known forest trees in Uganda. He attributed the distribution of forest plants and animals in Uganda to modern environmental conditions and changes in climate during the last ice age (more than 12,000 years ago). Hamilton predicted the future of forestry in Uganda and observed that ever since the introduction of agriculture nearly 2500 years ago, forests have been cleared to make way for agricultural crops and pasture, a process that still continues, so that even the remaining forest patches are shrinking fast. In the savannah and wooded agricultural lands, trees are being cut for firewood, charcoal and other products. He noted that there are many places that supported considerable number of trees in the last 40 years which today are almost treeless.

A comprehensive account of the biodiversity status of the natural forests has been given by Howard (1991) in view of the increasing human activities such as encroachment, illegal settlement and uncontrolled exploitation of the forests. With the support of the World Conservation Union (IUCN), he carried out an inventory of twelve principal forest reserves in Uganda and reported that there are 427 tree species, 329 forest bird species, twelve diurnal forest primate species and 71 species of forest butterflies and charaxes (Table 2). Building on Howard's work, in 1996, the Forest Department published a series of biodiversity reports in Uganda's forest reserves based on biodiversity indicator species (trees, birds, butterflies, mammals and primates) inventory data.

Changes in Uganda's forest cover

The current status of forests in Uganda is a product of changes in the forest cover because of degradation and

Table 2 The number of species belonging to four biodiversity indicator groups from Uganda's twelve principal forest reserves

Indicator group	Maximum Possible number of species	Kalinzu-Maramagambo		Bungoma		Bwindi Impenetrable		Kasyoha-Kitomi		Itwara		Sango Bay		Mt. Elgon		Rwenzori		
		Budongo	Semliki	Budongo	Semliki	Budongo	Semliki	Budongo	Semliki	Budongo	Semliki	Budongo	Semliki	Budongo	Semliki	Budongo	Semliki	Budongo
Trees	427	209	168	240	242	158	163	163	204	143	170	202	112	75				
Birds	329	177	216	159	181	144	214	104	104	87	119	151	144	89				
Primates	12	8	8	5	6	6	7	6	6	6	6	2	2	4				
Butterflies	71	45	51	42	40	42	57	21	21	25	45	39	36	15				

Howard (1991)

deforestation during the past century. According to the FAO (1997, 2001), the forest cover may have been as much as 10.8 million hectares (53%) of Uganda's land area in 1890. The National Environment Management Authority (2004/2005) reported that Uganda's tropical high forest cover dwindled from 12.5% of the total land area to 3% in 1987. The National Biomass Study data collected between 1989 and 1995 indicate that this has now shrunk to <5 million hectares or 24% of the land area (Ministry of Water, Lands and Environment, 2001). According to the National Forestry Authority (2008), Uganda's forest and woodland cover has dropped from 4.9 million hectares (20% of Uganda's land area) in 1990 to 3.6 million (14%) in 2005. This represents a 1.9% deforestation rate, which is slightly higher than in other Eastern Africa countries whose rate is below 1%. On private lands, nearly 1.3 million hectares have been lost over the last 15 years while 91,000 ha have been lost in CFRs, confirming that forests on private lands are fast disappearing.

The quality of the tropical high forest, in terms of number of species and trees, has also declined over time with well over 30% being classified as degraded. Although there is no clear definition or measurement of this degradation, oral accounts from experienced foresters indicate that 75% of Uganda's principal forest reserves have been degraded by heavy mechanical and uncontrolled pit-sawing. In 2000, deforestation rate in Uganda was estimated at 55,000 hectares (0.9%) per annum based on change in areas of bushland and woodland from 1990 to 1995. Other estimates of deforestation rates are 1.10–3.15% per annum.

The State of the Environment Report of 2002 indicates that data on the trends in tree cover change and deforestation are not consistent because they were not collected in some years (National Environment Management Author-

ity, 2002). Estimates by the Forest Department show that by 2002, Uganda was losing about 200,000 hectares of forest annually. Of a total of 1.17 million hectares of CFRs, 58,000 hectares (5%) had been degraded or depleted. Overall, 14 of 500 forest reserves had been degraded. Table 3 shows changes in forest cover between 1990 and 2005.

Several causes of forest degradation and deforestation in Uganda have been documented key among which is breakdown in law and order between 1970 and 1986, conversion to agricultural land and other land uses, increase in demand for forest products for domestic and commercial purposes, higher demand for construction and furniture timber and weak law enforcement and policy implementation. About 3,436,000 ha of forests found on private land have been degraded because the landowners regard the forest as a major source of income, and potential agricultural and grazing land. Charcoal, fuel wood, poles and timber are uncontrollably extracted from these forests. The high human population growth rate of 3.4% per annum (Uganda Bureau of Statistics (2002), and expanding human settlement (urban and rural) have also been responsible for the high rate of deforestation in Uganda as forests are cleared to give way to spatial agricultural expansion and settlement. In general, annual rate of deforestation is highest in the woodlands (2.1%) and lowest in the relatively well-stocked tropical moist forests (0.3%).

The National Environment Management Authority (2004/2005) has documented a number of underlying factors that have contributed to the decline in the quality and extent of Uganda's forest resources. First, some forest land was lost as a result of postindependent government policy to increase agricultural production between 1960 and 1970. Extensive woodlands were at the same time cleared for livestock production. Second, there are policy

Table 3 Changes (ha) in forest cover in Uganda between 1990 and 2005

Year/ Land cover/use	Broadleaved plantations	Conifer plantations	THF well stocked	THF low stocked	Woodland	Total forest cover
1990	18,682	16,384	650,150	274,057	3,974,102	4,933,375
2005	14,593	17,174	616,307	187,420	2,719,102	3,554,594
Change in area	-4,089	790	-33,843	-86,637	-1,255,000	-1,378,781
Change in area per year	-273	53	-2,256	-5,776	-83,667	-91,919
% change in area	-2.2%	5%	-5%	-3.2%	-3.2%	-2.8%
% change per year	-1.5%	0.3%	-0.3%	-2.1%	-2.1%	-1.9%

Source: National Forestry Authority (2008).

deficiencies relating to the private sector and local communities over land tenure, access rights and responsibilities for resource management. Third, market failures such as inappropriate royalty rates, poor market information, trade restrictions and hidden subsidies which distort the markets for forest products have in the past affected the forest resource base. Fourth, although environmental and forest regulation has improved considerably at the central government level, at the local level, the institutional structure to regulate environmental and forest management is weak because of inadequate funding for operations and development. Fifth, the failure of government to provide alternative energy sources has increased the demand for biomass energy. Sixth, rural poverty restricts the ability of local communities to invest in sustainable land use practices, and lack of alternative livelihood options has resulted in continued dependence on forest resources.

Seventh, and probably the most important, is the government policy on modernization of the economy. The policy promotes fast economic growth and rural transformation centred largely on agriculture. The desire for fast economic growth triggered government decisions to degazette forest reserves and the land given to investors under the guise of increasing agricultural production in spite of public disapproval and resentment. The degazetting of Butamira and Bugala Island forests recently are clear testimonies to this. On Bugala Island in Lake Victoria, over 6000 hectares of relatively undisturbed natural forest have been cleared to give way to oil palm growing. Mabira forest reserve on the Kampala–Jinja highway is still at risk of being given away for sugar cane growing. In the affected areas, economic reasons are often given to justify conversion of forest land to agricultural land. The perceived notion is that the forests yield lower social rate of return than agriculture for the same unit area of land.

The drive for a modern economy has also been coupled with a significant increase in construction of residential, commercial and institutional buildings that use millions of bricks burnt with thousands of tonnes of firewood. Timber for construction is also on high demand and much of it comes from the natural forests. Furthermore, the majority of industries are agro-based and some like tea processing, sugar production, tobacco curing, bakeries and fish processing require huge quantities of firewood. Although all these indicate the economic importance of forests to Uganda, they at the same time show the detrimental effects of social and economic activities on Uganda's forest and tree cover.

Concluding remarks

The status of Uganda's forests cannot be discussed without referring to issues of governance, poverty alleviation and human population growth. Although Uganda's forest policy is well articulated, its implementation is weak because of inadequate resource allocation and political interference that are highly detrimental to good forest management and conservation. Uganda's poverty eradication action plan has been well intentioned but has achieved little because of inadequate resources. As such, millions of resource poor Ugandans still depend on environmental resources such as trees and forests as the most readily accessible and valuable resources for personal acquisition and exploitation for income and to sustain their livelihoods. Unless great progress is made in addressing poverty and livelihoods situation in Uganda, especially household income enhancement, pressure on the forests will continue to grow and the remaining forests will be degraded and lost.

Uganda's forests can also be saved if sufficient resources are allocated to the NFA to manage, conserve and ensure their sustainable utilization. The forest sector has been inadequately financed over the last four decades, along with other environmental services. Despite the recent establishment of the National Environment Management Authority (NEMA) and the NFA as governmental agencies responsible for implementation of environmental systems of control, low expenditure on the environment and forestry has contributed to their deterioration and this has in turn aggravated social tensions between these agencies and the local communities relying on environment and forest resources. A greater commitment by government and more financial support is required to manage and conserve Uganda's forests. As noted by Hamilton (1984), a loud and clear voice in favour of forests and trees is needed to assist the work of the NFA, so too is a firm commitment by government to conserve and manage forests.

The NFA needs to regularly monitor the status of plantation forests in terms of tree species being planted, their survival and productivity in the different agroecological zones. Although government has gazetted a national tree planting day after the enactment of the Forest and Tree Planting Act 2003, the increase in tree planting interest in the last 10–15 years cannot be wholly attributed to it. Furthermore, NFA together with the UWA and the NEMA should monitor and report the status of the natural forests both in and outside the protected areas and the

information made available to stakeholders in the forestry sector. Such information will indicate the performance of the trees species and whether or not there is an increase in tree cover and acreage. Accurate and reliable information is needed to inform debates, discussions and decision making on forest management and conservation in Uganda.

Lastly, there have been efforts by the NEMA and the NFA to report the status of Uganda's forests in terms of changes in forest cover. This is not enough because the report on status of forests should also include information on the number of biodiversity indicator species such as trees, birds, mammals, primates and butterflies. Without such information, it is impossible to apply measures that can enhance forest management and conservation that should lead to sustained benefits of forests for the current and future generations.

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