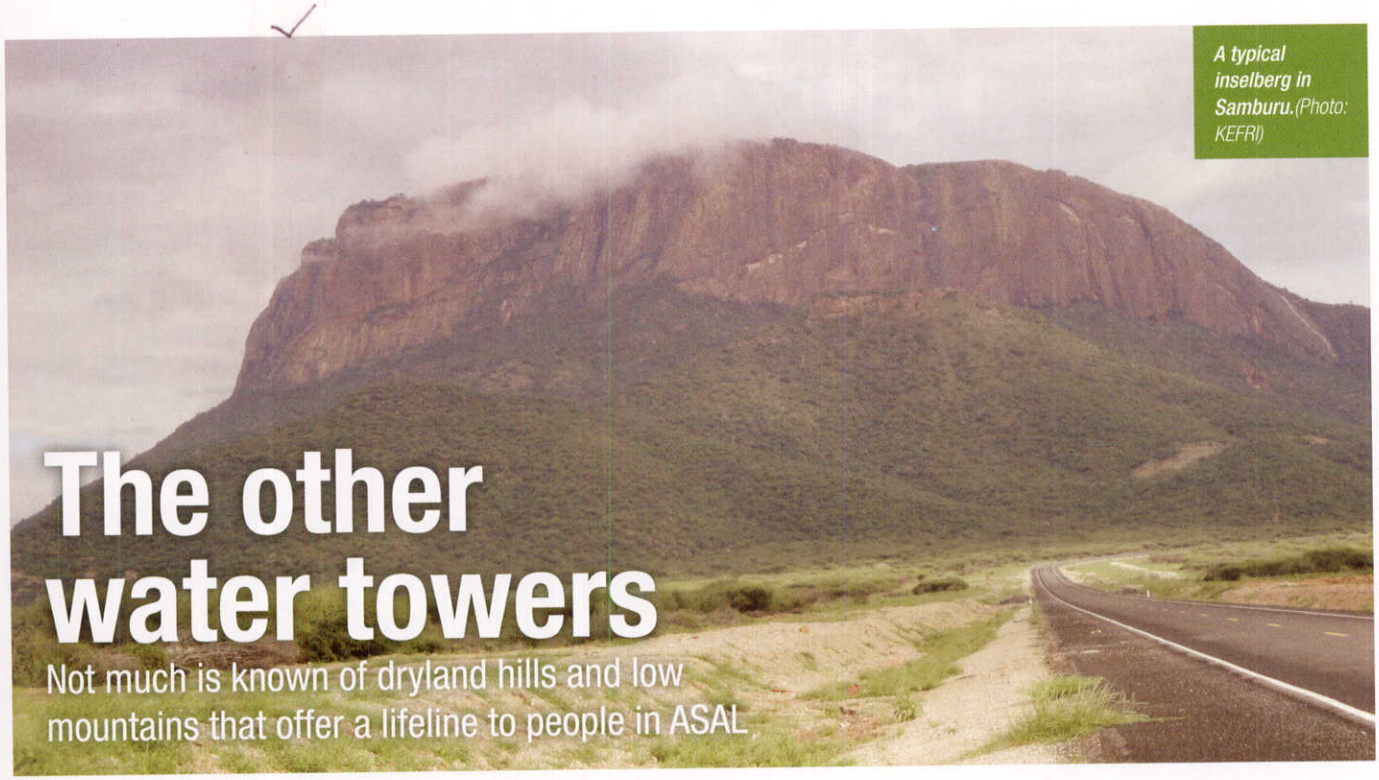


A typical inselberg in Samburu.(Photo: KEFRI)

The other water towers

Not much is known of dryland hills and low mountains that offer a lifeline to people in ASAL

By FRANCIS GACHATHI

Extensive areas of Kenya's drylands are low-lying plains covered by thickets of thorn bush, grassland and scattered trees, mainly *Acacia* and *Commiphora* species. These plains are however characterised by isolated hills and low mountains often called inselbergs, as they rise abruptly, from the gently undulating plains.

These hills trap and hold clouds or force moisture-laden winds into high altitude where cooling causes precipitation. Even during the very dry season, the hilltops are often covered with thick fog in the early morning and in the evenings, and in the rains, the atmosphere is usually moist. The result is a relatively cooler atmosphere than the surrounding areas, and a suitable environment for better developed vegetation cover of trees, shrubs and herbs. The hilltops receive much higher rainfall than the lowland plains.

Although geographically within the drylands, these restricted hilltops are not dry. They hold unique "islands" of forests with different flora and fauna from that of the surrounding hot dusty thorn bush at the base. They have tree species of the upland dry montane forests and those from the intermediate transitional forests as the ones around Nairobi.

Common tree species include *Juniperus procera* (pencil cedar), *Olea europaea ssp. cuspidata* (wild olive), *Podocarpus falcatus* (podo), *Nuxia congesta* (muchorowe), *Cassipourea malosana* (muthaiti or pillar wood), *Acokanthera schimperi* (muvai, murichu, ol-morijoi), *Apodytes dimidiata* (pear-wood, with pear, mlambusi mbage), *Ekebergia capensis* (ekebergia, teldet), *Olinia rochetiana* (mwathathia, ol-kirenyi), *Pistacia aethiopica* (musaa, chepkorokwet), *Schrebera alata* (lamaiyat, mutoma, ochol), *Teclea nobilis* (munderendu), *Teclea simplicifolia* (munderendu), *Croton megalocarpus* (musine) and *Calodendrum capense* (Cape chestnut).

These unique hilltops are vital habitats to the long-term maintenance of biodiversity and other natural processes in the drylands. They play a major and significant role as water catchments.

The impact of hilltop forest cover on temperature and soil moisture conditions is significant. The forests prevent the rapid run-off of rainwater, so enabling it to sink in slowly and replenish springs and streams in the valleys below. The water catchments are vital for the existence of the local pastoral communities, their livestock and the wildlife living in and around them. During periods of drought, people and animals converge to these hills for water, wild food plants and pastures, the only hope for survival. A number of plant species in these forests have medicinal, spiritual as well as socio-cultural value. The forests play a central role in traditional ceremonies and sacrifices.

The species of plants and animals in hilltops

Some major hills and low mountains in the drylands that provide water to millions of people, livestock and wildlife

Mountain/hill	Size (ha)	Catchment for	County/counties
Mt Marsabit	13,675	Lake Paradise, Local springs	Marsabit
Mt Kulal	2,240	LOcal springs	Marsabit
Matthews Range	26,330	Uaso Nyiro and Milgis rivers	Samburu
Ndoto Mts	10,155	Milgis River, local springs	Samburu
Nyiru Mts	7,890	Local springs and streams	Samburu
Kirisia Hills	22,340	Uaso Nyiro and Milgis rivers	Samburu
Ol Doinyo Orok	6,575	Local springs and streams	Kajiado
Emali Hills	50	Local springs and streams	Kajiado
Chyulu Hills	4,640	Mzima Springs, Tsavo and Galana	Makueni, Kajiado Taita
Machakos Hills	4,290 (total)	Athi River, springs and streams	Machakos, Makueni
Ol Doinyo Sabuk	720	Athi River, springs and streams	Machakos
Endau Hill	455	Local springs and streams	Kitui
Mutitu Hill	145	Local springs and streams	Kitui
Mumoni Hill	45	Local springs and streams	Kitui
Tugen Hills	7,590	Perkerra, Kerio and Suguta rivers	Baringo
Karasuk Hills	650	Turkwell River, springs	Turkana
Kasigau Mt	230	Local springs and streams	Taita-Taveta
Maungu Hills	200	Local springs and streams	Taita-Taveta

Source: H.J. Beentje, The Forests of Kenya: Proceedings of the Twelfth Plenary Meeting of AETFAT, Hamburg, 1990. Figures refer to the size of the indigenous forests on these hills, not the gazetted areas. Today these forests could be much less and disturbed.

have evolved with mutual adaptation in an intimate interdependence. Some animals remain on a particular hill since it has become difficult for them to move across the dryland plains to similar habitats on another hilltop forest. The resident buffalo, leopard, klipspringer, reedbuck and the greater kudu, found on various hills, are such examples. Even birds such as eagles and vultures which could fly from one hill to another with ease, are restricted to specific hills, as are reptiles and thousands of insects. These forests are of special interest to biologists, for in them we witness the process of survival and adaptation of species.

Local communities have traditionally conserved and managed hilltop forests in drylands through customs and unwritten rules and regulations. Traditionally, communities have developed ecological management strategies in harmony with their fragile ecosystems by exploiting different ecological niches. Under normal circumstances, the people graze their livestock on the lowland plains but with the onset of drought, animals gradually move to the hills and into the forest.

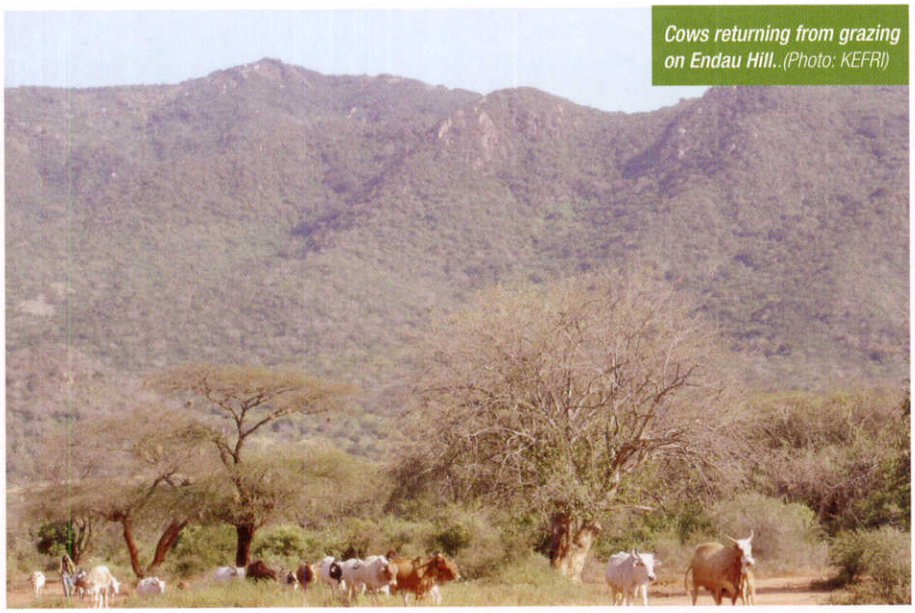
Harvesting of plant materials, including herbal medicines, was regulated by rules and regulations effected through the elders. This way, the local communities have managed hilltop forests since time immemorial. However, with an ever-rising human population, demand for forest resources, farmlands, settlement and building materials, the hilltop forests may not be secure, even through gazettement.

Case study on Endau Hill

A case study on Endau Hill illustrates the importance of these hilltop forests as water catchment areas and biodiversity conservation sites. It also highlights the role of hilltop forests in strengthening adaptation to climate change and the involvement of local communities in conservation and management.

Endau Hill lies between the highlands and the coastal forests at 38^0 38' east, 1^0 16' south. From the general elevation of 500m above sea level on the plains, the hill rises to several peaks with their summit at Matundu (1,400m). Endau hilltop forest is gazetted, and has been surveyed and demarcated on the ground. It is owned by the government and managed by the Kenya Forest Service (KFS) on behalf of the state.

The forest falls under the administration of the Zonal Forest Office, Kitui. The day-to-day management of the forest is the responsibility of the Forester at Mwitika with one Forest Guard and one Patrol Man, both stationed at Endau Trading Centre. The forest covers an area of 6,700 ha. There are no plantations and management is purely for protection, particularly for water catchment.



Cows returning from grazing on Endau Hill..(Photo: KEFRI)

Services of Endau Hill to the local communities

According to the communities living next to Endau Hill, the most important commodity derived from the hill is water. The hill is the source of about 20 permanent water springs. Six of these have been tapped and piped down into huge tanks at the foot of the hill and to the market centres for use by the community and their livestock.

Permanent springs include Ngunya-imwe and Kausya, which supply Ikisaya, Wazalani and Kathua markets. The Ikituku and Yongoni springs supply Manjunja area; Kangera and Kaundua supply Mutalani; Kibau spring supplies Koi Primary School and Twamboi markets while there is a shallow well at Malalani. This water is piped with the help of various organisations particularly the ASAL Programme and AMREF. Water is managed by local communities through water committees. Availability of water is the main factor for human settlement around the hill.

Endau Hill is also useful for dry season grazing, herbal and traditional medicine and wild food plants. During the dry season when grass and palatable herbs are dry, livestock, mainly cows, are moved to the hilltop forest for pasture. The medicinal plants around Endau Hill are very popular and held in high esteem by the Kamba community.

Some of the medicinal plants collected from the hilltop forest are *Strychnos henningsii* (muteta), *Caesalpinia volkensii* (kivuthi), *Albizia anthelmintica* (moakyumanai), *Zanthoxylum chalybeum* (mukenea) and *Croton megalocarpus* (muthulu). Wild food plants, particularly fruits, are useful during famine. Some are sold at the local markets for extra income.

Among the fruits found in Endau hilltop forests are *Uvaria acuminata* (mukukuma), *Cordia monoica* (muthiia), *Vitex payos* (kimuu), *Berchemia discolor* (kisaya), *Ximenia americana* (lamai) and *Grewia villosa* (muvu).

Endau hilltop forest is associated with various traditional ceremonies and sacrifices of great cultural and spiritual value to the local Kamba community. For example, every year before planting, a traditional ceremony is performed at one site on the hill, where people take their seeds for blessing by their ancestors. These sacred sites are at Kwa Sio Sili and Kwa Muteyia.

The hilltop forests also support a variety of wildlife.

From the Endau Hill study, it was clear that hilltop forests in the drylands are a crucial resource both for economic activities, drought adaptation and for biodiversity conservation. It is important therefore that local communities be involved in the planning and management of hilltop forests.

Frequent droughts are a major threat to survival in the drylands. Generally, they affect quality and quantity of water and grazing resources, reduce incomes and aggravate poverty.

They may trigger conflicts, cattle raids, loss of life and accelerate the rate of land degradation. The hilltop forests in the drylands play a vital role of providing water for local communities and even beyond. The extent to which natural vegetation on hill tops enhances microclimate and protects water sources in the drylands is an issue that requires critical attention at both national and county level.

A comprehensive survey of hilltop forests in the drylands would establish more fully the diversity and value of species in these forests. This is particularly important because very little attention has been paid to, and no such surveys have been conducted, on dryland hilltop forests

These are truly water towers!

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