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Contacts:

Paul Mackie, WRI senior media officer, +1(202) 729-7684, pmackie@wri.org
Rosemary Okello-Orlale, African Woman and Child Feature Service, 254-20-2724756, rookello@awcfs.org

Journalist Guide to *Nature's Benefits in Kenya*

This guide is designed as a quick and helpful reference to the Atlas and to help journalists generate relevant story ideas.

Kenyans – like all people on Earth – depend on nature to sustain their lives and livelihoods. Not only do they obtain the basic goods needed for survival – such as water, food, and fiber – they also rely on nature to purify air and water, produce healthy soils, cycle nutrients, and regulate climate. Collectively, these benefits derived from nature's systems are known as *ecosystem services*. They fuel the Kenyan economy and, if wisely used and invested, build the nation's wealth.

The definition of ecosystem services used in this work comes from the Millennium Ecosystem Assessment (www.maweb.org). The array of ecosystem services enjoyed by humans can be divided into four main categories: Provisioning services, regulating services, cultural services, and supporting services (see graphic, next page).

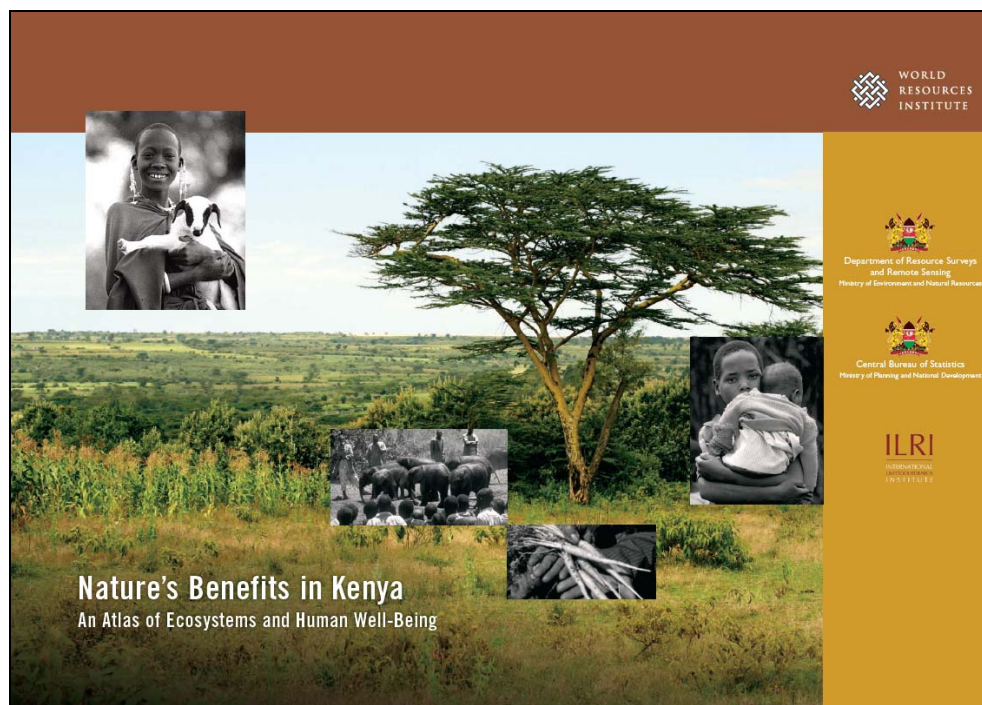


Table 1 The Condition of Ecosystem Services			
Ecosystem Services	Degraded	Mixed	Enhanced
Provisioning	Capture fisheries Wild foods Wood fuel Genetic resources Biochemicals Fresh water	Timber ruber	Crops Livestock Aquaculture
Regulating	Air quality regulation Regional and local climate regulation Erosion regulation Water purification Pest regulation Pollination Natural hazard regulation	Water regulation (e.g., flood protection) Disease regulation	Carbon sequestration
Cultural	Spiritual and religious values Aesthetic values	Recreation and ecotourism	

Ecosystem services and poverty around Mount Kenya

The case study in Chapter 8 of the Upper Tana River and Mount Kenya regions breaks new ground by showing for the first time in one publication where key supply areas of ecosystem services

coincide and where both poorer and better-off communities are located in relation to these supply areas.

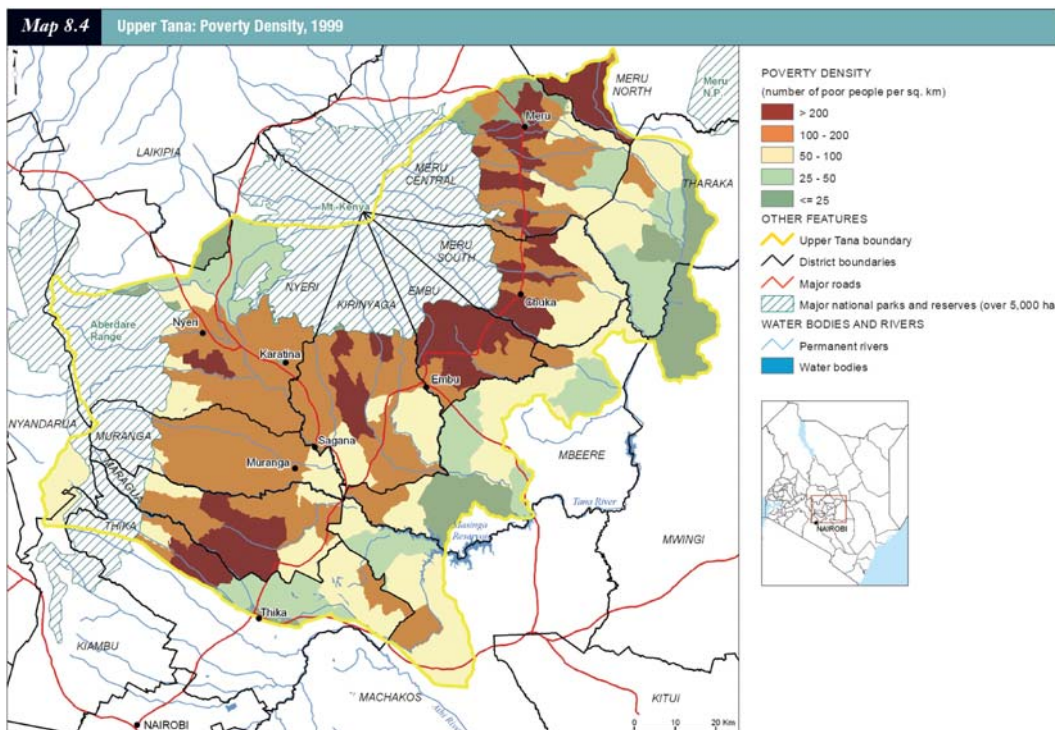
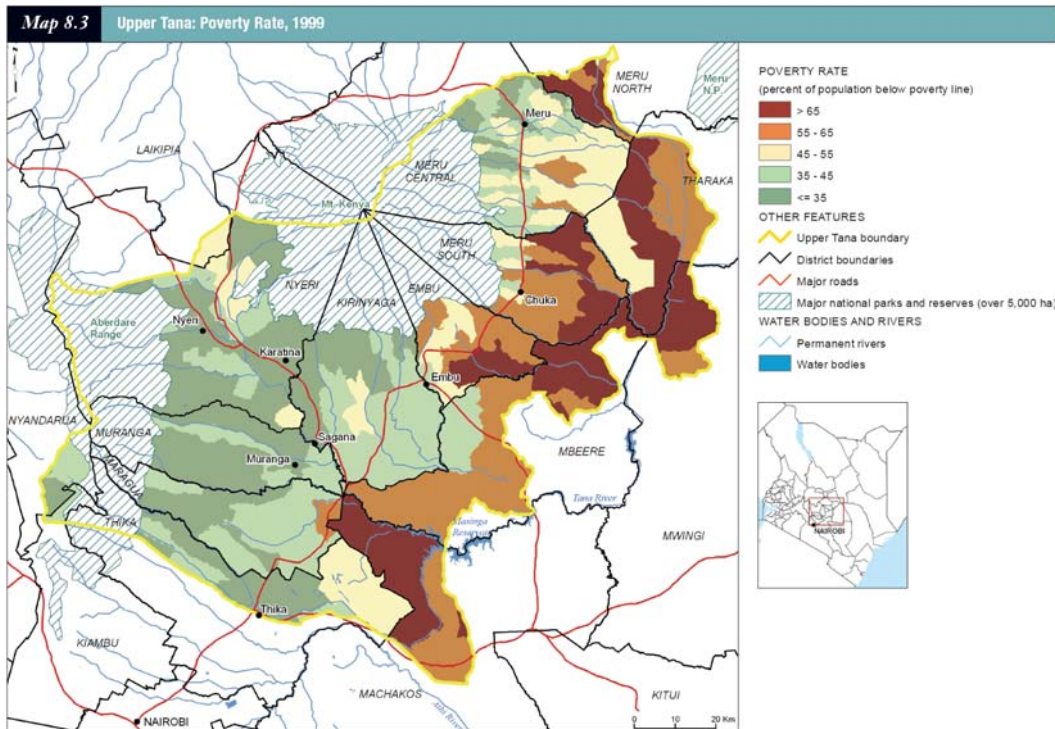
Within Kenya, the Upper Tana region – which includes the Aberdare Range, Mount Kenya, and the headwaters of Kenya's largest river – represents an economically important region for agricultural production. This region has a high demand for ecosystem services but is also an important supplier of ecosystem services. For example, the headwaters of the Tana River are an indispensable source of water for crops, livestock, wildlife, and human use, not only within the mountain vicinity, but also farther downstream across a large expanse of arid and semi-arid lands.

The Upper Tana area is home to 3.1 million people (about 11.4 percent of Kenya's total population). Most of the area is covered by smallholder agriculture. It includes important areas of cash or export crops such as tea, coffee, vegetables, and rice.

Along the rivers that drain through the area, locations at higher elevations in general have lower poverty rates than the locations further downstream. The communities in the lower plains and the drier parts of the Upper Tana have the highest poverty rates, which are above the national rural average of 53 percent. The better-off region, which contains large contiguous areas where the poverty rate is less than 35 percent, is located in the foothills of Thika, Maragua, Muranga, Nyeri, and Kirinyaga Districts.

Despite the very high poverty rates in the lower plains, the poverty density (that is, the number of poor people per square kilometer) is generally quite low in many of these dry, sparsely populated areas. In contrast, some communities with the highest poverty densities (areas with more than 200 poor people per square kilometer) are located in densely populated areas with relatively low poverty rates. This reflects the situation in the nation as a whole.

We must be reminded that analyses of spatial poverty patterns or program targeting cannot rely on poverty rates alone – or any one single indicator, for that matter. Doing so may overlook communities such as some spots in Maragua and Nyeri Districts that have a high number of poor, averaging more than 200 poor persons per square kilometer, but only show average poverty rates of 35–45 percent.



Using Maps to Connect Ecosystem Services and Poverty

The Atlas overlays georeferenced statistical information on population and household expenditures with spatial data on ecosystems and their services (water availability, wood supply, wildlife populations, and the like) to yield a picture of how land, people, and prosperity are related in Kenya.

About 80 percent of Kenyans derive their livelihoods from agricultural activities. Agriculture contributes, directly and indirectly, to about 53 percent of the nation's Gross Domestic Product. Other contributions of ecosystem services to the economy come from tourism based on Kenya's natural endowment of wildlife, mountains, rangelands, beaches, and coral reefs; as well as timber production from forests; and fish catches from lakes, rivers, and the Indian Ocean.

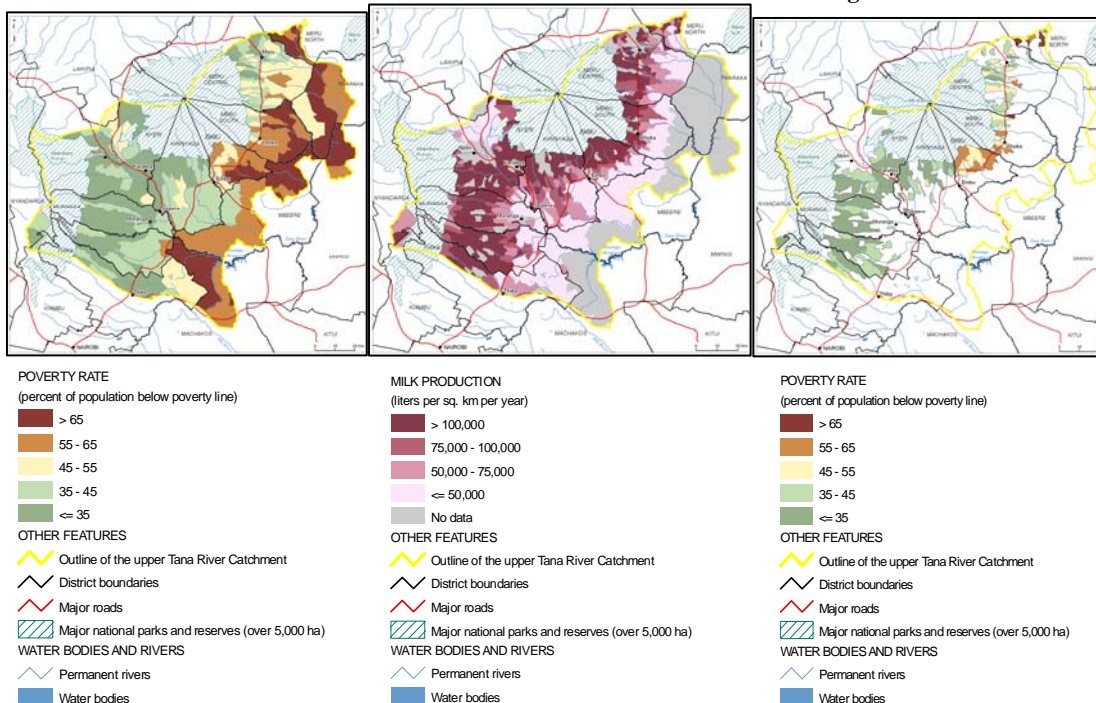
Attaining development goals means that policymakers and civil-society groups need to access information and analysis on the numerous interconnections among environmental resources, human well-being, and economic expansion. The maps and analyses presented in this Atlas are a first attempt to provide such information.

This information can be used in developing poverty-reduction programs and in designing policies for water-resources management, agriculture production, biodiversity preservation, and charcoal production, among others. The maps can be targeted to specific geographic areas of the country, focusing on the poor, and making better use of Kenya's natural resources.

Map 1: Poverty Rate, 1999

Map 2: Milk Production, 2005

Map 3: Poverty Rate in Areas with High Milk Production



With the three maps on the previous page, we return to the poverty rate indicator. As mentioned before, communities in the lower plains and the drier parts of the upper Tana have the highest poverty rates (shown in two shades of brown on Map 1), which are above the national rural average of 53 percent. The least poor region, which contains large contiguous areas where the poverty rate is less than 35 percent (shown in dark green) is located in the foothills of Thika, Maragua, Muranga, Nyeri, and Kirinyaga Districts.

Maps 2 and 3 examine the spatial relationship between milk production and poverty in the Upper Tana watershed basin. Areas with annual milk production greater than 100,000 liters per square kilometer (dark pink areas on Map 2) are mostly at higher elevations in the foothills of the Aberdare Range and Mount Kenya, while areas of low milk production (light pink areas on Map 2) occur at lower elevations.

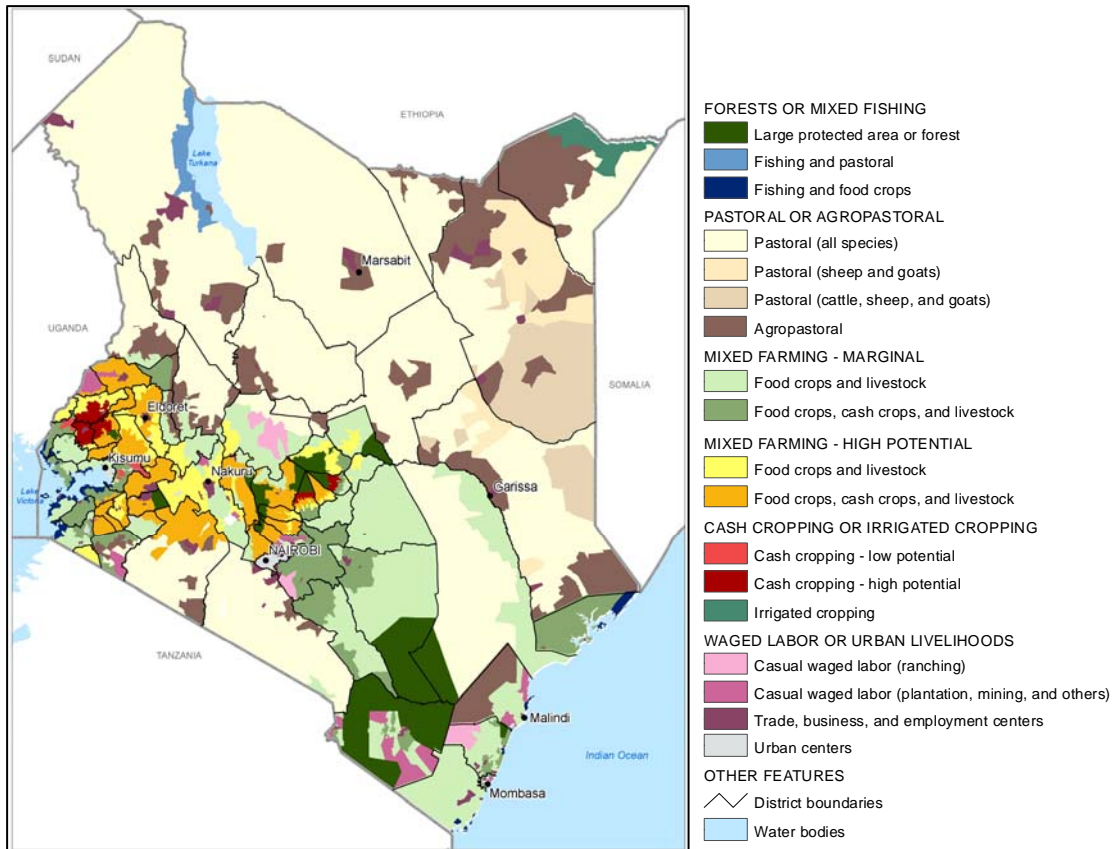
Dairy provides a source of high-quality protein and micronutrients, which often are lacking in largely cereal-based diets. Thus, areas with relatively high levels of milk production might be expected to be better off economically, with a greater concentration of households that can afford better nutrition. Moreover, livestock provide household savings and supplemental income for farming families. A plausible hypothesis, therefore, would be that areas with higher dairy output correlate with lower poverty rates.

Map 3 shows the spatial coincidence of poverty and locations with high milk production (i.e., production of more than 100,000 liters per square kilometer per year). Most of these areas are colored dark green or light green, corresponding to locations with a low incidence of poverty. Such locations form a large expanse across the eastern foothills of the Aberdares and the southwestern slopes of Mount Kenya, as well as a few locations in Meru Central District.

The pattern in these administrative districts supports the hypothesis that high milk output – most likely associated with a greater number of cross-bred dairy cattle – is more prevalent in communities with lower poverty rates. Further investigation is needed to determine whether households in these communities became less poor once they became high milk producers or whether a certain amount of capital had to be in place to support a high-milk output production system. An examination of areas of high milk production and high poverty rates can provide useful insights into the causes of high poverty rates. It could also help promote appropriate milk production technology in poorer communities in the Upper Tana River drainage basin.

A Few More Examples from the Atlas

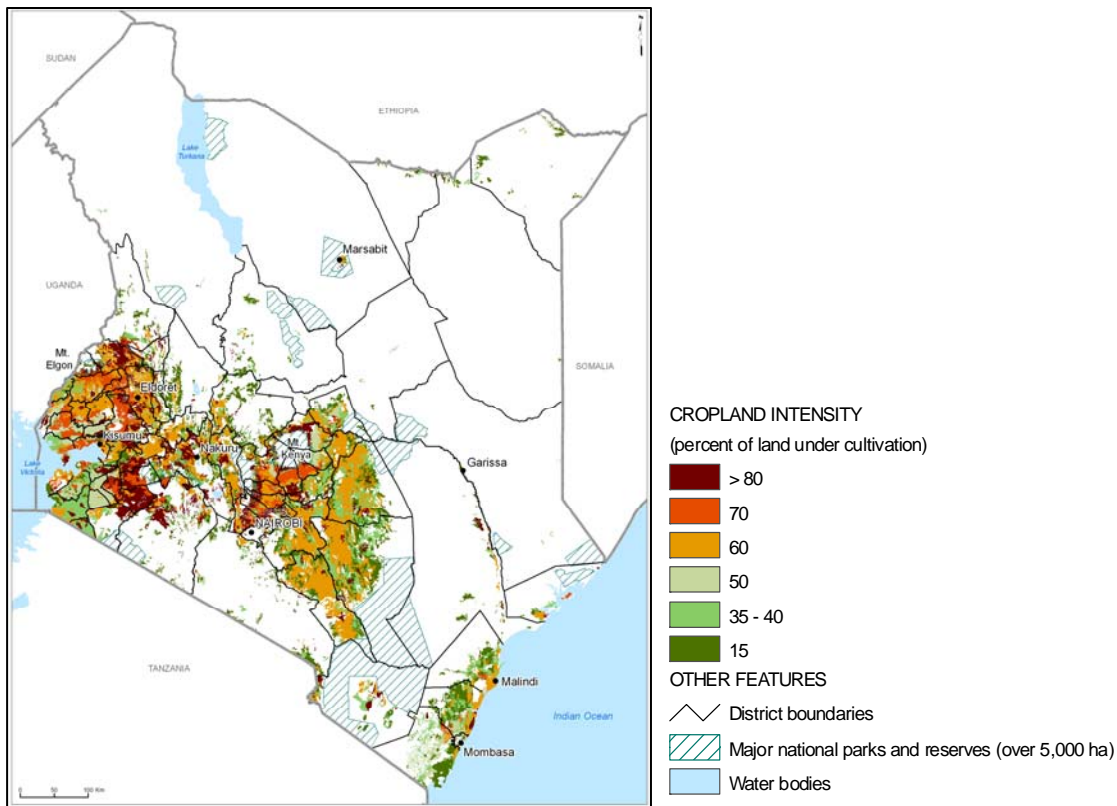
Prominent Livelihood Strategies Pursued by Households, 2003-05



This map shows the spatial distribution of Kenya's predominant livelihood strategies, presenting areas where Kenyans rely most heavily on the environment for such livelihoods as fishing, farming, and pastoralism. In most of Kenya's arid and semi-arid areas, pastoral livelihood strategies dominate. Pastoralists move their livestock periodically to follow the seasonal supply of water and feed. Areas of cropping combined with pastoral livestock raising (agropastoral strategies) are clustered along the margins where rainfed agriculture is possible and around more permanent water sources. These areas are often close to trading and market centers (shaded in dark purple), which provide some employment and wage opportunities.

In most of central and western Kenya, high-potential agricultural lands are dominated by a mix of dairy cattle, food, and cash crops (shaded yellow and orange). Mixed farming along the shores of Lake Victoria, in the croplands east and southeast of Nairobi, and in the coastal hinterlands is more marginal (shown in two shades of green). In many of these areas, rainfall is more erratic or soils are less fertile. Here, yields and incomes derived from a mix of livestock and food crops are generally lower.

Food from Crops: Intensity of Cultivation, 2000



This map shows that intensively farmed land – areas of more than 80 percent cropland – represents only a small proportion of Kenya’s agroecosystems. These densely cropped areas (shown in dark brown) are found predominantly in the highlands of central and western Kenya and in small patches of the lowlands. They include intensively produced crops such as wheat, tea, sugar cane, irrigated rice, and high-yielding maize.

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The majority of Kenya’s agroecosystems consist of landscapes with 50 or 60 percent active cropland (shown in lighter green and orange), mixed with less-intensively managed land. The latter can include, for example, forests or woodlands that can support mixed activities such as wood extraction and livestock

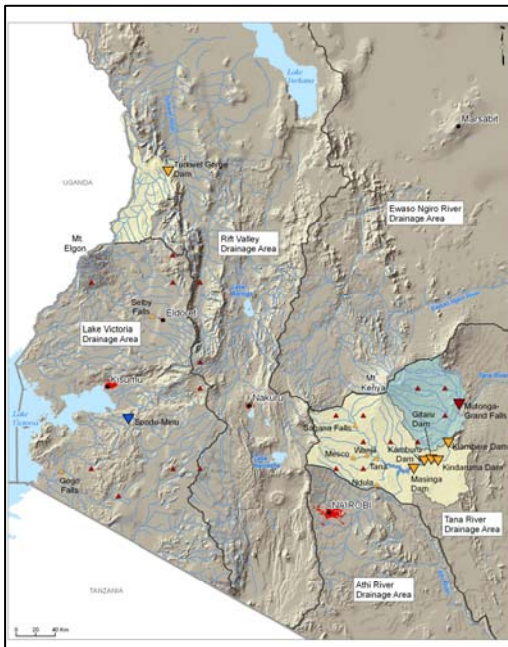
Water Used for Electricity Generation

This map illustrates Kenya's dependence on water for the production of hydropower. It shows the spatial distribution of hydropower sites in Kenya, indicated on the map by triangles. Areas that are shaded depict the water catchments that feed the existing power stations and reservoirs on the Tana and Turkwel rivers. Land use practices in the catchments upstream from the dams can influence the amount of water and sediment flowing into the reservoirs, affecting water quality and the productive lifespan of the hydropower infrastructure.

Proposed hydropower dams are indicated by red triangles and catchments feeding them are shown in the areas shaded in light green. These proposed dams would effectively capture the remaining permanent rivers feeding the Tana River from Mount Kenya, significantly impacting ecosystems downstream. Potentially affected ecosystems include the seasonally flooded grasslands (important for livestock grazing and wildlife), gallery forests along the river's shores (key primate and bird habitats), and coastal ecosystems (valuable for fisheries) in the Tana estuary. Other proposed micro-hydro sites are indicated by small orange and red triangles. A number of these proposed small hydropower sites are considered economically viable and their impact on freshwater systems and associated species and habitats would be limited. Investing in appropriate dam design and hydrological management, such as timed water releases, could maintain some of these downstream ecosystem benefits while also boosting electricity supplies to support Kenya's economic recovery.



The full atlas is available to download at www.wri.org. The Atlas was a partnership project by the Kenya National Bureau of Statistics at the Ministry of Planning and National Development, the Kenya Department of Resource Surveys and Remote Sensing at the Ministry of Environment and Natural Resources, the International Livestock Research Institute, and the World Resources Institute.



HYDROPOWER INFRASTRUCTURE

- Existing hydropower sites
- Hydropower sites under construction
- Proposed hydropower sites
- Existing small hydropower sites
- Proposed small hydropower sites

IMPORTANT DRAINAGE AREAS

- Subdrainage area important for current hydropower generation
- Subdrainage area important for proposed dams

IMPORTANT LAND COVER FEATURES

- Urban areas

OTHER FEATURES

- Major drainage area boundaries

WATER BODIES AND RIVERS

- Permanent rivers
- Water bodies