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Edwin S. Munger

Geographical Review, Vol. 40, No. 4 (Oct., 1950), 575-582.

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Geographical Review is currently published by American Geographical Society.

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WATER PROBLEMS OF KITUI DISTRICT, KENYA*

EDWIN S. MUNGER

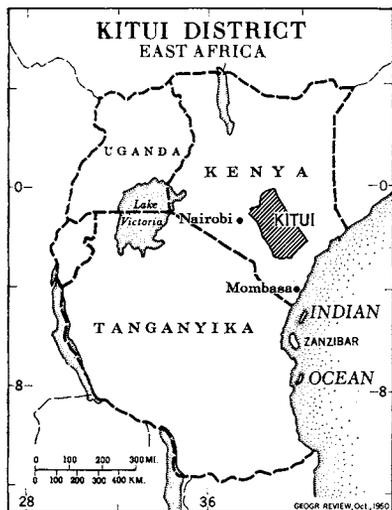


FIG. 1—Location map.

KITUI DISTRICT in Kenya Colony has many problems, but of paramount importance, and related to most of the others, are those concerned with water. Water is the principal determinant of land use. Its yearly presence or absence means prosperity or possible starvation.

Kitui District occupies an area of 18,000 square miles, of which 6000 is Native Reserve. It lies, for the most part, at elevations of 2000 to 4000 feet between the coastal plain and the highlands to the west. Hills of gneiss and schist rise above a dry, rolling, eastward-sloping plain of red lateritic soils covered with thornbush except where

scattered native *shambas* dot the countryside. There are no permanent streams; in wet periods the district is drained by "sand rivers" (Fig. 7), the largest of which, the Tiva and the Thua, may barely reach the Tana River but usually end in the bush. A population of 214,000, including fewer than 1000 non-Africans, is concentrated in the southwest around Kitui Township, where the land is higher, hillier, and wetter.

The inhabitants, the Akamba, are of eastern Bantu stock and in the past were one of the more backward tribes of Kenya—and the indigenous tribes of that colony were among the least advanced in Africa. The Akamba are agriculturists, but they also keep large herds of cattle and goats; on the Yatta Plateau, however, and around the confluence of the Kithioluo and Tana Rivers tsetse fly restricts cattle grazing. Women do the *shamba* work, planting and hoeing with primitive sticks or, increasingly, with iron implements. Political organization is simple. The British District Commissioner relies on chiefs, or headmen, selected by him, from candidates nominated by the

*The writer wishes to express his appreciation for the generous hospitality of the District Commissioner, Mr. W. F. P. Kelly, and Mrs. Kelly.

► MR. MUNGER is at present in East Africa, engaged in field studies under a Fulbright research grant. He will continue his work, in West Africa, under the auspices of the Institute of Current World Affairs.

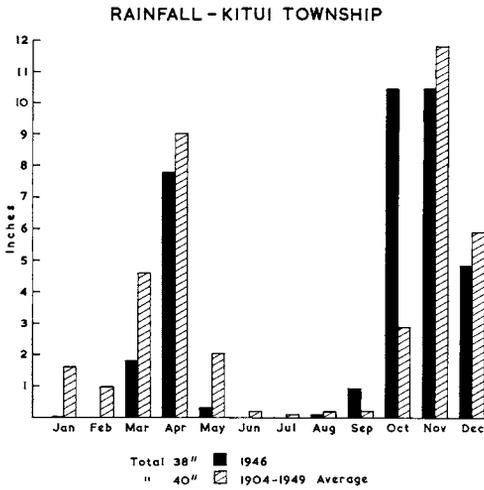


FIG. 2.—Monthly rainfall graph of Kitui. The year 1946 is more representative than the 1904-1949 average. Of the 45 years, 36 show at least one rainless month.

has shown a progressive attitude toward the solution of water problems.

AN EQUATORIAL RAINFALL REGIME

Kitui District follows the typical equatorial regime of two dry and two wet seasons (Fig. 2). Rainfall ranges from an average of 40 inches a year at Kitui Township to 18 inches in the northeast. Records of the 10 district stations cover from 1 year to 44 years (at Kitui Township); the average length is 10.7 years, altogether too short a period from which to generalize. However, the records do reveal that yearly fluctuations of 10 inches or more are not unusual. Convection is the primary cause of local rains; orographic rain in connection with the southeast and northeast monsoons gives the western part of the district its higher precipitation.

The rainfall regime shows remarkable uniformity and from year to year, averages for every station indicate that the first wet season usually reaches a maximum in April and the second in November, but there may be sharp deviations. For example, if the second rains come late, a station may record one inch in November when the average calls for eight inches; conversely, dry months on both sides of the normally wet ones may receive heavy rains.

CONSERVATION OF WATER

The rain that falls on Kitui District would be sufficient to support good crops and fine pasture if the supply were timed and used most effectively. When a quarter of the yearly total comes in a single month, and half of that

people, to exercise local authority in the 22 "locations" of Kitui District, in some of which there are also "sub-headmen." A Local Native Council, composed of 17 elected chiefs and 6 government appointees and representing the entire district, is being given more and more authority in education, public works, taxation, conservation, and general policy. The council's support is virtually essential to the success of district projects. So far it

in two storms, the ground becomes saturated, and rapid runoff produces disastrous soil erosion. Within a few hours large, silt-laden streams make the roads impassable and wreak havoc on the cultivated land. The streams may dry up in a few months, but the forces of destruction multiply from year to year, and under such conditions water is more of a burden than a blessing.

This problem is being attacked in two ways: the construction of dams and the terracing of land. The government is carrying out a plan to dam the larger intermittent rivers. Most of these are too small, and the number of dams needed is too great, to justify the expense of all-concrete construction by the Kenya Colony Dam Building Unit, but concrete cores and spillways will be used in the larger dams. The present program calls for 50 earth dams a year; 32 were completed in 1949. They differ in size but are generally some 15 feet high and 250 feet long, with a capacity of a quarter of a million gallons to 20 million.

The physical work is undertaken by the people who live in the area; the government furnishes engineering plans, wheelbarrows, and picks. When a dam is completed, the Local Native Council contributes \$140 to the community. This may be used to purchase food or equipment for shambas, or otherwise as seen fit. At present each chief is required to build two dams a year, one in each dry season. This is an enormous undertaking for the village. All the people turn out under the eye of the chief or sub-headman. Men work in gangs, swinging their pickaxes in unison to the rhythm of their singing. Other men trundle wheelbarrows, and women form a long line and pass shallow baskets full of dirt from the excavation to the top of the dam wall. The younger girls walk as far as six miles to fill calabashes with water for the workers to drink.

Water bailiffs are appointed and paid by the Local Native Council to see that engineering plans are carried out between inspection trips. They make sure that the spillway is sufficiently below the top of the dam wall, and that a wide catchment area around the dam is fenced off with brush piles so that the water will not be contaminated by cattle dung. Sometimes, however, it is necessary to allow cattle to puddle the basin at a low-water period so that their trampling hoofs will pound the dirt and dung into a watertight base. Final supervision is made by the District Commissioner, who periodically checks on building progress and maintenance.

Dams are built on two principal sites. Some small ones are constructed around the base of sloping rock outcrops, which serve to collect water. Others are built to hold back the water rushing out of a network of deep dongas or gullies. How successful a dam will be is difficult to predict. Some "reservoirs"



FIG. 3 (upper left)—Dam under construction. At right, line of women passing baskets of earth to top of dam wall; at left, men with pickaxes lowering basin; in foreground, District Commissioner talking to local chief.

FIG. 4 (upper right)—Beating the earth into place on dam wall.

FIG. 5 (lower left)—Women passing the baskets of earth. The important task of dumping is reserved for a man.

FIG. 6 (lower right)—Borehole site. This hole is not properly managed; to avoid contamination it should be fenced, the animals led to the trough for watering, and then led away.

hold water perennially; others may dry up in a few months, if the year is dry and the people draw a good deal of water. Some dams may leak for a time; others, not properly constructed, may burst in a period of heavy rain. On the whole, however, every dam is successful to some extent in reducing erosion and providing a larger and more conveniently located water supply. Since there are innumerable sites where a dam of the present size, or even smaller, could be placed, as many as 300 effective dams could be built in the district.

Terracing is the second means being encouraged for retaining water and retarding soil erosion. In 1946 roughly a thousand acres were terraced; in 1947, 1800; in 1948, 3500; and in 1949, more than 4000. Most of this work has been done in areas of heavier rainfall, where the need is greatest. The Akamba's understanding of the need for contour plowing is growing. Unfortunately for Kitui District, the rainfall is not sufficient to support the elephant grass that has been used successfully in terracing elsewhere in East Africa in hilly areas with greater precipitation.

In spite of improvements, the educational process is slow and difficult. Chiefs are encouraged to adopt progressive methods and teach by example; primary schools, and especially the secondary school in Kitui Township, are used as demonstration centers for the older men and training grounds for the young people. The secondary school already has five dams on its adjoining school farm, and 40 more are planned. Modern methods of agriculture and mixed farming are carried on by the students as part of their practical training.

Another facet of the conservation program is erosion control on the steep and almost barren hillsides. Most of the higher hill slopes are suitable for forest; in fact, many of them were forested in the past. Unlike some other tribes, the Akamba were never completely driven into the hills by the cattle-raiding half-Hamitic Masai from the plains, and they continued to use the valleys and plains for grazing and agriculture. One result of this may be the presence of fine residual forests on the ridges and higher hills. Podocarpus, cedar, black wattle, and gum trees all grow well in these areas, and with a little encouragement forest will spread down the hillsides. The Akamba, however, have the habit of burning the high grasslands every year in order, they believe, to destroy the dead grass and improve the new growth. Large areas have been set aside as Kenya Colony Forests, and the Local Native Council is experimenting with plantings on its own land. If the excellent mist forests of the higher areas could be extended and new forests and grass cover developed, erosion could be checked and water released gradually;

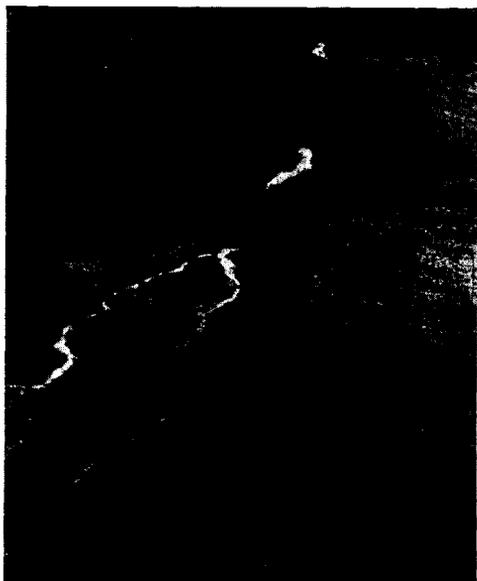


FIG. 7—A sand river. Although such rivers are dry for most of the year, the Akamba seldom fail to find water by digging shallow wells in the stream bed.

moreover, the forests would supplement the increasingly smaller supply of poles for huts, and some trees, such as the black wattle and podocarpus, would provide a cash income.

None of this is simple to accomplish. The land must be acquired from the native owners; small groups of people who may at present be cultivating it must be resettled; and finally, firebreaks must be cut and fireguards hired (about six dollars a man monthly). But the red hills with their 20° slopes blackened and bare of vegetation are an unspoken argument for the need for immediate action.

INCREASING THE AMOUNT OF WATER

One attack on the problem of increasing the amount of water in Kitui has been to sink wells to tap ground water. In nine attempts seven boreholes have been successfully drilled, one by the British Army during the campaign against Italian Somaliland and the rest under the auspices of the Local Native Council. Two of the boreholes are operated by hand pumps, which make them mechanically simple, and two have Diesel engines to raise the water from a greater depth (as much as 600 feet); these latter require transported fuel supplies and increased maintenance. Proposals have been made to charge a small fee for the privilege of watering cattle—a sum that would cover upkeep (estimated at \$14,000 a year) after the government has made the initial expenditure. In areas of lowest rainfall boreholes should be a great blessing, for during droughts there may be literally no water and the cattle die or must be driven many miles to new watering places already occupied by other natives. Unfortunately, however, boreholes are entirely outside the native's traditional knowledge, and psychologically they seem to be less desirable than dams, which can be built and maintained with local labor and a minimum of outside supervision and funds.

MINIMIZING THE EFFECTS OF DROUGHT

If, despite conservation and efforts to increase the supply, there still is not enough water, the problem can be approached from another angle. Acute water shortage means withering crops and dying stock. In the old days famine was the next stage, but the possibility of that extreme is declining. What will help to counteract local crop failures is continued development of better means of transport. Transport in Kitui District means roads, built and maintained by either the Public Works Department of the government or the Local Native

Council. Roads (all earth) are generally being improved, and since the war there has been an increase in the number of African-owned lorries carrying foodstuffs and goods within the district and to the outside world.

Although government relief is now available to prevent starvation, it is far better that provision against drought and famine be made locally. In recent years District Commissioners have reported that the economy is shifting from one based on cattle to one based on money. Nowadays a suitor may substitute an approved number of goats for each head of cattle or may purchase with cash the required number of cattle to be paid his prospective father-in-law—a trend accelerated since the war by returning *askaris* with discharge pay and accumulated savings. Cattle and goats are still the accepted medium of exchange, but they are becoming symbols of convertible wealth rather than wealth itself. The amount of money in circulation in the district has increased so enormously as to inflate cattle prices to such an extent that many young men cannot raise enough for the bride price and either remain unmarried or defy tradition by eloping. As regards famine relief, however, it is desirable that many families should have cash reserves, so that they can purchase food in difficult times.

Growing of new, drought-resistant crops is another method of attacking



FIG. 8—A typical small dam, photographed from 12,000 feet. A cluster of huts surrounded by a brush fence may be seen in center foreground.

the problem. Millet cultivation is widespread, even where, despite its hardiness, the crop may fail in one year out of three. On the other hand, the people are learning to grow more cassava; some chiefs require that a certain acreage be planted to cassava each year. Its rootstocks can be dug up when other crops fail, and it is safe from invasions of locusts, which in bad years may strip every bit of greenery from an entire village and its surrounding area.

THE FUTURE OF KITUI

The future of the Kitui Akamba may be a rising standard of living based on better use of land and water. Setbacks do and will occur, but it is encouraging to sit at a *baraza* and hear men ask the District Commissioner for permission to collect funds for a new school rather than wait two years until the expanding government school-building program reaches their village, or to visit a dam and see that the villagers have toiled an extra two weeks to make it broader, higher, and stronger than the plans called for. The people are fortunate to be under the guidance of an administration that has their confidence and knows how to direct their improvement. The natural resources of sun, soil, and water are available; the wisdom of their use will determine the progress of Kitui.