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Conservation for Development in Botswana, Kenya, Somalia, Sudan



Learning from the Past:
Traditional Land Management Systems in Kenya

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African-Caribbean Institute

Betty Nafuna Wamalwa was awarded an honors bachelor's of science in botany and zoology from the University of Nairobi. She continued her education at Clark University, where she received an M.A. in environmental affairs. After returning to Kenya, Ms. Wamalwa worked in the Ministry of Culture and Social Services and later served as a research officer at Nairobi's Public Law Institute. She is now engaged as a research fellow in one of Kenya's most active nongovernmental organizations concerned with natural resource conservation - the African Centre for Technology Studies. Focusing on the Akamba society as a case example, Ms. Wamalwa's fellowship project explores how traditional land tenure and management systems can be adapted to lessen resource depletion and environmental degradation, and thus to serve the developmental needs of rapidly growing populations in the 82 percent of Kenya's total area which is arid and semi-arid.

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BOTSWANA, KENYA, SOMALIA, AND SUDAN**

**Edited by
Rodger Yeager**

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FOREWARD

This publication is a part of a larger body of materials from eight authors in eastern and southern Africa that have been sponsored by the African-Caribbean Institute's Natural Resource Project. The combined works are in three main sectors. Papers by Betty Wamalwa and Mutasim El Moula focus on traditional institutions in environmental management in Kenya and Sudan. Papers by Mohamud Jama, Ahmed Yasin, Ahmed Hassan, and Amina Warsame are concerned with specific sector issues in energy, dry land fishing, camel husbandry, and women in forestry in Kenya and Somalia. The final section by Eagilwe Segosebe and Alawiyya Ahmed concerns modern industrial waste management problems in Botswana and finally the important issues of environmental education in Sudan.

Further studies will focus on issues of forestry and women and the preservation of biological diversity in eastern and southern Africa. As with the projects that are nearing completion or currently underway, the African-Caribbean Institute will edit, publish, and disseminate the works. This commitment and all other aspects of the African Fellowship Program are intended to serve ACI's ultimate goal of assisting in the quest for genuinely African solutions to African problems of resource conservation and development.

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LEARNING FROM THE PAST: TRADITIONAL LAND MANAGEMENT SYSTEMS IN KENYA

INTRODUCTION

Until recently, Kenya has been able to ignore the impact of ecological damage triggered by the types of economic development pursued in the past. Despite a predominately arid and semi-arid environment, Kenya has achieved a sufficient measure of economic progress to establish it as one of Africa's few developmental successes. On closer examination, however, it becomes evident that this good fortune has brought with it a level of uncontrolled environmental degradation which can no longer be ignored. A public-policy bias toward more humid agricultural zones has been rationalized in terms of affording greater immediate returns on investments. As a result, ecological and economic declines have become particularly evident on Kenya's arid and semi-arid lands (ASAL) which comprise fully 83 percent of the country's total area. This is in spite of the fact that the sixth national development plan acknowledges the need for environmentally sound policy alternatives. In particular, the plan faults the current trend toward "diseconomies" created by an overexploited and deteriorating natural resource base (Republic of Kenya, 1988, p. 169).

This monograph proposes that the search for alternative forms of agricultural and rural development must take into consideration the indigenous knowledge and institutions of small-scale farmers and pastoralists. The suggested approach is particularly relevant to ASAL locations because of difficulties imposed there by an environment characterized by low rainfall, fragile soils, and poor vegetative cover. Following a general discussion of Kenyan and other African farming systems, the study presents a case analysis of Kenya's Machakos District. In the context of twentieth-century ecological decline, Machakos is examined to illustrate how traditional land-use systems can still provide alternative means of increasing and maintaining agricultural production. This position is based on the obvious but often overlooked fact that, today as in the past, the creation of sustainable agricultural surpluses

and the conservation of the agricultural resource base are inexorably linked. The genius of traditional systems, which can still be invoked, was that the preservation of soil quality, water supplies, and indigenous plant species formed an inherent part of agricultural production.

CHANGES IN AFRICAN AGRICULTURAL SYSTEMS

As elsewhere in Africa, the colonial interlude in Kenya was a period of continuous revolutionary change (Brett, 1973, p. 1). Brookfield (1987) has argued that the revolutionary character of colonialism was neither accidental nor incidental. Rather, it was deliberately introduced with the intent of bringing indigenous values and practices into a permanently subordinate relationship with those of the colonizing power. This relationship was considered necessary because, in Lord Lugard's words, "the African . . . lacks power of organization, and is conspicuously deficient in the management and control alike of men or of business" (Lugard, 1922, pp. 69-70). Colonialism, then, became a mission to achieve "progress in civilisation and justice" for Africa (*Ibid.*, p. 95). In this view, the linkage of interests between colonizer and colonized would evolve toward reciprocity and creativity instead of toward exploitation and contradiction.

This complex ideological position was employed to create a world in which most things local were either rejected or confined to peripheral attention, on the assumption that they lacked any basis for real "progress" (Richards, 1983, p. 25). Much of the precolonial African experience has been "rehabilitated" over the past 30 years. Until recently, however, attitudes toward indigenous land-use have remained stigmatized by an official acceptance of Western land-use systems as inherently superior. In questioning this assumption, policy research is pointing toward new land-use opportunities with indefinite possibilities. This study is intended to help clarify these

opportunities, especially for policy makers who are ultimately responsible for defining the land-use situation in rural Kenya.

Early European Attitudes Toward African Land Use. Colonial perspectives on indigenous farming systems varied from patronizing to more practical. Colonial ideologues generally dismissed African agricultural practices while many field officers tended to urge caution against a wholesale rejection of indigenous land-use techniques. Inevitably, this divergence reflected differences in the perceptions and goals of the two groups. Ideologues were preoccupied with constructing theories to justify Britain's continued control over Kenya. Accordingly, they typically voiced the opinion that Kenyan Africans were incapable of using the land in an environmentally sustainable manner (see, e.g., E.S. Grogran's comments in Ormsby-Gore, 1925, p. 3044).

For their part, British field officers came into close daily contact with "native" communities and were able to experience first-hand the workings of local land-use systems. Reflecting these observations, an early director of agriculture offered a more positive assessment of African land use:

Up to a point, it should be recognized that there is some value attached to the native's own primitive methods of crop cultivation. They do not deplete soil fertility, particularly nitrogen and humus, nearly so rapidly as common methods of European cultivation in new countries. Take the case of continuous growing of maize or wheat on the same land. The native's methods of cultivation, with his mixed system of seeding and cropping, are incomparably better from the standpoint of maintenance of soil fertility than one line production. Native methods should not readily be condemned, and as a matter of fact they return to the soil a large amount of nitrogen and humus in the course of a year (Alex Holm in *ibid.*, p. 2049).

In Kenya, this rudimentary appreciation of African conservation practices warned against an uncritical acceptance of agricultural land-use models based too closely on environmentally questionable European notions.

The Rediscovery of African Agricultural Systems. By the 1930s, a growing awareness of the contribution of mechanized agriculture to soil erosion led L. Dudley Stamp to examine land-use alternatives in Africa. He concluded:

A recent tour of Nigeria has convinced the writer that the native farmer has already evolved a scheme of farming which cannot be bettered in principle even if it can be improved in detail and that as practiced in some areas. This scheme affords almost complete protection against soil erosion and loss of fertility. It may be that the African has thus a contribution to make towards the solution of the great soil erosion problems of other regions (Stamp, 1933, p. 34).

This new openness reflected a trend prompted by a catastrophe known in the United States as the Dust Bowl, a human-ecological disaster reaching its peak only 35 years after the final settlement of Oklahoma (Hyams, 1952, pp. 139-150). Basically, the Dust Bowl was created by an application of what had become hallmarks of the Western agricultural revolution (involving large-scale mechanized monoculture, the use of artificial fertilizers, and dust mulching) on the semi-arid, drought-prone steppes of the American midwest. From the Dust Bowl experience it became evident that "modern" agricultural methods were not always transferable across ecological zones (*Ibid.*, p. 140). This realization led to a search which continues today, for agricultural alternatives embodying strong conservation components. Kenya and Africa as a whole are very much involved in the quest for environmentally protective land use.

The historical achievements of farmers in the African tropics have been significantly undervalued and undermined by a tendency to use interpretive frameworks and research approaches relying heavily on models derived

for the northern latitudes. Much of past research was predicated on the classification of whole African societies as consisting of "shifting cultivators," "pastoralists," or "hunter/gatherers." These categories tended to hide more than they revealed because they made no provision for distinctions within single agricultural regimes, in which "elements from a number of systems" were often combined in the land-use decisions of "a single household production unit" (Richards, 1983, p. 24). Furthermore, they glossed over the fact that rationales motivating these decisions were not usually associated with a typical "European preoccupation with farm sizes, land tenure, and productivity per unit of labour input" (*Ibid.*, p. 30).

In short, most African land users still value production over productivity and risk minimization over profit maximization (Low, 1975). To fulfill their purposes, African agricultural systems exhibit a tendency toward a complexity that defies compartmentalization. Risk-spreading management strategies are employed to take advantage of local ecological variations. Moreover, the long and frequently varied agricultural year of the tropics enables a productive "riding with the season" which is severely constrained in temperate zones.

This propensity for complexity is manifested in the land-use practices of African communities. Where the environment permits, agriculture combines upland shifting cultivation with flood-retreat or alluvial cultivation of a more permanent nature. Further diversity is achieved by maintaining domestic livestock, with hunting and gathering over fallow and uncultivated lands serving as contingencies against drought. In a study of Kenya's Akamba society, Hyer discovered 243 possible combinations of land use, labor commitments, crop varieties, and timing of productive activities (Hyer, 1965). Beyer suggests that African agriculture is "a constant matter of meticulous attention to ways of insuring production in times of drought or crop failure; providing time for supplementing food from cropping and livestock with hunting, fishing and collecting; and utilizing ritual feasting for reward and incentive" (Beyer, 1980, p. 18).

Flexibility is a vital feature of environmentally sensitive land use, enabling communities continually to shift their productive regimes back and forth along an extensive/intensive spectrum. Traditionally, a community's need to shift was usually initiated by some positive or negative change in the local resource base. Crops such as maize (which quickly depletes soil nutrients) caused frequent movement of plots but little change in overall land-use patterns. Long-term climatic changes could produce deeper transformations, with predominately pastoral communities relying more on farming and vice versa. In either event, such shifts implied a rejection of the rigidity and territorial fixity characteristic of Western approaches to the land. The African approach was, and where possible remains, "a matter of allocating resources of different relative scarcities to achieve or maintain an income stream from a piece of land" (Blaikie and Brookfield, 1987, p. 71).

In the past, this balancing of resource use was made possible by the range of technologies employed by farmers to modify their environments in the interests of environmentally sustainable agriculture. The unique features of these innovations encourage resource conservation and, in this sense, form the basis of a modern African agricultural revolution. Instead of accepting the European emphasis on large-scale monocultural production, ever-increasing mechanization, and intersification based on the application of artificial inputs, the African focus is ideally on what Dupriez has termed the "conservation of equilibrium biomass" (Dupriez, 1982). Amalgamating production with conservation is consistent with an African world view, common in preindustrial societies, of "the whole world as alive" (Hyams, 1952, p. 275) and interconnected.

Ndeti (1972) and Adesanya (1958), among others, link a concern for the environment with the unity in reason and faith basic to African philosophy. In this conception, nature is literally the house of the spirits. Trees, for example, are taken to be favorite dwelling places for ancestral spirits, explaining the widespread incidence of sacred trees and groves. Pollarding - the cutting of branches from live trees - can be explained as making use of

forest products while still maintaining the dwelling places of spirits. Pollarding also produces thick growths of young branches, increasing the productivity of the forest resource. In a more general sense, nature was not lightly to be disrupted, lest misfortune be released on the unsuspecting.

Fear of phenomena that transcend human spiritual comprehension served to temper human interference with the African environment. This state of mind, together with objective ecological constraints, help significantly to account for the strong conservation ethic still inherent in African farming systems. Moreover, hoe technology, broadcasting of seed, intercropping, and other techniques minimize disturbance of the soil and greatly extend the lives of individual farm plots by imitating nature and preserving the dynamics of climax plant communities. Wind and water erosion is thus lessened, while desirable soil properties are kept intact and pest infestation controlled. Widely spaced fields enable further adaptations to the advantages and limitations of ecological microsystems, creating subtle productive arrangements that take full advantage of the available natural resources without also destroying them. Similar sensitivities are observable in the division of labor in African farming systems.

Gender Distinctions and Group Cooperation in Resource Management. Studies of African agriculture have long emphasized a gender-related distribution of labor which places women in the role of primary producers. In terms of resource conservation, a more complex sharing of responsibilities emerges. In traditional land-use systems, men enjoyed allocative powers extending from their control over kinship-related social, economic, and political institutions. In capacities ranging from family heads to lineage and clan elders, chiefs, and religious leaders, men dispensed land and controlled the use of temporary sources of water, grazing land, wildlife, and other communal resources. When necessity dictated, men also decided on the physical segmentation of society through migration (Ndeti, 1972; O'Leary, 1984; Pala, 1974).

Women performed actual farm-management tasks. They matched crops and crop combinations to appropriate soil conditions, and cultivated in ways to protect the fertility and physical properties of the soils in their trust. Operating in separate spheres, men and women generally cooperated on behalf of resource conservation. In day-to-day touch with the land, women were particularly sensitive to resource depletion. They constantly monitored changes in environmental quality, and communicated this information to the male authority structures in which alternatives were decided. If sometimes only in attenuated form, these arrangements survive today.

Group cooperation also continues to play an important, although now possibly a threatened, role in local resource mobilization and protection. Traditionally, kinship, age, and associational groups fostered cultural values and social integration, and also provided mechanisms for labor-intensive responses to environmental and other external challenges. Allan (1965) has suggested that the decline of these institutions must form a key factor in any explanation of the deteriorating quality of African land management. In this argument, colonialism's "incessant and insatiable demands for labour, tax money and economic crops" encouraged an as yet unabated increase in private land ownership and individualized working arrangements at the expense of community resource ownership and communal labor contributions. This interpretation may be overly broad in light of the uneven application of colonial economic policies. The widespread survival of group cooperation in resource management attests both to the limits of alien rule and to the resilience of traditional survival strategies.

In their modern forms, these collective strategies are employed to compensate for poverty-related denials of access to financial, infrastructural, marketing, and extension services. Official attempts are often made to co-opt local communal initiatives, but these rarely generate much in the way of group cohesion and cooperation because they are ultimately planned and implemented by outsiders. Successful communal initiatives more closely resemble traditional group efforts

because they are institutionalized within single communities. When community efforts are organized in this manner, the implication is that the resulting groups are valued because of their benefits which can only be derived collectively. Thus, husbands may urge their wives to join women's groups to promote soil conservation. Husbands may be willing to contribute land and labor in the construction of a local dam.

In the Akamba society of central Kenya's Machakos District, group cooperation is generically termed mwethya. To illuminate this and other concepts discussed in the preceding pages, the study turns to a case example, drawn specifically from Akamba land-use patterns, of how the past can be adapted to bring forth a viable future for African resource conservation and sustainable agricultural development.

THE AKAMBA OF MACHAKOS

Machakos District lies between Kenya's eastern Rift Valley and Nyika Plateau. Geographically, Machakos consists of a central hilly region surrounded by a large plateau which slopes from about 1,700 meters in the west to about 700 meters in the southeast. For its Akamba inhabitants, the district's most limiting ecological feature is an inadequate supply of both surface and ground water. In particular, annual rainfall averages only about 750 millimeters, an amount considered minimally necessary for rain-fed agriculture. Moreover, rainfall patterns exhibit wide temporal and spatial variations from season to season and from year to year. These irregularities give rise to a situation in which drought is a common occurrence. Coming in the form of both delayed wet seasons and prolonged periods of dry weather, recurrent drought has become a permanent feature of Akamba ecology. This trend which, when combined with a series of demographic, economic, and political factors in the history of Machakos, has created a precarious environment for human and animal habitation (Downing *et al.*, 1985).

The 1.3 million Akamba people who live in the district are mainly farmers, although in the past they also kept large herds of cattle (Mutiso, 1989, p. 371; Downing *et al.*, 1985).

While a tendency toward drought produces a degree of uncertainty in any semi-arid area, it is not inevitable that semi-aridity in Machakos should pose serious risks for humans and livestock. Indeed, indigenous Akamba communities had evolved land-use and management systems that enabled sustainable resource use. In past times, only long periods of consecutive rain failure and/or invasions of pests and disease caused these systems to fail. Cyclical dry spells of lesser magnitude induced losses that were soon replaced.

Population growth is the main immediate factor responsible for more-recent ecological imbalances in Machakos. Kjeksinus (1977) suggests that the viability of earlier Akamba communities can be adduced from the slow if steady population growth occurring in Machakos prior to the 1890s. This modest expansion stands in marked contrast to the exponential rate of annual increase that reached 4.46 percent between 1969 and 1979. Estimated to swell from 1,237,400 in 1985 to 2,341,500 by 2000, Machakos' exploding population has already created a serious population/resource imbalance - particularly in the district's high-potential agricultural zones (Mutiso, 1989, p. 371). This imbalance is more the product of socially disruptive economic and political changes introduced with colonialism than a sign of societal vitality among the Akamba.

ECOLOGICAL DECLINE IN MACHAKOS

Rapid population increases partly result from dramatic improvements in maternal and child health care. In addition to these innovations, modern Machakos' ecological troubles originate in four structural changes introduced during the British colonial period; namely, the creation of "native" reserves, land confiscation for European use, and the introduction of new economic relations and systems of agricultural production. Partly to accommodate European settlers, reserves were created for the permanent resettlement of Africans with no attention paid to the ecological requirements of indigenous land-use systems and with no clear plan for reserve development. Reserve lands were surrounded by crown lands, whose use by local inhabitants

was prohibited as part of an early colonial effort to prevent conflicts among neighboring peoples. Crown lands were intended to serve as human buffer zones and in some instances were more extensive than reserve lands (O'Leary, 1984, p. 32).

False assumptions about local land use encouraged the colonial administration to annex what it termed "uncultivated waste land" as crown lands. Far from composing wastelands, however, these tracts were vital to land-extensive agricultural systems which combined various forms of shifting cultivation with pastoralism, hunting, and beekeeping. In the late 1930s, Maher (1937, p. 57) estimated that under these systems, every piece of bush was employed 15 to 20 times in a 200-year period. Even when the land was held in fallow or was recovering from heavy grazing, it was still used as a hunting ground and for beekeeping.

The Akamba cultivated wetter and more-fertile lands for five or six years, with 10 years representing the outside limit. Subsequent fallow periods typically extended to six years. The general rule was that the better the land, the shorter the period of bush fallowing. When new fields were opened, the normal procedure was to select areas within easy reach of water. As yields diminished, the land was left to bush fallow. Alternative fields were then cleared and cultivated, preferably in areas containing tall grasses and deciduous trees. These locations were rich in humus derived from fallen leaves and other plant materials. Yields from humus-rich and easily worked soils were initially high but soon fell off, prompting yet another opening of fields. The process of local movement was halted when water was so far removed from cultivated fields that women required more than five hours a day to fetch it. Cultivators then migrated to new virgin land.

The cumulative effect of this process was that at any given time, the landscape contained large tracts of seemingly empty fields and pastures in various stages of regeneration. This appearance, together with a general ignorance among Europeans of ecological conditions in semi-arid areas, strengthened the colonial administration's negative assessment of Akamba land-use practices (see Ormsby-Gore, 1925, p. 3053). The

conclusion was that semi-arid conditions in Machakos had been caused by the initial cutting down of trees, and by the continuous clearing of bush for shifting cultivation over a period of 200 years. The presence of bush vegetation and heavy forest cover in areas infested by tsetse fly, such as Kikumbuliu, was taken as evidence in support of this argument. In reality, however, ecological degradation was the direct result of European land alienation which destroyed the physical basis for traditional shifting cultivation.

The colonial government reacted by initiating half-hearted measures to treat the symptoms of the problem rather than its root cause. Programs were instituted to combat over-population, over-cultivation, and over-grazing (Sorrenson, 1967, p. 42; Maher, 1937, p. 77; Ormsby-Gore, 1925). These failed to generate much local confidence because their implementation was inevitably coercive. They also often created new problems. Prohibition of bush burning led to the spread of insect pests. Destocking campaigns were particularly disruptive and widely resisted because, for the Akamba, cattle represented an essential cultural link to immortality (Maher, 1937, pp. 89-90). Cattle also served an important practical function. They were the "bottom draw" in the scheme of life, and in times of drought could spell the difference between life and death for a sizeable portion of a community. To the Akamba, "destocking was, in effect, raiding the provident fund" (*Ibid.*, p. 90).

The introduction of new economic relations and systems of agricultural production exacerbated the negative ecological effects of colonial land alienation. Suddenly, local resources were no longer exploited exclusively for local consumption but were now subject to the dictates of the imperial economy. Kenya was treated, like other British territories, as a source of tropical and semi-tropical raw materials required for the British home market, and as a soft local market for cheap British exports (Brett, 1973, p. 72). To enable this transformation, the colonial triad of taxation, export-commodity production, and a monetized formal economy was set in place (Watts, 1983, p. 249). The effect in Machakos was the gradual undermining of Akamba agro-

pastoralism, whose main objective was subsistence production by and for the basic unit of society - the conjugal family and, in the case of polygamous families, the house (nyumba) consisting of wives and their children under the care of their husband (O'Leary, 1984, p. 23).

Taxation compelled the male members of Akamba communities to take up wage labor on white-settler farms, precipitating a "rapid entry and integration of men into the colonial economy" (Pala, 1974, p. 14). The consequent shortfall in subsistence labor meant that women were forced to intensify their involvement in agriculture by taking over tasks previously performed by men. As a result, families now found less time to spare for activities, such as conservation measures, that were not directly productive, with the effect of accelerated land degradation and increasing socioeconomic marginalization. With the introduction of cotton, export-commodity production offered new opportunities for some members of Akamba society but at an additional cost to the land. Maher (1937, p. 72) observed that cotton cultivation was a "definite menace to the land" because the directed method of planting, monocropping, exposed the soil to the elements. Minor gully erosion followed the very first cotton planting and, by the 1930s, more-serious erosion had become common even on gentle slopes.

Kenya's monetized economy affected Akamba land-management practices in several ways. An absolute increase in cultivated area occurred in Machakos, as cash began to play a greater role in the lives of the Akamba. The introduction of labor-saving farm implements, such as the plough, facilitated agricultural expansion beyond the limits of soil conservation. In addition to the hoe, the only available indigenous implements were the digging stick (muo) and the long and stout crowbar (nithii). The latter was used with both hands, for the first breaking of new land, while the small, narrow muo was wielded with one hand for breaking up soils. Furthermore, the new formal economy offered the Akamba alternative sources of livelihood that bore no links with the land. As money became more available from outside employment, patterns of authority within community and extended family networks began to break down. A

diminished sense of social obligation atomized land-management responsibilities, with disastrous effects in an environment requiring high communal labor commitments (Blaikie and Brookfield, 1987, p. 109).

LAND, POLITICS, AND CONSERVATION IN THE LATE COLONIAL PERIOD

By the late 1930s, land depletion in Machakos had reached alarming proportions. Agronomists and local administrators alike were calling for a "reconditioning" of the district (Maher, 1937). Government's reaction was to embark on a massive post-war program of bench terracing. This campaign, undertaken by the colonial Conservation Service, was lauded as the final solution to the soil-erosion problem. It was inspired by the success of the U.S. Tennessee Valley Authority scheme, but human-ecological conditions in Machakos were very different and problems were soon encountered. Countour terraces ran in narrow horizontal strips from the tops to the bottoms of ridges, cutting across traditional Akamba land holdings. For the program to be successful, it had to be carried out on a communal-labor basis. This disrupted normal agricultural activities, and was especially hard on farmers with small plots who could spare neither the land nor the labor for terracing. The most distasteful feature of the campaign for the Akamba was the requirement that women work side-by-side with men (Sorenson, 1967, pp. 42-43).

The compulsory land-terracing program attracted the attention of Kenya's emerging African political movements. Boycotts were organized in Machakos and 10,000 people marched to the governor's office in Nairobi. The leaders of these demonstrations were arrested, but the point had been made. Communal terracing was halted after 1947, yet the issue of enforced communal soil conservation had become such political dynamite that "late colonial officials were frequently exasperated by insistence on its importance from London . . . and by experts foisted on them by international bodies" (Blaikie and Brookfield, 1987, p. 111). Soil erosion and land degradation continued unabated in Machakos, and by this time the Akamba had lost all ability to reverse the trend. Instead, a sense of helplessness and

resignation had set in, as people felt out of control of their environment. Earlier, Maher (1937, p. 73) recorded that, even as they resisted official terracing measures, "the Akamba elders now blame God. They say 'if Mulungu (God) would send us as much rain as He used to we could keep our present stock and soil in good condition. God is the Great Eroder."

The political fate of the terracing effort ruled out further direct attempts at soil conservation, and government began to search for alternative approaches toward reversing ecological decline and agricultural stagnation in the reserve areas of Machakos. Not surprisingly, by the late 1940s agronomists were arguing that the basic cause of these problems was neither over-population nor inferior farming methods. Indigenous land-tenure arrangements now became the main culprit. The call went forth to consolidate land fragments, to register individual titles of occupancy, and, eventually, to accelerate cash cropping under the Swynnerton Plan (Swynnerton, 1955; Sorrenson, 1967). These mandates were not new. As early as 1925, the Report of the East African Commission (Ormsby-Gore, 1925) had suggested the introduction of individual land tenure in the reserves as a prerequisite of better land use. The Carter Commission of 1934 again emphasized the individualization of tenure. In the words of A.E. Walter, Government Statistician:

I think that the present land tenure of the native will not take you very far. . . some sort of personal tenure would have to be adopted if the native were going to make any progress at all With regard to subdivision and fragmentation of land, what I think is that you cannot support such a large population where land is held communally as where you have individual tenure. The land holds a very much larger population if it is subdivided rationally (Carter, 1934, p. 3034).

Accordingly, the Commission recommended that, in locations where people were amenable to the idea, land tenure should be guided in the

direction of individual titles (Sorrenson, 1967, pp. 54ff).

The proposal was generally ignored by the colonial government, in spite of the support it received from African political parties and from so-called "progressive" farmers in the reserves. After World War II, the land issue and the call for individual titles in the reserves became major sources of conflict between these African groups and the government. The British dismissed African demands by attributing them to a few greedy "land miners" suffering from the "ills of individualism" (Hon. C. Tomkinson, Provincial Commissioner of Central Province, quoted in Sorrenson, 1967, p. 56). Colonial officials then became determined to stem the rising tide of individualism by assisting African communities to revert back to an idealized state of traditional communalism. This shift in attitude did not reflect reality in most of the reserves. In 1948, a retired African school teacher summarized the changed situation:

Modern conditions dictate that some modern acts be done to regularize these practices to remove any fears existing among African land owners and to give them a feeling of complete security The Private Title or Individual Title Deed is now a necessity in many parts of Central Province. The security it would give the right holders would encourage better farming methods. In fact, I do not see how we can avoid it. People are now growing permanent crops; they are establishing permanent buildings and other improvements, like fencing and dips. Individualism in the areas under consideration has come to stay. The Native Lands Trust Ordinance of 1938 will have to be amended to fit in with the times" (Muthu, quoted in Sorrenson, 1967, p. 63).

This defense of individualized land tenure depicted only the immediate benefits to be derived by the privileged few. It failed to account for the plight of the vast majority of impoverished Akamba peasants in Machakos, and also for the necessity of preserving community responsibility for the land as a

vital condition of resource conservation. The introduction of cash crops had given cash value to the land which it did not possess before. Inequality and highly uneven distributions of land ownership were inevitable, as land was bought, sold, and inherited. Cash transfers left many families landless and destitute. Individualized inheritance among sons resulted in the distribution of increasingly fragmented and sub-economic plots.

In 1953, at the height of the Mau Mau "emergency," the colonial government finally amended existing legislation to authorize private land acquisitions in the reserves. These changes set the stage for a comprehensive agrarian reform program in the African areas of Kenya, the Swynnerton Plan of 1954. This plan was intended to form a blueprint according to which the productivity of African agriculture could be increased, livestock carrying capacity augmented, and human welfare uplifted. Its basic goals were to consolidate fragmented land holdings, to assure security of individual land tenure, and to provide the necessary productive and infrastructural investments to transform subsistence production into remunerative cash-crop agriculture.

After independence in 1963, the new Kenya government adopted these tenets. In its policy statement African Socialism and its Application to Planning in Kenya (1965), government specified that land tenure was to be converted from communal to individual throughout the country. The rationale was that communal land ownership

cannot be carried over indiscriminately to a modern, monetary economy. The need to develop and invest requires credit and a credit economy rests heavily on a system of land titles and their registration. The ownership of land must, therefore, be made more definite and explicit if land consolidation and development are to be fully successful (Republic of Kenya, 1965, pp. 10-11).

Twenty-eight years after independence, great strides have been taken toward the realization of this land policy. Customary tenure has been transformed into statutory freehold tenure,

with the effect that in 1985 it was estimated that about 1.5 million titles had been issued, 6 million hectares adjudicated, and 5.5 million hectares surveyed for adjudication and registration (Republic of Kenya, 1988, p. 197).

Unfortunately, the poverty and inequality associated with colonial privatization have persisted and increased in independent Kenya. So too have the negative ecological effects of privatization in Machakos and in Kenya's other ASAL regions. Authorized under the Registered Land Act, private ownership has created a situation in which control over the land and its resources is highly fragmented. For the majority of Akamba and other ASAL dwellers, who own no more than two hectares, this individualization of responsibility for the environment has produced dire consequences. To be effective in ASAL locations, conservation measures must cover larger areas and require more time and labor than in more-humid zones. Effective land management thus results more from community action than from individual effort. More than any other factor, a legally sanctioned abandonment of communal involvement in resource conservation has led to the environmental deterioration now encountered in Machakos and elsewhere in the 83 percent of Kenya which is arid and semi-arid.

This conclusion is not intended to invoke a return to the past in Machakos. Many traditional Akamba institutions, land-management strategies, and technologies are now obsolete. It is also evident, however, that western innovations have contributed significantly to the ecological decline experienced by the Akamba, and neither are they the solution to the problem. The existing state of affairs, then, calls for a marrying of the more positive elements of both approaches. Before this can be accomplished, the lasting advantages of Akamba (and other traditional) land-management and conservation strategies must be understood and appreciated.

LEARNING FROM THE PAST

Land Use. The Akamba were able to overcome the ecological limitations of Machakos and to engage in environmentally sustainable agriculture through a combination

of technical innovations and institutional rules governing land use. Developed over time, and still possible today, Akamba land-use practices associated variations in rainfall, temperature, and soil with preferred crops and potential yields in given locales. In particular, the Akamba classified soils according to four types - nzangathe, mutune, hiku, and nthanthai.

Nzangathe soils predominate in the Akamba locations of Machakos. They are light, sandy, and deficient in humus. They also tend to dry out rapidly because of their lightness and the high temperatures to which they are exposed. Traditionally, the Akamba cultivated cassava, pigeon peas, sweet potatoes, and other drought-resistant and deep-rooted crops in nzangathe soils. By contrast, mutune clays were not favored for cultivation because of their hardness and the steep slopes where they are found. Mutune were chiefly used to provide forage and were also mined by women for the manufacture of pots. Hiku, the most valuable soils to the Akamba, are alluvial varieties located near large streams including the Tiva and the Thowa. They are suitable for grains such as maize and sorghum, in addition to pigeon peas, cowpeas, and sugar cane for beer brewing. Hiku are also exposed to seasonal grazing. In that these soils retain moisture, they yield grass when all other land is dry. On the other hand, rocky nthanthai soils, found mainly near the Yatta Plateau, were generally rejected for both cultivation and grazing.

The Akamba not only recognized how, where, and when to employ the land for best results, they also devised conservation measures to protect this scarce and valuable resource for the future. Such investments, again still possible, included small-scale terracing and irrigation, together with intercropping and other cultivation patterns to enhance soil quality and prevent erosion. Taken together, Akamba soil/land-use distinctions and conservation techniques ensured sustainable agricultural production in an often hostile environment.

Land Tenure. Rules governing land tenure further protected Akamba agricultural systems and society. As with land-use practices, the overall aim was to distribute risk and thereby

guarantee group survival. In the case of land tenure, security was achieved through a flexible institutional framework that discouraged exclusive individual rights and elaborated procedures for the sharing, management, and conservation of resources within and among communities. Land was viewed as essentially disaggregated. Emphasis was placed on an equitable distribution of different soil types, preventing the hoarding, for example, of alluvial hiku plots by single individuals or groups. In light of the social, economic, and environmental dislocations associated with the introduction of individual land rights to Machakos, the lasting advantages of traditional Akamba land-tenure arrangements bear re-examination.

In terms of ownership and use rights, the Akamba distinguished between arable and grazing land. Title to rich agricultural land, collectively termed ng'undu, was permanently assigned to each clan (mbai) for distribution on a need basis to individual families. As long as such land was plentiful, a continual subdivision of holdings was avoided through kin-group segmentation and settlement on new lands. (Today, in a situation of land scarcity, technically supported agricultural intensification must replace the migration option. See Boserup, 1965, for a detailed exploration of this alternative.) Other resources likewise carried perpetual rights, including beehives and water requiring extraction through boreholes and/or routing along furrows dug for the purpose.

At the other end of the ownership continuum was grazing land, weu, defined as land which had never been cultivated and was available for use by anyone's livestock. Weu could be converted into ng'undu if local land shortages threatened crop production. While cultivation rights were allocated to the male heads of extended families, grazing rights were distributed to and among whole clans.

Okoth-Ogendo (1974, p. 153) summarizes the Akamba's complex intertwining of individual and communal land rights and responsibilities, on behalf of social equity and economic security:

Access has always been specific to function, for example cultivation or

grazing. Thus, in any given community a number of persons could each hold a right, or bundle of rights, expressing a specific range of functions. In a typical case, therefore, a village could claim grazing rights over a parcel of land subject to the hunting rights of another, the transit rights of a third and the cultivation rights of a fourth. Each one of these categories carries with it varying degrees and levels of social organization. For example, while cultivation rights were generally allocated and controlled at the extended family level, grazing rights were a matter of a much wider segment. The *raison d'être* of control was to guarantee these rights and allocate them among other members of the community should this be necessary.

The lesson from the past to be drawn here involves the strong sense of collective responsibility for community and inter-community well-being which motivated Akamba land-tenure rules. The "modernization" associated with individualized tenure has eroded this ethic, and has also intensified the need for its re-introduction.

The same conclusion can be applied to men's and women's rights in land. Allocative powers were conferred on men rather than on women in the patriarchal Akamba society, partly because men were also responsible for opening new lands. On the other hand, women enjoyed inalienable land-use rights obtained through marriage and from their fathers before marriage. This permanency of women's rights reflects the importance attached by the Akamba to the role of women in providing for community subsistence. Exercising ultimate control over the land, men acted primarily to invest agricultural surpluses in order to provide the necessary resources for symbolic activities which cemented group cohesion. Again, both sets of rights and responsibilities emphasized cooperation over conflict, and group prosperity over socially disruptive individual acquisitiveness. This stands in sharp contrast to the situation today, in which individual (and primarily male) rights to the land and its

resources feed inequality, social disintegration, and a collective loss of responsibility for protecting and perpetuating land-based resources.

Regardless of the level at which they were activated and by whom, land-tenure rights embodied specific responsibilities for management and conservation. These obligations were embodied in commonly accepted customs, rules, and techniques pertaining to the use of soils, water, indigenous vegetation, and wildlife. These management and conservation innovations closely resemble what are currently recommended to improve Kenyan and other Third World agricultural systems, under the "small is beautiful" rubric of what is termed "appropriate technology."

Soils. The Akamba employed mounding, composting, cover crops, and fertilization with household wastes and animal manure to maintain and improve soil fertility. Cropping procedures were also aimed at protecting soil structure and fertility. Leaving some of the land in natural vegetation minimized wind and water erosion. Intercropping of cereals and legumes with tree and root crops allowed the soil to be exploited at different depths, fixed nitrogen, lessened pest infestation, reduced time and labor expended on weeding, increased ground cover to conserve soil and water, and brought forth an extended harvesting period.

Eastern Africa had long ago experienced the diffusion of plough technology from Egypt. Nevertheless, the Akamba deliberately chose the less-efficient hoe because ploughing often leads to excessive soil oxidation and breakdown, and tends to mix soils of lower and higher quality. (This readiness to settle for a relatively laborious technology is probably also linked to the fact that cultivation was and remains a women's concern among the Akamba, whereas in northern Africa the task normally falls to men.)

Water. Most Akamba agriculture was rainfed, with the exception of cropping in riverine areas. In more-arid locations yields were sustained through the use of various water-harvesting techniques and through the conscious selection of crops for their drought resistance. Household water supplies presented

a special problem for Akamba women who were responsible for fetching it, but this burden was reduced with the introduction of community boreholes. Except in times of prolonged drought, livestock were moved over wide areas to avoid ecosystem collapse as a result of overgrazing and the depletion of groundwater reserves. In spite of heavier human population densities, this option remains viable today if communal grazing rights are revived.

Vegetation. Trees are an impediment to both farming and herding. Like most other eastern African societies, the Akamba cleared trees by burning them and other woody growth in areas needed for agriculture. Over time, continuous burning created savanna grasslands in parts of Machakos that could otherwise support woodlands.

Despite this long tradition of intentional deforestation, the Akamba also conserved forest resources for present and future use. Some trees, including the baobab, were prized for beekeeping. Other species provided sustainable supplies of firewood and building materials. Especially in times of impending food shortages, the fruits of certain trees were treated as contingency foods. Selected species were viewed as offering homes for the spirits and played an important role in religious observances. They too were conserved.

Wildlife. The potential benefits of wildlife to the Akamba are much different today than in the past. Now the chief value of wild fauna lies in the financial contributions they make possible from wildlife tourism, some of which can be shared locally. Traditionally, wildlife served an important, if limited, purpose in helping to satisfy Akamba subsistence needs. In short, the rationale for protecting wildlife may have changed for the Akamba, but the ethic of wildlife conservation is not absent in Akamba society and culture.

As a society that still practiced hunting, the Akamba depended on wildlife for meat and for skins to turn into utility goods such as musical instruments, ornaments, and storage vessels. Some wild animals posed a physical danger, however, and others acted as reservoirs of trypanosomiasis, rinderpest, and other human and livestock diseases. In Machakos and

throughout eastern Africa, the mixed blessing of wildlife was accommodated through the clearing of bush and woodland, thus confining wild ungulates and carnivores to specific areas. Balances were maintained, until both human and animal populations were decimated in the epidemic diseases that accompanied the introduction of colonialism into eastern Africa during the late nineteenth and early twentieth centuries (cf. Kjekshus, 1977).

The environmental and ecological dislocations that have since occurred are not confined to human-wildlife interactions. They span the entire gamut of relationships joining African societies with their resource base. This is not to imply that, for the Akamba and other societies, these disturbances have become so irreversible that traditionally established means of correcting them are no longer relevant to the future.

AKAMBA PROSPECTS FOR THE FUTURE

In its quest for sustainable natural resource utilization to serve an inexorably growing population, Kenya has frequently turned to the outside world. This inclination is no more apparent than in the country's attempts to deal with its arid and semi-arid lands. The Kenyan ASAL have long suffered under a misperception of being ecologically barren, economically dead, and, most importantly, inhabited by subsistence farmers and pastoralists who have used the land and its resources inefficiently and in other ways irrationally. These mistaken interpretations form part of Kenya's colonial legacy. Since colonial times they have continued to exert a powerful and largely negative influence over public policy for these areas.

Represented by the Akamba, indigenous farming and pastoral communities have demonstrated over hundreds of years that sustainable resource use is possible in ASAL settings, notwithstanding the delicate nature of their environments. And yet challenges to the ASAL are much greater today than at any time in the past. They result not only from accelerating environmental deterioration associated with population growth, but also from an erosion of traditional controls that once controlled such decline. The critical question is

whether the essence of Akamba and other traditional approaches to resource conservation can be resurrected and made compatible with the Kenyan development agenda for the 1990s and beyond. Present indications suggest a guardedly positive response.

Individualized land tenure and use rights were introduced on a mass scale into Kenya during the 1950s. Included in the Swynnerton Plan of 1954, this revolutionary change in land ownership and management for subsistence-oriented Africans was intended to commercialize small-holder agriculture and thus to incorporate a restive majority decisively into an independent Kenyan economy. In Machakos and other ASAL areas at least, Kenya has since achieved only marginal success in pursuing these goals, and at considerable cost to the country's natural resources and environment.

Assisted by the government's self-help Harambee movement, a counter-trend may now be emerging. Modern forms of communal land management are appearing among the Akamba and in other local societies. Some of these nuances are based on traditional institutions and practices and others result from the actions of modern secondary associations, including non-governmental organizations specifically concerned with resource conservation as well as agricultural cooperatives, religious congregations, and women's groups. Unfortunately, these innovations are as yet unaccompanied by alterations in land tenure based on lessons from the past which are still appropriate to natural resource conservation and sustainable agrarian development.

To the extent that it already exists, the new communalism in itself represents no mean feat, requiring as it does a loosening of individual prerogatives and even the surrender of land on behalf of resource conservation. That the effort arises largely from community self-help initiatives attests to the enduring vitality of traditional values which once promoted the same kind of commitment. In no small measure, the future of Machakos and its Akamba inhabitants will turn on the ability of national policy to further these links with the past and to extend them throughout Kenya's vast reaches of arid and semi-arid lands.

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