Human Ecology, Vol. 27, No. 3, 1999

Response to Drought Among Farmers and Herders in Southern Kajiado District, Kenya: A Comparison of 1972–1976 and 1994–1995

David J. Campbell[1]

This article examines continuity and change in farming and herder communities' strategies for coping with food deficits in S.E. Kajiado District, Kenya, through a comparison of coping strategies reported in surveys conducted in 1977 and 1996. It provides empirical evidence of the dynamic responses that one rural society prone to recurrent drought-related food insecurity has made to the complex interactions between exogenous and local political, economic, social and demographic, and environmental processes. It demonstrates that although driving forces emanating from national and international scales create the broad context for developmental change, local processes mediate these. As these alter, so do the options available for coping with food insecurity. The availability of these options differs according to a person's age, gender, and socio-economic status. Such dynamism and differentiation is inherent in rural development and should inform development planners and those seeking to include monitoring of coping strategies as a component of famine early-warning systems.

KEY WORDS: Kenya; drought; coping strategies; rural development; Maasai.

INTRODUCTION

This article examines continuity and change in communities' strategies for coping with food deficits in S.E. Kajiado District, Kenya. Many students of coping strategies have hypothesized that they are dynamic and will change as the development context of a community develops. Few have

[1]Geography and African Studies, Michigan State University, East Lansing, MI 48824-1115.

0300-7839/99/0900-0377$1 6.00/0

been able to examine this dynamism. The study illustrates how the suite of coping strategies in the research area has responded to rapid and significant changes in economic and social circumstances over the past 20 years.

Since the mid-1970s an extensive literature has appeared on the subject of strategies used by rural societies in Africa to ameliorate the impact of recurrent food shortages.[2] This includes many important contributions from research in Kenya.[3] One of the important postulates of this literature is that the strategies used to cope with food shortage are embedded in existing rural socioecological systems. They are facets of that system that are deliberately maintained as security against shortages. In times of low stress they may be subdued, employed regularly by the very poor for whom coping is a constant necessity, but they assume general significance in times of stress.

Being integral components of existing production systems, the viability and efficacy of these coping strategies may alter as the wider society in which they are embedded undergoes structural changes in response to exogenous and endogenous forces. Existing strategies may falter, and new alternatives may present themselves as economic, social, political, and environmental conditions alter (Campbell, 1990).[4]

Relatively few studies have examined how the coping strategies of societies change over time.[5] This study directly compares the coping strategies reported by herding and farming groups in S.E. Kajiado District in Kenya (Fig. 1) in surveys conducted in 1977 (Campbell, 1984a) and 1996. The 1977 survey followed a prolonged period of drought from 1972 to 1976, and the survey in 1996 followed a less intense drought in 1994 and 1995.

The comparison includes an assessment of the patterns of change in the socioeconomic systems of the area and of their driving forces, an

[2]For reviews of this literature see and Corbett (1988) Campbell (1990). Recent additions to the literature include Davies (1996), Grolle (1995), McCusker (1997), and numerous contributions to the journal *Disasters*.

[3]These include Akong'a (1982), Akong'a & Kareithi (1998), Bush (1995), Campbell (1984a), Downing *et al.* (1989), Fratkin (1998), Fratkin & Roth (1990), Fratkin & Smith (1995), Galvin *et al.* (1994), Mbithi & Wisner (1972), Neumann *et al.* (1989), O'Leary (1980), Sperling (1987), and Wisner (1977).

[4]This framework, based on studies in the 1970s and 1980s, has recently been restated for West Africa by Adams *et al.* (1998).

[5]That coping strategies do change has been noted by a number of authors including Moris (1988), who examined how herders' responses to experiences of drought and government policies on pastoral development have altered herders' vulnerability; Campbell *et al.* (1990), who reported changes being undertaken by Zimbabwean farmers as a response to recent experiences of food shortage; Lambert (1994) and Davies (1996) who wrote about the SADS Programme in Mali. All have noted that, over time, coping strategies may become part of the regular livelihood of people. Ross *et al.* (1996) explored long-term dietary changes in Northern Nigeria, linking these changes to local responses to integration into the broader commercial economy, facilitated particularly by improvements to the transportation infrastructure.

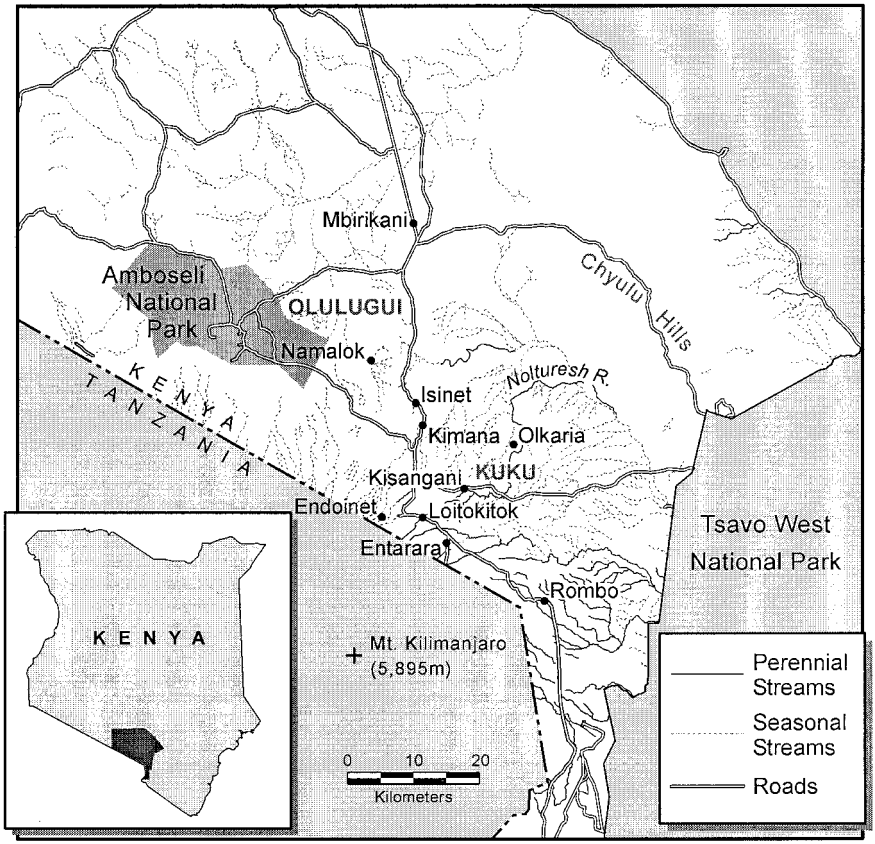

Fig. 1. S.E. Kajiado District, Kenya.

examination of the similarities and differences in the strategies for coping with food deficits reported in the two surveys, and a discussion of the relationships between patterns of coping and the developmental context.

This article provides empirical evidence of the dynamic responses that one rural society, in an area prone to recurrent drought-related food insecurity, has made to the complex interactions between national and local political, economic, social and demographic, and environmental processes that characterize rural development. It demonstrates that although driving forces of change emanating from national and international scales create the broad context for developmental change, local processes embedded in a community's interactions with the natural resource base mediate these forces. Globalization might imply that the world is becoming more homogeneous, but we

may in fact be finding that the local scene is becoming more differentiated, not less, as societies mediate global trends and their susceptibility to power through their history, institutions, resources, and location.

The outcome is a complex mosaic of societal processes and land use patterns. As these alter, so do the options available to rural people for coping with food insecurity. Not all options are available to all people or groups. Differentiation by age, gender, and socioeconomic status exists in the availability of such options, as with most aspects of livelihood systems. Such dynamism and differentiation is inherent in rural development and should inform development planners and those seeking to include monitoring of coping strategies as a component of famine early-warning systems.

ANALYTICAL AND SURVEY METHODS

The framework for the discussion is based in regional political ecology (RPE) (Blaikie, 1994; Blaikie & Brookfield, 1987; Peet & Watts, 1996; Rocheleau, *et al.* 1996). Application of the framework to recent developments in Kajiado District is found in Campbell and Olson (1991a). The broad parameters of the approach emphasize that socioeconomic change results from interactions among and between economic, social, and political processes and the physical environment. These interactions occur between different scales (global, national, local) over time and space. Furthermore, explicit recognition is given to the role of power exercised by individuals, groups and institutions, both local and external, in driving these interactions.

The complexity of these interactions requires the use of multiple sources of data, analytical methods, and modes of presentation. These sources include information on land use and socioeconomic change from household surveys and community workshops conducted in 1977 and 1996, and data concerning plants, their uses, and change in distribution and access, by transect survey of vegetation and by household-level interviews conducted in 1996.[6]

The household surveys provided information concerning family structure, economic activity, aspects of environmental management, response to food scarcity, and perspectives on present and future conditions in the area. The survey in 1977 comprised 225 farmers and 167 herders, whereas the 1996 survey included 227 herders and 332 farmers.[7] The interviews took

[6]Information on plants was obtained by transect surveys, from the household interviews, and from additional information gathered from parents by children in the area's primary schools.
[7]Some of the interviews in 1996 took place in areas of Mbirikani Group Ranch that were not surveyed in 1977. These were omitted from any direct comparisons of the situation in 1977 with that of 1996.

place on the group ranches and farms around the slopes of Mt. Kilimanjaro. The sampling method in 1996 replicated that used in 1977. The survey was conducted along ecologic transects that descended from the Tanzania border into the semiarid rangelands. Four transects were surveyed—from Endoinet to Namalok, from Loitokitok to Kimana through Isinet, to Mbirikani, from Entarara to Kuku, and in Rombo. The sampling along the transects was stratified by major land use to include rainfed agriculture, irrigated lands, and pastoral areas.

In both 1978 and 1996, community workshops were held in areas where the research was conducted to review some of the findings and their interpretation.[8] Lively and pointed discussion took place at each of the workshops. The issues raised by the research findings were discussed critically. This contributed to a more focused interpretation of the information from the survey and clarified a number of issues that might otherwise have been misconstrued or underrated. Important among these were the high rate of reporting the predatory activity of hyenas and the apparent decline in mutual support during times of food shortage as indicated in the survey data. This decline was explained in the workshops as an artifact that resulted because the field survey coincided with food distribution by a nongovernment organization (NGO). As a consequence, people emphasized external assistance over mutual support in their responses to the enumerators' questions.

THE SURVEY AREA

The study area is part of the semiarid arc that borders the high-potential lands of central and western Kenya. This area experiences two rainy seasons: March to May and October to December. The average annual rainfall over the area is between 500 and 600 mm, although higher totals occur on the Chyulu Hills and Mt. Kilimanjaro. The rainfall, however, is inconsistent in time and space, and drought is a recurrent problem.[9]

The vegetation, and thus the productivity of the landscape, is closely related to rainfall. Savanna dominates the area. Land with higher agricul-

[8]The workshops held in 1978 are reported in Campbell (1984b, 1987). In 1996 the team implementing the workshops included D. J. Campbell, H. Gichohi, A. Mwangi, E. Ogol, D. Somoire, P. Ntiati, and J. Lempira. To ensure a balanced coverage of farmers and herders, workshops were held in six market centers (i.e., Rombo, Illasit, Kisangani, Isinet, Namalok, and Mbirikani). The study team presented the principal findings specific to each area and also stated the major problem identified in each area. To initiate the discussion the workshop participants were then asked to address the following questions (a) Is this the problem? (b) What are the causes? and (c) What can we do about it?

[9]During the present century droughts are recorded in 1933–1935, 1943–1946, 1948–1949, 1952–1953, 1960–1961, 1972–1976, 1983–1984, and 1994–1995.

tural potential is found in areas where rainfall is greater (e.g., the northern slopes of Mt. Kilimanjaro) and in relatively small, localized areas, which because of their permanent water and fertile soil, are potentially more productive than the surrounding savanna rangelands. These include the swamps at Amboseli, Namalok, and Kimana, and the valleys of the perennial streams that originate on Mt. Kilimanjaro.

Before the arrival of the British, the area that is now Kajiado District in southern Kenya was inhabited by the Maasai. The Maasai were transhumant pastoralists whose subsistence economy was based on the herding of cattle, sheep, and goats. These animals formed the basis of the Maasai social and economic system, whose primary goal was to maintain sufficient livestock in the face of an unpredictable physical environment in which periodic drought and livestock diseases jeopardized their survival. Colonial policy restricted the area available to Africans, and the study area lies in what was designated as the Reserve. Significant portions of the Reserve were set aside as national parks or reserves to protect wildlife. The Tsavo and Amboseli National Parks bordering the study area are a contemporary legacy of this colonial policy.

Since colonization of Kenya by the British, government development efforts have attempted to modernize the Maasai economy by transforming land tenure arrangements, encouraging the education of children, reducing livestock numbers, and controlling seasonal movements. At the same time, social and economic changes in the nation have brought change to traditional social norms.

The major policy efforts for herding in the arid and semiarid lands of Kenya, including Kajiado District, from independence to the early 1980s have built on strategies begun during the colonial period under the African Land Development Board (ALDEV) and Swynnerton plans. These have included promoting a new land tenure system in an attempt to achieve economic and environmental objectives, improving livestock health through vaccination campaigns and building dips, and encouraging livestock sales. In 1979 the government began the Arid and Semiarid Lands (ASAL) Development Programme, which continued these policies, but also added a focus on crop production. Such development concerns are similar to those addressed in other parts of Africa and in Asia (Fratkin, 1997; Moris, 1988; Sandford, 1983).

The support for crop production recognized that population growth has been rapid since independence in 1963, as migrants from the densely populated central highlands of Kenya have moved to cultivate the fertile and relatively well-watered slopes of Mt. Kilimanjaro, and nearby swamp margins and riparian lands. Immigration has resulted in ethnic diversity. According to the 1989 Census (Kenya, 1994), the Maasai account for 57%

(although many are farmers), Kikuyu 24% and Kamba 8% of the District population (Table I).

The economy is diverse. Subsistence livestock and crop production dominates, although horticulture has expanded over the past decade and the area has become Kenya's foremost producer of horticultural products (H. Krugmann, 1995, personal communication). Livestock herding by the Maasai is still widespread and extends over much of the savanna. Rainfed agriculture is situated on the slopes of Mt. Kilimanjaro and irrigated crops are grown around swamps and along rivers. Wildlife-based tourism is the most important activity in terms of the national economy.

The rapid population growth and the diversification of economic activity, along with their implications for land use, have contributed to the changes that have occurred in the area over the past 20 years, which continue (Campbell, 1981a, 1981b, 1993; Campbell *et al.,* 1997a). In 1977 three principal economic activities dominated the area: herding by Maasai on the rangelands, rainfed agriculture on the slopes of Mt. Kilimanjaro, and tourism based on wildlife viewing in the national parks. The distribution of these activities was discreet: wildlife in the parks with a seasonal dispersal into adjacent rangelands, Maasai herding in these rangelands, and farming on the mountain slopes.

This was not a static pattern of land use. Farming on the mountain was relatively recent, having originated in the 1930s but becoming widespread only after Kenya's independence in 1963. The demarcation of national parks and reserves for the protection of wildlife occurred immediately after World War II. In the rangelands land tenure reform and the creation of individual ranches and group ranches (Olang, 1982; Ole Pasha, 1986)[10] accelerated after independence as the government sought to encourage

Table I. The Population of Kajiado District 1969–1989

Census year	Population	Average annual growth (%)	Intercensus growth (%)
1969	85,093		
1979	149,005	5.76	75.1
1989	258,659	5.67	73.6

[10]In the more productive margins of rangelands, land was adjudicated to individuals, whereas in the semiarid rangelands, adjudication was carried out on a group basis, as group ranches. These were established on the basis of traditional rights of occupancy, and efforts were made to include a variety of resources to provide for the herders' seasonal needs for water and pasture. The ranches, once registered, could apply for government loans to improve ranch infrastructure with such additions as boreholes and dips. The intent was that the government would set conditions on these loans to control livestock numbers and keep them within the ecologic carrying capacity.

improved range management and as a response to fears among the Maasai that they were losing their land to agriculture and parks.

By the mid-1970s there also were indications of processes that since have become very important, exerting a powerful influence on land use and the societies of the area. These include the beginning of cultivation at the swamp margins, sedentarization of herders, and calls to break up the group ranches into individual land holdings (Campbell, 1986; Galaty, 1992, 1994).

DEVELOPMENT AND CHANGE 1977–1996

Over the past 20 years, the patterns of interaction between the study area and the political economy of Kenya have dramatically altered. In 1977 the area's economy could be differentiated into the long-standing herding and wildlife land uses in the plains, and rainfed agriculture on the upper slopes of Mt. Kilimanjaro, immediately north of the Tanzania border. This expansion began in the 1930s and, paradoxically, had been both resisted and facilitated by the Maasai herders (Campbell, 1993) resisted because it threatened access to important dry-season grazing areas, and facilitated by individual Maasai inviting relatives to farm.

By the mid-1970s the interface between agriculture and herding was moving farther into the rangelands, occupying land with access to water around swamps and along rivers. Government policy, under the ASAL Development Programme and District Development Plans, supported the expansion of crop agriculture. In the wildlife sector, the Kenya Wildlife Service (KWS) and the Ministry of Tourism and Wildlife were actively promoting their interests, which included the protection of wildlife in national parks. Both expanding cultivation and the parks took land from the herders' resource base.

The herders and farmers responded to opportunities and constraints deriving from policy, economic options, land tenure arrangements, and access to land and water. The principal land use changes noted between 1977 and 1996 were intensification on the mountain slopes, including stall feeding of cattle, downslope expansion of agriculture under more extensive land use; extension of swamp-edge and riparian cultivation; and an increase in extra-national park tourist activity, including tented camps and the Wildlife Sanctuary at Kimana.

Significant socioeconomic change accompanied this pattern. The number of Maasai who maintained a livestock-based livelihood declined, whereas Maasai agropastoralism increased and prospered. In anticipation of the subdivision of group ranches into individual units, competition for

the valuable land with access to water increased. Furthermore, as young men feared that they would lose in this process, they began to challenge the traditional age-set hierarchy.

Population growth among farmers, accelerated by continued migration from elsewhere in Kenya, altered the ethnic composition of the population such that by the mid-1990s the Maasai were a bare majority. Today, many farmers, particularly in areas of agricultural expansion on the lower mountain slopes and in the rangelands, are experiencing insecurity over land rights. They are farming land on group ranches. Moreover, as subdivision is implemented, non-Maasai who have been farming for a considerable time may lose access to land, because the agreements under which they have been allowed to farm have protected Maasai land claims.

Meanwhile, those concerned with wildlife management and related tourism have struggled to foster a positive relationship with farming and herding communities. Land use change threatens to fragment the wildlife habitat and reduce the access of wildlife to water (Western & Gichohi, 1993). Greater proximity between people and wildlife has increased the incidence of injury, predation, and crop damage. As in other areas of East Africa, the competition between wildlife and people is rife (Fratkin, 1997; Homewood, 1995; McCabe *et al.,* 1992; Western, 1989, 1994).

The driving forces of these changes include economic, social, and political processes as well as environmental and resource concerns. Some originate locally, whereas others reflect national and international influences. For example, expansion of rainfed cultivation and irrigated horticulture and the increased revenues from wildlife-based tourism are related nationally to demographic trends, and internationally to a growth in tourism and the diffusion of structural adjustment programs.

Economic Changes

The economy of the area has been transformed over the past 20 years. A confluence of factors, both locally and externally driven, has resulted in the diversification of many herders to cultivation, an expansion of rainfed cultivation and irrigated horticulture, and the increased importance of the tourist economy for the national economy and for some local people. These factors include the unequal distribution of land in high-potential areas of Kenya that has caused many people to emigrate to the wetter margins of the rangelands in search of farmland; the expansion of international tourism, with a significant emphasis on wildlife viewing; structural adjustment programs, which, combined with improved local surface transport and air

freight facilities, have opened up markets for horticultural products in Nairobi and Mombasa as well as in Europe; and the local land use changes that national parks and agricultural expansion have wrought, together with their implications for the Maasai herding economy.

Many Maasai herders have taken up cultivation along rivers and around swamps. This began at Kimana, Namalok, and Rombo in the mid-1970s, but has expanded since in these locations as well as others, including Isinet and Kuku. There also has been an expansion and diversification of activity among non-Maasai farmers. In 1977 most were practicing rainfed cultivation and growing primarily maize and beans on the slopes of Mt. Kilimanjaro, whereas relatively few were irrigating crops at Kimana, Namalok, and Rombo. By 1996, large numbers had taken up production of irrigated crops along rivers and around swamps. Furthermore, there have been significant efforts to increase the involvement of local people in tourism-related activities.

These changes have resulted in far more intricate spatial patterns of land use and increased conflict over access to resources (Campbell *et al.,* 1997a). Although in 1977 one could generalize with some confidence about a "herding zone" in the savanna, an "agricultural zone" on the mountain slopes, and a "tourism and wildlife distribution" in the parks and savanna, the situation in 1996 was far more complex.

The "herding zone," while still the largest, had lost significant territory with access to water as swamp-edge and riparian agriculture expanded. When asked what they would do to protect themselves from the effects of future droughts, many Maasai respondents to the 1977 survey stated that they would take up agriculture. This has happened. Among the Maasai, there now are herders, herder-farmers, farmer-herders, and farmers. Those who farm and have few animals (farmers) are found primarily on the slopes of Mt. Kilimanjaro, whereas those who farm and still keep sizable herds (farmer-herders) are found around swamps and along rivers. The herders who do no farming remain in the rangelands, whereas those who practice some cultivation (herder-farmers) are located near swamps and along rivers.

Cultivation by non-Maasai farmers also has expanded. There has been substantial immigration to locations where irrigation is possible and to the lower slopes of Mt. Kilimanjaro, although on these lower slopes rainfed agriculture is more sensitive to rainfall variability. Today upper-mountain cultivation, lower-mountain cultivation, swamp-edge irrigation, and riparian irrigation are found. Furthermore, the crops produced under irrigation differ from one location to another.

The tourism economy also has grown in volume and diversified its activities in the area. Tourism is a major source of foreign exchange for Kenya. The two parks that border the study area, Amboseli and Tsavo, are among the most popular tourist destinations among Kenya's renowned

parks and reserves. In 1995, they accounted for approximately 25% of the visits to Kenyan parks and reserves outside the Nairobi area.

Tensions between park authorities and adjacent communities stem from the enclosure of water and pasture formerly available to herders, and from predation and crop damage caused by wildlife dispersing from the parks, and by wildlife resident in the study area. A variety of policies have been considered and tested to increase the economic returns from tourism to the people of the area (Berger, 1991; Western, 1976, 1982, 1989, 1994).

Recently, local communities and the Kenya Wildlife Service (KWS) have promoted direct economic returns to the landowners living adjacent to the parks. These have included building electric fences around farmers' fields, such as at Namalok; setting up tented camps for tourists on group ranches, such as Olulugui Group Ranch; leasing land for tourist concessions, as at Mbirikani Group Ranch; and establishing a Wildlife Sanctuary on Kimana Group Ranch. Furthermore, KWS has used revenues to support the education of children from the area. Although these activities have benefited some communities, complaints about conflicts with wildlife remain common (Campbell *et al.,* 1997b). At this writing, the objectives of wildlife managers in promoting community involvement in wildlife management have had mixed success.

The study area is undergoing conversion from an economy dominated by local transactions to one that is increasingly integrated into the national and thereby linked to the global economy. This has implications for local production, political and social structures, and the demands made on the resource base.

Social/Cultural Changes

In 1977 livestock raising was the dominant activity of a large majority of the Maasai. Since then Maasai society and economy have changed (Kituyi, 1990; Spear & Waller, 1993). Many Maasai now include some cultivation in their production system, and others are traders. Furthermore, institutional structures have altered. On the group ranches young men are asserting an influence that would have been impossible under customary age-set structures, and cultural bomas[11] provide women possibilities to im-

[11]Cultural bomas are Maasai bomas given over to entertaining tourists who arrive in the minibuses that transport them from national park to national park. Typically, the visits are arranged so that the tourists have free rein in photographing. They see inside houses; they are entertained by dancers (girls, women, and moran leaps); and they are guided by an English-speaking Maasai man who tells something of the history and culture and answers questions. Some are tasteful; many are not. In 1995, the fee for a visit was about 1000KSH (~ $20) per bus. Of this, the driver received 700KSH. The bomas offer work opportunities for women and increased financial security for their households.

prove the financial security of their households. (Father Gogarty of the Loitokitok Catholic Mission, personal communication, 1995).

Impending changes in the relationship between older and younger Maasai were detected in the responses to the 1977 survey, when younger men stated a desire to diversify into agriculture and recognized that this would require a change in land tenure arrangements (Campbell, 1984a, pp. 55–56). The objectives of the young have received support from individuals and organizations that saw the customary Maasai institutions as inhibiting economic opportunity. The recent expansion of extrapark tourism and of horticulture on private plots has provided incentives for investment. In the case of horticulture, most local producers rely on wholesalers based in Nairobi and Mombasa for transport and marketing, and the KWS has been actively supporting initiatives based on tourism. Individual ownership of land is seen as facilitating such economic activities, and the subdivision process has received support both from the government and entrepreneurs who seek to benefit from these potentially lucrative options.

The population of the study area has been increasing rapidly since independence because of both natural increase and continued immigration. Immigration is a response to the lack of perceived opportunity in other parts of Kenya, where land pressure has existed since colonial land alienation. As a result, the ethnic composition has become diverse and the Maasai are only a bare majority in the District according to the 1989 Census (Kenya, 1994). These census figures should be read with some caution because some observers have noted a change in ethnic self-identification among some Maasai (Kituyi, 1990; Spear & Waller, 1993). Many of those who farm, particularly on the slopes of Mt. Kilimanjaro, are children of marriages between Maasai men and women from groups who are predominantly farmers, such as the Kikuyu, Kamba, and Chagga. Although in the past they would have identified themselves as Maasai, today many recount that they are of their mother's ethnic group and view the Maasai way of life as "out on the plains" (Father Gogarty of Loitokitok Catholic Mission, personal communication, 1995).

Since colonial days, Maasai have expressed concern about immigration into Maasailand (Kenya, 1947), and conflicts between different groups have arisen over access to and use of resources. While the Maasai remained dominant, their institutions mediated such conflicts. The 1996 survey data show that interethnic conflicts have increased in frequency, that violence is more common, and that civil authorities (the police and chiefs) are playing more important roles in resolving disputes (Campbell *et al.,* 1997a).

Demographic trends, land tenure structures, and government policy on agriculture, wildlife, and tourism are among the forces that have resulted in a diversification of social relations and ethnic composition in the area.

Maasai society is experiencing a period in which established social structures and land use practices are being questioned, and recent immigrants are forging economic and institutional arrangements that will interact with those of the Maasai to negotiate future social, economic, and institutional patterns with their environmental implications.

Institutional and Political Issues and Policy

A combination of local, national, and global forces have altered the institutional and policy context of the area. Of particular importance are the impending transformation of land tenure and allocation of resources related to new economic opportunities, land use dynamics, and demographic pressure.

Since colonial times, there has been concern that the communal land holding arrangements of the Maasai and other herders were contributing to land degradation. Although there is clear evidence that land degradation was identified as a problem only during periods of drought (Campbell, 1993), policy has assumed it to be chronic. Land adjudication was seen as a prerequisite for more careful resource management. Beginning in the 1950s, the government initiated a program of demarcation of land to individual and group ranches. The program covered the whole of the study area by the end of the 1960s, and similar programs have been applied in other pastoral areas of Kenya (Fratkin, 1994). Although initially accepted by the Maasai as a means of controlling the spread of non-Maasai cultivation, the program's economic and environmental goals were not met.

The government's concern with the failure of the program was matched by a concern among the Maasai that the demarcation of the group ranches had made no provision for population growth. In the 1977 survey, dissatisfaction with the rules governing membership of group ranches was evident among younger Maasai, who saw their opportunities being constrained by the failure of regulations to make provision for land ownership of future generations. Subdivision to individual holdings was seen by many as a viable alternative (Ole Pasha, 1986).

Subdivision is now under active consideration in all group ranches (Galaty, 1992, 1994; Rutten, 1998). Each male family member has an expectation that he will receive title to a portion of the ranch to which he belongs. Some realize that such allocation will not result in an equal distribution of resources because the productive potential of the ranches varies from place to place.[12] Those locations with access to water are the most valuable.

[12]Galaty (1992, 1994) provided a detailed discussion of issues arising from the debate over subdivision. He documented specific examples of contention, including land being unequally divided, the rapid sale of land after subdivision, and disputes between older and younger Maasai over the allocation of land.

On each ranch, some people already have claimed individual property in anticipation of subdivision. Often, they have fenced plots in riparian areas or swamp margins, and have begun either to cultivate themselves or to lease the land to farmers.

Although members of group ranches have a valid claim to land stemming from the original rules establishing the ranches, there are immigrants who have been farming areas within group ranches for years whose rights to continued occupancy are disputable. These include farmers at Isinet, and those who live at Olkaria and other places along the Nolturesh River on Kuku Group Ranch.

One outcome of the debate over subdivision is that younger Maasai have become more aggressive in asserting their interests. Under the traditional age-set authority arrangement, young men had less influence than their elders in setting policy. Recognizing that this organization might result in their disadvantage in the distribution of resources, younger people are challenging the age-set structure, and there is increasing representation of young people in leadership positions on many group ranch committees. At the root of this contest between age groups is access to local economic opportunities. The most potentially remunerative activities are horticulture and tourism. Because each of these has very specific resource requirements, particular locations are the focus of competition for ownership and thus coveted in the anticipation of subdivision.

Under subdivision, the group ranch committees will play a decisive role in the allocation of land to individuals and other parties. Powerful persons of both national and local status, NGOs, and government institutions perceive this and are involved in activities designed to secure their economic and policy interests under revised land tenure arrangements (Krugmann, 1996; Southgate & Hulme, 1996).

These changes in policy and institutional arrangements are happening at a time when the area has become more heterogeneous in its economic and cultural characteristics. Comparison of the survey results from 1977 and 1996 indicate that conflict over access to resources has increased, and that violence between and among groups is more common. In 1996 government-appointed chiefs are more involved in resolving disputes, whereas established institutions have become less effective.

Subdivision, land use change, and policy on wildlife management and agriculture are among the processes that will affect the future of the area. Some people will gain and others will lose. In this context, there are many stakeholders with legitimate interests, including the Maasai, immigrant farmers, and those concerned with tourism and horticulture. All seek representation in decisions over land allocation through institutions representing local people, the chiefs associated with Kenya's ruling party (Southgate &

Hulme, 1996), government bodies such as the KWS, and national and international organizations that represent global conventions such as biodiversity and climate change, and wildlife conservation (Western, 1994).

Environmental Changes

The aforementioned economic, societal, and institutional forces have dramatically altered patterns of resource management and land use in the area. The demand for wood for fuel and construction is growing as the population increases, soil fertility that was high during the initial years of cultivation is showing evidence of decline, and the critical resource for all land-based activities in the area, water, is increasingly failing to meet local demand. Land cover has been transformed by the clearing of vegetation for cultivation, building, fencing, and fuel. Respondents indicated that the area of woodland has declined, although a few reported the planting of trees. Many also state that plant, soil, and water resources are declining.

In 1977, latent conflict was discernible over access to land where sufficient water was available to meet the needs of various land users: herders, farmers, wildlife, and tourists. Such conflict over water is now overt. The issue, however, is not merely one of access but also of quantity and quality. Demand has increased, and many are concerned with chemical pollution. (Campbell *et al.,* 1997a; Krugmann, 1996; Southgate & Hulme, 1996). The situation has been exacerbated by the diversion of water from the Nolturesh River into a pipeline serving Machakos and areas near Nairobi.

Soil fertility decline, increased soil erosion, and deforestation were widely reported in 1996. Some farmers on Mt. Kilimanjaro, where holdings are small and cultivation has been practiced for more than 30 years, have responded by taking land out of production, increasing the amount of fallow land, and more than 20% reported planting crops such as cassava and millet that are more tolerant of environmental stress.

A number of plants and trees are recognized as sources of food. Among the farmers who identified plants with food value in the 1996 survey, 50% told of a decline in availability over the past 10 years, mainly because of weather conditions and land clearance. Of the herders, 50% stated that there had been no change in availability, and almost all of the 33% reporting a decline blamed drought conditions.

The major impact of expanded human settlement on wildlife has occurred outside the parks, and is seen in the fragmentation and loss of habitat, and in restricted access to water. Conversely, the reservation of land for the exclusive use of wildlife has enclosed land and water resources that otherwise would be available for crop and livestock production.

Environmental considerations have influenced policy toward the herding economy since colonial days. Recent developments in agriculture and wildlife-based tourism have altered patterns of resource use, and the sustainability of the resource base now must be evaluated in terms of a more complex land use system resulting from the responses of people to local opportunities and those arising from external sources.

COPING STRATEGIES IN 1977 AND 1996

The strategies for coping with the food shortages reported after the 1972–1976 drought reflected the interactions between the socioeconomic system, institutions, and the resource base at that time (Campbell, 1984a). The dramatic changes over the past 20 years have altered the opportunities for and constraints on different socioeconomic systems in the area, and thus the basis of their coping strategies. The coping strategies identified in 1996 must therefore be analyzed in this context, and any comparisons with the 1977 survey must consider both the changed context and the fact that the 1972–1976 period of drought was longer and more intense in its impact than that of 1994–1995.

Problems Identified by Respondents, 1977 and 1996

The problems identified by both herders and farmers in 1996 demonstrate a similarity with those in 1977 as well as differences resulting from the changes in socioeconomic conditions and the intensity of the most recent drought. A wider range of problems was identified in 1996, although drought and lack of food ranked high both times among all respondent groups. The high degree of concern in 1996 over schooling and peoples' health represents dissatisfaction with the provision of social services. Herders' responses reflect the diversification of the herding economy (Table II). There are now herders, herder-farmers, and farmer-herders, each with different perspectives. Therefore, although in 1977 herders' concerns dealt with the condition of the livestock economy, in 1996 these were complemented by anxiety over the status of crop production.

Herders

In 1977, few herders did any farming. For comparative purposes, respondents to the 1996 survey who did not farm are defined as "herders," whereas those who did farm are identified as herder-farmers. The problems facing

Table II. Herders: Problems Faced in the Study Area, 1977 and 1996[a]

	1977 Herders Total (N = 165)			1996 Herders Total (N = 126)			1996 Herders (N = 77)			1996 Herder-farmers (N = 49)		
	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank
Drought	163	99	1	82	65	2	55	71	2	27	55	3
Animal disease	141	85.5	2	64	51	5	33	43	5	31	63	2
Hunger/lack food	80	48	3	91	72	1	58	75	1	33	67	1
Lack of animals	74	45	4	10	8	11	6	8	10	4	8	11
Lack of pasture	70	42	5	71	56	4	51	66	=3	20	41	5
Lack of dips	58	35	6	23	18.5	10	11	14	9	12	24	8
Poor health	41	25	7	76	61	3	51	66	=3	25	51	4
Poor harvest	NR	NR		42	33	6	27	35	6	15	31	7
Wildlife	NR	NR		37	29	7	18	23	=7	19	39	6
Lack of land	NR	NR		27	21	8	18	23	=7	9	18	9
Lack of school	NR	NR		24	19	9	16	21	9	8	16	10
Floods	NR	NR		4	3	=12	1	1	=11	3	6	=12
Too much rain	NR	NR		4	3	=12	1	1	=11	3	6	=12
Other	3	2		9	7		3	4		6	12	

[a]NR, No Response.

herders in 1996 differ from those noted in 1977 (Table II). In 1977, lack of food was related to a lack of animals, the herds having been severely reduced by disease and by the drought that had diminished availability of pasture and water.[13]

The intensity of the rainfall deficit in 1994–1995 was not as severe. However land use changes had reduced herders' access to dry season pasture and water. In 1996 "lack of animals" was not reported as frequently, which is surprising because average herd sizes were much lower.[14] This may reflect the fact that in recent years many herders have increased the importance of purchased grains in the diet. Therefore, they reported problems in the agricultural sector as well as those that affected their herds.

Wildlife was a serious concern in 1996. Although Maasai herders have long recognized the dangers of malignant catarrh fever from wildebeest, and of predators, the role of the hyena has assumed great concern. Participants in the workshops explained that there were more hyenas in the region,

[13]In the 1977 survey, 63 herders provided information on livestock that the research team considered reliable. For this group, the average number of cattle that died was 16 and the average for dead sheep and goats was 10. This represented about 30% of the herders' predrought herds (for a detailed discussion, see Campbell, 1978). In 1996, 80% of the herders reported deaths of cattle in the prior drought but refused to provide information on actual numbers. Informal discussion with herders suggests that the proportional losses during the less severe 1994–1995 drought were less than in the 1972–1976 period.

[14]The average herd size reported in the 1977 survey was 70 cattle and 99 sheep and goats (Campbell, 1978, p. 54). In 1996, it was 33 cattle and 36 sheep and goats.

and that their behavior had changed in that they more frequently approach settlements and attack livestock, both around the swamps and in the open range land.

Herder-Farmers

In 1977, few people who identified themselves as herders were engaged in crop production. By 1996, many Maasai had diversified into agriculture to take advantage of the economic returns, and as a means of reducing their vulnerability to the effects of recurrent low rainfall. While sharing many of the anxieties of those whose focus was on crop production, herder-farmers and farmer-herders also were very concerned with the condition of their livestock in 1996. Dearth of pasture, animal diseases, and lack of dipping facilities were reported by many. This was a consequence of the more sedentary nature of their lifestyle, limiting the range of their livestock movements, and of the fact that livestock development projects, including the provision of dips, are focused on the rangelands where the more traditional livestock economy exists.

Farmers

Among farmers in 1977, lack of land was an important issue (Table III). This was far less so in 1996, because agricultural expansion was being promoted by chiefs, and opposition to farming had weakened among many Maasai. In response to the impending subdivision of group ranches and to the economic returns on irrigated agriculture, many Maasai had leased land to farmers.

Concern with soil erosion and declining soil fertility was reported by many more farmers in 1996. In 1977 many soils were being cultivated for the first time, and productivity responded to the nutrients stored in the soil. Fallowing was more widely practiced by the Maasai farmers in 1977, when only 10% had no fallow land, than in 1996, when 60% of Maasai farmers reported no fallow land. For non-Maasai farmers, the proportion with no fallow was about 80% in both surveys. The differences between groups reflect the fact that the Maasai began by owning larger areas of land whereas the immigrant farmers rent or buy small plots and have little margin for fallow.

By 1996 the natural fertility of the soil was declining, and 60% of both Maasai and non-Maasai farmers interviewed used some chemical fertilizers. However, a surprising number of farmers on the slopes of Mt. Kilimanjaro

Table III. Farmers: Problems Faced in the Study Area, 1977 and 1996[a]

	1977			1996			1977			1996			1977			1996		
	Total (N = 225)			Total (N = 280)			Maasai (N = 90)			Maasai (N = 138)			Non-Maasai (N = 135)			Non-Maasai (N = 142)		
	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank
Drought/water supply	130	58	1	189	67.5	1	52	58	1	97	70	1	78	58	2	92	65	1
Lack of land	118	52	2	73	26	=7	34	38	3	34	25	8	84	62	1	39	27	5
Hunger/lack of food	60	27	3	151	54	2	22	24	6	76	55	2	38	28	3	75	52	2
Soil erosion	55	24	4	73	26	=7	30	33	5	40	29	7	25	18.5	4	33	23	7
Loss of animals	40	18	5	NR	NR		38	42	2	NR	NR		2	1.5	8	NR	NR	
Animal disease	35	16	6	84	30	6	31	34	4	63	46	4	4	3	6	21	15	8
Poor health	23	10	7	103	37	4	8	9	7	46	33	=5	15	11	5	57	40	4
Lack fertility	8	4	8	63	22.5	9	5	6	8	28	20	9	3	2	7	35	25	6
Poor harvest	NR	NR		110	39	3	NR	NR		46	33	=5	NR	NR		64	45	3
Lack of pasture	NR	NR		86	31	5	NR	NR		67	49	3	NR	NR		19	13	9
Lack of school	NR	NR		36	13	10	NR	NR		18	13	11	NR	NR		18	13	10
Lack of dips	NR	NR		33	12	11	NR	NR		19	14	10	NR	NR		14	10	11
Lack of animals	NR	NR		26	9	12	NR	NR		15	11	12	NR	NR		11	8	12
Lack irrigation water	NR	NR		13	5	13	NR	NR		8	6	=13	NR	NR		5	3.5	17
Floods	NR	NR		11	4	14	NR	NR		4	3	=15	NR	NR		7	5	=13
Poor transport	NR	NR		10	4	=15	NR	NR		4	3	=15	NR	NR		6	4	=15
Wildlife	NR	NR		10	4	=15	NR	NR		3	2	=17	NR	NR		7	5	=13
Too much rain	NR	NR		9	3	=17	NR	NR		8	6	=13	NR	NR		1	1	19
Lack of money	NR	NR		9	3	=17	NR	NR		3	2	=17	NR	NR		6	4	=15
Insecurity	NR	NR		2	1	18	NR	NR		0	0		NR	NR		2	1	18
Other	NR	NR		2	1		NR	NR		2	1		NR	NR		0	0	

[a]NR, No Response.

(N = 62; 77.5%) do not use fertilizer, and many stated that because of declining crop yields, they were taking land out of production so it could regain fertility.

Strategies for Coping with Food Shortages, 1977 and 1996

The range of strategies that people used to offset the 1994–1995 shortages was greater than that identified in the 1977 survey. The changes reflect the altered socioeconomic and policy context. In both surveys the greatest differences were between production systems, whereas differences also existed between localities.

Herders

Traditionally herders have depended on their livestock to supply them with milk and meat, and they have supplemented their diet with grains and legumes obtained either by exchange of livestock or with cash from the sale of animals. In 1996, as in 1977, herders could not rely entirely on the products of their herds and had to obtain additional food. Purchase at the market, famine relief, and assistance from relatives and friends were important (Table IV).

Table IV. Herders: How Food Was Obtained in the 1972–1976 and 1994–1995 Shortage (By Number and Percent Reporting a Recent Shortage)[a]

	1972–1976			1994–1995			1994–1995			1994–1995		
	Herders Total (N = 166)			Herders Total (N = 122)			Herders (N = 74)			Herders-Farmers (N = 48)		
	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank
Sold livestock	166	100	=1	4	3	8	0	0		4	8	7
Bought food at market	166	100	=1	78	64	2	48	65	2	30	62.5	1
Famine relief	112	67	3	81	66	1	52	70	1	29	60	2
From relatives/friends	105	63	4	24	20	3	18	24	3	6	12.5	6
Hunted animals	48	29	5	6	5	7	3	4	6	3	6	8
Sold labor	8	5	=6	3	2	9	2	3	7	1	2	=9
Used stored food				18	15	4	9	12	4	9	19	=4
Harvest				16	13	5	6	8	5	10	21	3
Used savings				9	7	6	0	0		9	19	=4
Wild berries				2	2	10	1	1	8	1	2	=9
Other	8	5	=6	3	2		2	3		1	2	

[a]1994–1995, Herders and herder-farmers: significantly different at 0.01 w/11 df, $\chi^2 = 26.07$.

Almost an equal percentage recalled moving during the period of scarcity (11% in 1977; 12.5% in 1996). In 1977, this represented the traditional movement of animals in search of water and pasture, there being little migration to towns (Campbell, 1984a, p. 49). In 1996, movement of herds was still the most common reason given for moving away from the home area (16 of 19 responses), with most going to the Chyulu Hills.

Herder-Farmers

The results from the 1996 survey showed that there were significant differences in the information provided by herders and herder-farmers. The latter relied less on livestock and more on their harvests, stored food, and cash savings. Access to the market, famine relief, and the ability to call on relatives and friends also were important.

Farmers

Farmers as a group had very similar response patterns in the 1977 and 1996 surveys (Table V). Market purchases, household stocks, and famine relief were the most frequently identified sources of food. An important difference was their greater ability to harvest some crops in the less severe rainfall conditions of the 1994–1995 period, and in the significance of savings. Very few had any savings in 1977, because as recent arrivals, they had not had time to accumulate savings.

An interesting finding of the 1996 survey was that help from relatives and friends continued to be important, and the percentage of people participating in such interactions had increased between the two surveys. Many observers had expressed concern that such mutual assistance would decline as modernization eroded the customs on which these interactions were based.

The ranked order of strategies used by the Maasai and non-Maasai farmers in 1996 were very similar, although the non-Maasai relied more on stored food and the harvest than the Maasai, for whom food relief and assistance from family and friends assumed greater importance.

Movement away from the home to reduce difficulties was reported by 16% of farmers, and 14% of herders. For the majority of herders such movement represented moves with livestock in search of water and pasture, whereas among farmers it was a movement of individuals in search of employment.

The economic categories with which respondents identify were more

Table V. Farmers: How Food Was Obtained in the 1972–1976 and 1994–1995 Shortages (By Number and Percentage Reporting a Recent Shortage)[a]

	1972–1976 Total (N = 225)			1994–1995 Total (N = 229)			1972–1976 Maasai (N = 90)			1994–1995 Maasai (N = 112)			1972–1976 Non-Maasai (N = 135)			1994–1995 Non-Maasai (N = 117)		
	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank
Bought food at market	210	93	1	153	67	1	87	97	1	67	60	1	123	91	1	86	73.5	1
Used stored food	109	48	2	88	38	3	46	51	2	35	31	3	63	47	3	53	45	2
Famine relief	108	48	3	106	46	2	37	41	3	58	52	2	71	53	2	48	41	3
From relatives/friends	38	17	4	52	23	5	17	19	4	28	25	4	21	16	4	24	21	5
Used savings	23	10	5	53	23	4	7	8	5	18	16	6	16	12	5	35	30	4
Harvest	3	1	6	42	19	6	0	0		20	18	5	3	2	6	22	19	6
Sold labor	NR	NR		17	7	7	NR	NR		2	2	10	NR	NR		15	12	7
Hunted animals	NR	NR		10	4	8	NR	NR		8	7	7	NR	NR		2	2	=8
Wild berries	NR	NR		7	3	9	NR	NR		5	4.5	=8	NR	NR		2	2	=8
Sold livestock	NR	NR		6	2.5	10	NR	NR		5	4.5	=8	NR	NR		1	1	10
Other	2	1		8	3.5		1	1		3	3		1	1		5	4	

[a]NR, No Response; 1994–1995, Maasai responses differ from those of the non-Maasai: significant difference at 0.01 level of χ^2, df = 11, $\chi^2 = 27.44$.

diverse in 1996 than in 1977. The dichotomy between farmers and herders was largely valid in 1977, although intimations of increasing diversity were present. By 1996, "herder-farmers" and "farmer-herders" could be added to the list, and the farming category comprised both rainfed and irrigated cultivation. This variety in activity was reflected in spatial specialization, for example, conditions at Namalok in the West were different from those at Rombo in the East, and both contrasted with the rainfed cultivation on the slopes of Mt. Kilimanjaro. This economic and spatial differentiation was reflected in the characteristics of coping strategies, which themselves had become more diverse between 1977 and 1996.

ESTABLISHED AND RECENTLY ADOPTED STRATEGIES

A recurrent theme in the literature on how rural African societies cope with recurrent food shortages is that the strategies employed are integral components of the communities' societal and biophysical systems. They are not activities that people "pull out of a hat" when they experience shortages, but actions that people take within their existing range of options to offset shortages. Because they are integral to the dynamic societal-biophysical system, these strategies are subject to change as the system changes in response to both exogenous and endogenous forces (Campbell, 1990). The current study explores ways of coping with shortage, and seeks to discover how these differ between two events separated by 20 years. Key questions therefore ask: What is constant? and What has changed?

Established Strategies

The 1977 survey identified a range of strategies employed by farmers and herders to offset food shortages (Campbell, 1984a). The broad categories among herders were movement of livestock to areas with better water and grazing resources, sale of livestock, prayer and pay to a rainmaker, resort to hunting and the use of wild foods, and the moral economy. For farmers, sale of crops, use of wild foods, and assistance from relief organizations were important. The data from the 1996 survey indicate that many of these strategies are still used.

Prayer and Pay to a Rainmaker

Although praying for rain is a universal response, paying a rainmaker involves an investment and therefore is related to the severity of the circum-

stances. In the severe conditions of the 1972–1976 shortage, 93% of the herders paid a rainmaker. In contrast, only 16% of the farmers had done so, and of these, 70% were Maasai. This suggests that the recently arrived non-Maasai had yet to develop relationships with rainmakers. In the less severe shortage of 1994–1995, 51% of the herders and 25% of the farmers paid a rainmaker. Among the farmers, the percentage of Maasai doing so remained stable (27% in 1977 and 30% in 1996), whereas that of non-Maasai increased from 8% in 1977 to 27% in 1996.

Movement of Livestock to Areas with Water and Pasture

Moving livestock to areas with secure water and grazing remained important for herders, and also was practiced by some herder-farmers in 1994–1995. The principal drought-retreat destination was the Chyulu Hills, because alternatives had become unavailable due to the expansion of other land uses (Campbell, 1986).

Liquidation of Assets

The range of opportunities reported for acquiring cash was far greater in the 1996 survey than in 1977, when there were few. At that time, for Maasai herders and farmers, the sale of livestock was significant, and for non-Maasai, working in town and selling crops were the most frequently mentioned sources.

In the survey of 1977, all but two of 167 herders interviewed told of having sold cattle to raise cash in the shortage. Their needs for cash included clothing, animals, and school fees, but the most important was food.

In the 1994–1995 period of shortage, herders continued to rely on the sale of livestock.[15] Livestock remain a source of cash. However, their importance as a specifically identified means for obtaining food was far less in the 1996 survey, when no herders and few herder-farmers reported sales to purchase food, than in 1977. This is particularly the case among those who farm, who have acquired a range of options for obtaining income. These included the sale of food[16] and working in town, both of which were

[15]Overall, 83% of the herders sold some livestock during the drought. Among those who did not farm, 80% sold some cattle in the 1994–1995 period, and 74% sold sheep/goats. Among herder-farmers, 72% sold cattle and 74% sold sheep and goats. Over the same period 34% of the farmers reported selling livestock.

[16]The sale of crops was reported as a source of cash for farmers, allowing them to meet a variety of their needs. In the 1996 survey, 80% told of crop selling as a source of cash income. During the 1994–1995 period, 19% of the farmers (19% non-Maasai and 18% Maasai) sold crops to get cash with which to purchase food, as compared with 14% in the 1977 survey.

prominent in the 1977 survey. In addition, farmers reported sale of livestock, business activity such as owning a small shop or operating a taxi, work on another farm, income from tourism-related sources, and a number of other activities.

Sale of Land

In the study area, sale of land was not identified in either 1977 or 1996 as a strategy used by farmers. In 1977, most of the farmers were recent arrivals who had moved in order to buy or rent land, because it was unavailable or too expensive in their areas of origin. Those who had bought land were not therefore likely to sell this land. For renters, of course, it was not an option. In 1994–1995, the lesser severity of the shortage and the availability of alternatives for obtaining food meant that the hardship was not so severe as to make sale of land likely.

Environmental Resources

The gathering of wild foods, hunting, and collection of wild plants to supplement food supplies is noted in a number of African societies.[17] In the study area, herders reported hunting and the use of wild plants, but whereas many farmers collected plants, very few hunted.

Among herders, reports of hunting declined from 29% in 1977 to 4% in 1996. One reason for the decline is that conditions in 1972–1976 were more severe. A second is that as a result of the activities of the KWS and herders' institutions such as the Amboseli-Tsavo Conservation Association, there currently is more acceptance of the need to conserve wildlife. Among herder-farmers and farmer-herders, 7% reported hunting in 1996, whereas no farmers in 1977 and only two farmers in 1996 reported doing so.

In 1996, 66% of herders told of using plants for food, and of the 335 reported the use of plants, 24% were for food. Farmers' responses were similar. Sixty-nine percent noted using plants for food; and 35% of 595 reported uses for plants by farmers were for food.

Moral Economy

There has been considerable discussion concerning the importance of the moral economy in providing means for reducing the impact of food

[17]See, for example, articles by Campbell *et al.* (1997, a, b), Johns *et al.* (1996), and McCusker (1997). Chapman *et al.* (1997) reported on wild plant use in food preparation of the Maasai.

shortages.[18] The moral economy refers to measures that the community enacts to reduce hardships through family obligations, kinship groupings, institutions, and political structures.

It has been postulated that as local economies become incorporated into the market economy, and as extended family structures are replaced by nuclear family structures, the reciprocal rights and obligations associated with the moral economy will alter. Those based in families and communities are likely to be replaced by those dependent on institutional structures such as farmer groups (Bratton, 1987), NGOs, and governments for financial support and access to food relief (Campbell, 1990).

Comparison of the results from the 1977 and 1996 surveys provides evidence for both continuity and change in the importance and impact of the moral economy in the study area. Two facets of the moral economy were explored: assistance from family and friends and food relief from institutions including the government, churches, and NGOs. These two facets are very different. Food aid is a gift from outside the area, whereas assistance among relatives and friends implies both a transfer of resources within the community and an establishment of obligations between donor and recipient.

During the severe shortage of the mid-1970s both facets of the moral economy were important to the herding community, whereas institutional support was important to the farmers (Table VI). This was because farmers, as recent arrivals, had yet to develop strong community structures. The 1994–1995 hardship was less severe, yet an increased proportion of farmers sought assistance from family and friends. This remained an active source of support for herders. Food relief also continued to be distributed to both herders and farmers.

Within this overall pattern there were marked differences from area

Table VI. Assistance from Relatives and Friends and from Food Relief Reported in Surveys in 1977 and 1996

	1977				1996			
	Herders (N = 167)		Farmers (N = 225)		Herders (N = 142)		Farmers (N = 225)	
Form of assistance	N	%	N	%	N	%	N	%
Help from relatives/friends	105	63	38	17	40	28	66	29
Food relief	112	67	108	48	71	50	117	52

[18]For a thorough discussion of the ''moral economy,'' see Fafchamps (1992).

to area, and between herders and farmers (Table VII). More herders (71%) than farmers (52%) reported receiving food relief in the 1996 survey. There were distinct differences by location among farmers, with 65% of those interviewed on Mt. Kilimanjaro reporting that they received food, compared with lower proportions in other areas. Whereas overall rates for the herders was high, they were highest at Kimana, where more than 80% received food, although the frequency of reporting may have been exaggerated because of a coincidence between the survey and the distribution of food by an NGO.[19]

There also were differences between areas and among herders and farmers in reports of receiving assistance from family and friends. Among farmers, the percentage who obtained such help was in the teens everywhere except on Mt. Kilimanjaro, where 48% noted it. This is an area long settled by Maasai and others, and family ties are strong. Among herders reports also differed from area to area. Only 2% of the herders in Rombo, 24% in Kuku, and 43% in Kimana noted such assistance. In Kimana there were great differences in reports of help from relatives between Isinet (5% of herders and 13% of farmers) and Namalok (64% of farmers and 86% of herders) (but see footnote 19).

The low level of help provided by family and friends in Isinet and Rombo may indicate an association between the maintenance of community ties and the expansion of horticultural production. It has been suggested that as societies become more integrated into the cash economy, customary community ties will diminish in importance. Both Isinet and Rombo are important centers of horticultural production. They also are better connected to the transportation system than other areas, such as Namalok, where crops are grown under irrigation. This may support the hypothesis that reliance on communal support declines when integration into the cash economy proceeds. People in both Rombo and Isinet did continue to receive food relief.

New Opportunities: Recently Adopted Strategies

A number of means for reducing the vulnerability of the area's population to food shortage have been instituted over the past 20 years. These

[19]The particularly high level of food aid reported in the different areas of Kimana Group Ranch, Isinet, Namalok, and neighboring Mbirikani Group Ranch contrasted sharply with overall reports of family assistance in the area of 43%. Inquiry into this contrast at the workshops revealed that the high level of reports of food aid was probably a result of the fact that food aid had been distributed in the days immediately before the survey team began working in this area. We were informed that many respondents associated the visit of the survey team with the NGO that had distributed food and, not wishing to discourage future disbursements of relief, they had overreported food relief and underreported the efficacy of support from family and friends.

Table VII. Assistance from Relatives and Friends and from Food Relief Reported by Location in 1996[a]

	Total				Mt. Kilimanjaro				Rombo				Kuku				Kimana			
	Herders (N = 142)		Farmers (N = 225)		Herders (N = 0)		Farmers (N = 48)		Herders (N = 34)		Farmers (N = 62)		Herders (N = 41)		Farmers (N = 32)		Herders (N = 67)		Farmers (N = 83)	
Form of assistance	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
From relatives/friends	40	28	66	29	NA	NA	23	48	1	2	11	17	10	24	5	16	29	43	11	13
Food relief	71	50	117	52	NA	NA	31	65	20	58	14	23	19	46	13	41	52	78	39	47

[a]Not Applicable.

are a result of deliberate actions taken within the area in response to the experience of past deficits and socioeconomic changes that have resulted from national and international forces.

The experience of the 1972–1976 shortage demonstrated that people wanted to save cash and food, but that they were unable to do so because there were no banks or food storage facilities in the area. At the workshops held to discuss the 1977 survey, people stated a need to work with the appropriate institutions to secure these facilities. Both were built and assisted those wishing to store food and save cash as means of reducing their vulnerability to food shortages.

There also are external processes that have contributed to changes in the economic systems over the past 20 years. These include continued immigration, improvements in the transportation system, structural adjustment programs that have liberalized aspects of the economy, and a development policy for tourism. The results include diversification of the herding economy such that many herders are now herder-farmers, and also diversification of crop production in that horticulture has expanded in both area and economic value. There also have been efforts to increase the economic returns to communities from the lucrative tourist economy. These have combined with the growing population to generate a far more diverse and vibrant economy that provides a wide range of opportunities for people to reduce their vulnerability to future food shortages.

The impact on production systems and different ethnic groups has been uneven. The opportunities for those who farm have generally increased as they have expanded the area under crops and entered in the profitable horticultural trade. Those engaged in cattle-based herding have experienced difficulty as crop agriculture has reduced their access to important sources of water and grazing, and as social changes are altering the fabric of society. Non-Maasai have gained little from government programs in the tourism/wildlife economy, which have focused on the Maasai as primary stakeholders. This complements the opportunities for the Maasai from "cultural tourism," including photography and visits to cultural bomas based on the stereotype of the traditional Maasai.

Tourism and Wildlife

In 1977, only 6% of the herders and 2% of the farmers obtained any income related to wildlife and tourism. By 1996 this figure had risen to 21% among the herders but remained low, at 4%, among the farmers. The opportunities for the Maasai were greater because their traditional image was promoted by the tourist industry and sought after by tourists. Further-

more, the emphasis of KWS initiatives has been much more on engaging the Maasai in wildlife management than on farmers.[20]

The tourist sector offers a variety of opportunities for income generation. Income can be earned from tourists directly through posing for photographs, sale of crafts, and visits to villages. There also are payments made to communities by the KWS for game scouts and school fees. Some group ranches have leased land to tour operators who have erected camping facilities. The Kimana Group Ranch has created a Wildlife Sanctuary, and the Kuku Group Ranch has leased land to the Kuku Field Studies Centre, funded in part by the Nairobi Rotary Clubs, which offers environmental education courses.

Trade

Many farmers and a few herders stated that they earned money from trading activities such as operating a small store or running a taxi. More than 41% of farmers in 1996 had some income from trading. Opportunities for trade have increased for a number of reasons including the growth of the population, which has increased the demand for a wide range of goods and services; the opening of the border with Tanzania providing for cross-border commerce; and improvement of transportation links to Nairobi and Mombasa enabling local producers to market crops in these towns. The increased cash flow from agriculture, particularly horticulture, and other activities has produced an effective demand that is reflected in the expansion of stores, workshops, and bars and restaurants in small towns such as Kimana, Illasit, and Rombo.

Horticulture

In 1977 horticultural production was just beginning at Namalok, Kimana, and Rombo. Today, these are major centers of production, which have been joined by farmers irrigating at Isinet and on the Kuku Group Ranch. The crops produced include chillis, okra, onions, and a variety of "Asian vegetables" such as dudhel, valoo, and chora. One observer estimated that the area is now the foremost producer of horticultural products in Kenya (H. Krugmann, 1995, personal communication). The farmers export to Mombasa, Nairobi, and Europe.

[20]It should be noted that the greatest share of income from tourists accrues not to farmers and herders, but to those who participate more directly in the tourist trade by, for example, working in hotels and owning souvenir stands. These people were not a focus of the surveys.

There is some evidence from the responses of those practicing horticulture that the income they derive has lessened their participation in the local moral economy. Fewer horticulturalists (22%) received assistance from family and friends than those who had no horticultural product (30%). More than 40% of both groups received food relief.

Migration in Search of Jobs

The increased involvement of the area in the cash economy and improved transport links with the major cities of Kenya has opened up possibilities for migration in search of employment. Among farmers, 15% reported income from off-farm work and 21% from work in town during the previous year. Few herders were willing to provide information on their sources of income. As a strategy for offsetting difficulties, 16% of the farmers and 14% of the herders said that family members had moved away because of drought. For most of the herders, this represented moves with livestock in search of water and pasture, whereas farmers' moves were in search of employment.

PRECAUTIONS AGAINST FUTURE FOOD SHORTAGES

In the 1996 survey, 70% of those interviewed indicated that they anticipated future shortages caused principally by deficient or irregular rainfall. As in 1977, respondents identified a number of actions that could be taken to reduce the impact of future shortages. The findings of the 1996 survey indicated that some of these actions actually were taken, and thus "likely future action" reported in 1996 might indicate changes that people might initiate in the near future. Given that a number of government agencies are engaged in devising and implementing development plans for the area, enumeration of these precautions against future shortages can serve as a guide to local actions that might complement or contest these external initiatives.

In the wake of the 1972–1976 shortages, the 1977 survey identified a number of specific precautions that local people thought could lessen the impact of future shortages. These included changes in their production activities and improvements to the area's infrastructure (Tables VIII and IX). The four most frequently noted precautions at that time were to save cash, buy more land, keep more animals, and store food. These were discussed at the workshops, and it was determined that whereas increasing the cultivated area and keeping more livestock were under the control of

Table VIII. Farmers: Precautions Against Future Drought, 1977 and 1996[a]

	1977			1996			1977			1996			1977			1996		
	Total (N = 160)			Total (N = 199)			Maasai (N = 57)			Maasai (N = 100)			Non-Maasai (N = 103)			Non-Maasai (N = 99)		
Farmers	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank
Save money	123	77	1	69	35	1	37	65	2	44	44	1	25	24	1	25	25	1
Buy/farm more land	60	37.5	2	43	22	3	17	30	3	22	22	3	24	23	2	19	19	4
Keep more animals	43	27	3	46	23	2	41	72	1	28	28	2	19	18	4	24	24	2
Store food	34	21	4	NR	NR	NR	10	18	4	NR	NR	NR	22	21	3	NR	NR	NR
Work away from farm	11	7	5	29	15	4	2	3.5	5	15	15	4	15	15	5	15	15	5
Nothing	2	1	6	27	14	5	0	0	—	5	5	5	2	2	6	22	22	3
Other	11	7	—	4	2	—	6	10.5	—	3	3	—	1	1	—	1	1	—

[a]No Response.

Table IX. Herders: Precautions Against Future Drought, 1977 and 1996

	1977 Herders Total (N = 158)			1996 Herders Total (N = 93)			1996 Herders (N = 55)			1996 Herder-Farmers (N = 38)		
	N	%	Rank	N	%	Rank	N	%	Rank	N	%	Rank
Keep more animals	103	65	1	22	24	3	18	33	2	4	10.5	5
Grow crops/buy land	90	57	2	13	14	5	4	7	6	9	24	=3
Save money	81	51	3	35	38	1	19	34.5	1	16	42	2
Store food	69	44	4	29	31	2	12	22	3	17	45	1
Reduce herd size	33	21	5	NR	NR	NR	NR	NR	NR	NR	NR	NR
Reduce family size	22	14	6	NR	NR	NR	NR	NR	NR	NR	NR	NR
Working away from farm	1	1	7	15	16	4	9	16	4	9	24	=3
Nothing	0	0	—	11	12	6	8	14.5	5	3	8	6
Other	6	4	—	8	9	—	6	11	—	2	5	—

[a]NR, No Response.

land users, saving money and storing food would be facilitated by the provision of a bank and a grain storage depot in the area. The participants decided that local people would need to work with the authorities to establish banking facilities and a grain storase. Both of these objectives had been met by the time of the most recent shortages.

In the 1977 survey, increasing the cultivated area and keeping more animals were strategies identified by both farmers and herders, although younger herders stated a preference for cultivation over increasing their attention to livestock production. The information gathered in 1996 indicated that the cultivated area did expand, that many herders took up farming, and that farmers had increased their livestock holdings. The group that did not achieve its stated objectives was the older herders who did not appear to have been successful in enlarging their herds. The precautions against future shortages identified in 1977 thus were an accurate indicator of future changes in the area, and it can be suggested that the same might be true of such responses to the 1996 survey.

Among all herders, including those from Mbirikani, saving money, storing food, and keeping more animals were the most frequently identified precautions in the 1996 survey. Surprisingly, 33 of 103 herders stated that they would do ''nothing'' in anticipation of future shortages, compared with only 5 of 75 herder-farmers. Among the herders there are differences among respondents of different ages. Only 20% of those younger than 30 years old said they would do ''nothing,'' whereas 40% of those older than 30 years gave that response. In other respects the information from herders of all ages is similar, except that far more in the younger-than-30 and older-than-45 age categories said that they would keep more animals than those in the 31 to 44 age category.

Older Maasai are less likely to change their lifestyle, so the commitment of 50% of this group to keeping more livestock is not surprising. That 30% of those younger than 30 years are thinking of keeping more animals is unexpected given the changes occurring in the Maasai lifestyle.

The most frequent precautions reported by farmers in 1996 were to save money, keep more animals, and buy more land, although a surprising number of non-Maasai stated that they were doing "nothing" in anticipation of future shortages (Table VIII). The high rate of responses about accessing more land not only reflects the opportunities that this would allow in crop production, but also the concern over security of tenure under subdivision of the ranches. The importance of keeping more animals is commonly recognized among all who farm, both Maasai and non-Maasai farmers and Maasai herder-farmers. This indicates an interest in diversifying their economy, and also the utility of livestock as a form of savings, and as a source of manure. The use of manure is reported by 50% of the farmers and 43% of the herders who farm.

In 1977, only 11 of 160 respondents (7%) said they would work away from the farm, whereas by 1996 that number had increased to 29 of 199 (15%). Nonfarm opportunities are available locally in trading, and as unskilled labor in Loitokitok. In addition, improved transport linkages to Mombasa and Nairobi have led to an increase in the number of people seeking work in these centers. In the year before the 1996 survey, 48% of the farmers but only 3% of the herders had received income from nonfarm sources. Given the transition that many herders are making to include farming in their livelihood systems, it is possible that they will significantly increase their participation in nonagricultural activities in the future.

CONCLUSION

This article examines continuity and change in strategies for coping with food deficits in one area of rural Africa that has experienced rapid and substantial changes in economic and social circumstances over the past 20 years. It shows that as societies have accommodated these changes they have altered the range of strategies employed to offset food deficits. Many established strategies remain active, and additional ones have been adopted as new opportunities arose.

The dynamic changes in economic activity and access to resources have provided opportunity for some and constrained options for others. In consequence, the suite of strategies available and their viability varies among production systems, areas, and ethnic groups. These results are similar to those reported in Fratkin's (1998) detailed study of the Ariaal

of northern Kenya. The finding that coping strategies have changed and the reasons for these changes, confirm that such strategies are integral components of society. They are based on the dynamic interactions between society and environment and alter as these interactions are modified in response to endogenous and exogenous forces.

A number of established strategies remain important including prayer; movement of livestock in search of water and pasture; activities that exploit the environment such as hunting and gathering of wild food; acceptance of food relief provided by the government, churches, and NGOs; and the sale of food and livestock. Assistance from family and friends also was common, although the frequency with which it was reported in 1996 varied from area to area, and there were indications that it was less frequent in communities more actively engaged in the cash economy.

Recently adopted strategies include those that result from local initiatives and others that are responses to initiatives from outside the area. Local initiatives have contributed to the provision of banking and crop storage facilities, and changes in the international and national economy have stimulated the growth and diversification of the area's economy. The latter include the expansion of horticulture, increased income from tourism, and greater effective demand provided by the larger population which have combined to augment economic opportunity in the area. The ability of people to participate in this economic expansion depends on their production system and location. People living close to main roads and farming centers have an advantage, and herders are less well-positioned than those who farm.

Those who remain in the livestock-based economy appear to be less able to take advantage of these changes than those who farm, and indeed the redistribution to crop production of resources formerly in the herding domain has weakened the herding economy. In contrast, farmers see increased income to purchase food as important to their food security. This income is derived from the sale of crops, particularly from horticulture; participation in trade; and off-farm labor. The farmers see the provision of banking and crop storage facilities in Loitokitok since the 1972–1976 drought as having improved their ability to save in anticipation of future shortages.

Income from tourism is obtained from a variety of activities. Some are more available to the Maasai than to other ethnic groups. This has resulted from the pattern of land ownership, the tourist stereotypes associated with the Maasai, and the decision of the KWS to base its community wildlife management strategy in Maasai institutions. The most lucrative activities are associated with the provision of services, such as hotels and transportation, and the sale of curios. People from outside the area control

the majority of these. Most of the opportunities for local people do not offer good pay. These include employment in hotels, the cultural bomas, and photography. There are also activities that bring income to the community as a whole, such as leasing of land for camping facilities and payments by the KWS and the Wildlife Sanctuary at Kimana. Respondents indicate that the benefits from these are not evenly distributed among the population.

Some have argued that such increased integration of rural economies into the national commercial system has the effect of undermining existing structures that are the basis for support among families, friends, and communities in times of stress. There is evidence both of the continued importance of these support mechanisms, and of their weakening in areas where the cash economy is most developed. In a community workshop at a location where the survey data had suggested that support from family and friends had declined, there was vigorous denial that this was the case (see footnote 19). There are data to suggest that the intensity of such support is less among horticulturists, who are the farmers most integrated into commercial production.

These differences among communities reflect one of the most interesting findings of the study: Whereas the major driving forces of change were exogenous and thus affected the whole area, their impact resulted in the area becoming more differentiated in terms of economy, land use and social processes. At a time when such initiatives as structural adjustment programs, integration with the world economy, and cultural homogenization are being recognized as contributing to "globalization," the local impact causes differentiation spatially and socioeconomically rather than homogenization. Local agency has mediated global and national structural changes (Foucault, 1993; Giddens, 1979), and the power of global institutions and the state is negotiated by individuals and communities to create a mosaic of outcomes expressed in land use and social relations.

The 1972–1976 drought was far more severe in its intensity, longevity, and impact than that of 1994–1995. The array of strategies was different, reflecting the altered circumstances existing in the area, but it is not possible to conclude from the preceding discussion that the current set of coping strategies is more effective than that available in the past. Those who farm appear to have been able to cope with the recent experience of food shortage, but herders fared less well because their resource base had been undermined and their economy weakened over the past 20 years. The findings suggest that in the event of a drought equal in severity to that of the mid-1970s, those with diverse options, such as farmers who engage in horticulture or those who are herder-farmers, will fare far better than those such as herders, whose economy is less diversified.

The suite of strategies identified in the 1996 survey illustrates continuity and change. Change is essential as the dynamics of political, demographic, social, and economic circumstances modify the opportunity set. People already are identifying possible future options, recognizing that current conditions will be altered by the impending transformation of land tenure arrangements and continued immigration. Implementation of planned developments also will alter the development context. These include putting a tarmac surface on the road from Loitokitok to the junction with the Nairobi-Mombasa highway, which will increase accessibility and provide new economic possibilities, and formalization of irrigation under regulations similar to those of the National Irrigation Board.

In this area, as in other parts of rural Africa, communities employ a wide variety of strategies to offset food shortage. These derive from social relations, the economy, institutions, and the environment. People are simultaneously conservative and opportunistic in their choice of coping strategies. They hold on to trusted ones, while responding to opportunities afforded by changing socioeconomic or other conditions. This study has implications for development planners and those seeking to incorporate information on coping strategies into famine early-warning systems. The latter need to consider the dynamics and the differentiated nature of coping. Similarly, effective policies designed to reduce poverty, food insecurity, and land use conflict need to address the management of different components of the resource base by different land users and the issue of differential access to resources among the population. Even in a small area such as S.E. Kajiado District, not all people or localities exhibit the same strategies. Local conditions, societal and environmental, mediate broad driving forces of change to create a mosaic of options that reflect the dynamic regional political ecology.

ACKNOWLEDGMENTS

I am most grateful to Elliot Fratkin, John Grolle, and Brent McCusker for their comments on drafts of this paper and to George Weisenborn for the cartography.

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