

This work is licensed under a  
Creative Commons Attribution-NonCommercial-  
NoDerivs 3.0 Licence.

To view a copy of the licence please see:  
<http://creativecommons.org/licenses/by-nc-nd/3.0/>



832

RESERVE

SEDENTARIZATION IN TURKANA: SOCIAL AND  
ECOLOGICAL CONSEQUENCES (A PROPOSAL)

By

Melanie Patton Renfrew

WORKING PAPER NO. 471

INSTITUTE FOR DEVELOPMENT STUDIES  
UNIVERSITY OF NAIROBI  
P.O. BOX 30197  
NAIROBI, Kenya

April, 1990

LIBRARY  
12 JUN 1990  
Institute of  
Development Studies

Views expressed in this paper are those of the author. They do not have official standing as such. This paper is protected under Copyright Act, Cap. 130, Laws of Kenya.

ISN = 52009

IDS/WP 471

"SEDTARIZATION IN TURKANA: SOCIAL AND  
ECOLOGICAL CONSEQUENCES" (A PROPOSAL)

Melanie Patton Renfrew

ABSTRACT

The major research question for this thesis is, "How do loss of Livestock and sedentarization bring about changes in Turkana social organization?"

Sedentarization involves basic economic change from herding livestock to alternative livelihoods, for example, irrigation agriculture. Ownership of animals is being replaced by use of other resources for livelihood (land, water, soil, wood) in a concentrated rather than widespread territory.

As nomads settle, their population density increases, which can intensify their social interaction as well as competition over resources. In human history, this intensification led to an increased need for political leadership. Theoretically, as the Turkana become sedentary, then social stratification will develop.

Fieldwork for this research is taking place in Morulem, an irrigation site along the Kerio River near Lokori, which is two hours from the main tarmac road in Turkana. Although there are a few civil servants working in Morulem, the external influence are fewer than in other settlements in Turkana District.

IDS Information Resource Unit  
University of Sussex  
Falmer, Brighton BN1 9RE, UK

PLEASE RETURN BY

~~08/02/95~~

31/5/90

13/6/96

8.6.01

## I INTRODUCTION

In a world-wide context, nomadic pastoralists have been becoming more sedentary for centuries as they adapt to agriculture or urban life. They currently occupy arid lands, leading their herds to graze on seasonal grasses and shrubs. In this century, these pastures have steadily decreased because of expanding dryland agriculture, desertification, and colonial and political actions to change the boundaries of pastoral lands. When livestock die during droughts, herders must seek alternative jobs or receive relief food, which lead to "settling down" and ceasing of their nomadic movement. A percentage also leaves the pastoral sector when human and livestock populations grow beyond the environment's carrying capacity.

Problem Statement

In northwestern Kenya, the Turkana pastoralists have traditionally adapted to an ecological niche in part of the country's arid and semi-arid lands (ASALS). Their culture revolves around flexible movement of livestock in response to sparse, erratic rainfall, ephemeral vegetation, water, and security needs. However, during severe droughts in 1979-81 and 1984, many Turkana lost their animals and settled at food-for-work development schemes. At the time one estimate was 46% of the population (Hogg 1984), but now some of these Turkana have returned to a nomadic herding lifestyle, (percentage unknown). Geographically, the settled ones are undergoing transition from low-density, mobile camps to higher density villages and towns.

Socially, the nomads' ties have been flexibly organized, egalitarian, and centered on livestock exchange; they could choose to avoid conflicts by moving away. Now, the Turkana who are sedentary no longer have the animals to give or the option of leaving, so they must adapt to new social pressures associated with village life.

Sedentarization also involves basic economic and ecological change from herding livestock to alternative livelihoods, especially irrigation agriculture. Ownership of animals is being replaced by use of other resources for livelihood (land, soil, water, wood, vegetation) in a concentrated rather than widespread territory.

IDS



027133

### Objectives

Within a cultural ecology framework, this thesis will examine the social and ecological changes occurring with sedentarization in Turkana District. My major research question is, "How do loss of livestock and sedentarization bring about changes in Turkana social organization?" Shaped by a theoretical framework of cultural evolution and a cross-cultural study of other nomadic societies in transition, my major general hypothesis is:

"If the Turkana nomadic pastoralists become sedentary, then social stratification will develop".

Stratification is defined as the layering of society into leadership and groups which have unequal access to wealth and resources. In the past, Turkana pastoralists have been characterized as typically egalitarian, where each herder could make his own decisions (Gulliver 1951, 1955).

The ancillary question for this research is, "What are some of the ecological consequences of sedentarization in Turkana?" My second general hypothesis is:

"Sedentarization will bring negative ecological changes."

A comprehensive ecological impact assessment is beyond the scope of this project, but I will examine the effects of settlement on human labor time, wood use, and vegetation.

My specific hypotheses are outlined in Section IV of this proposal. One other objective of my research is to document the changes going on in this historical process before all the traditions among settling Turkana have been lost. As peoples all over the world become more "modernized" and incorporated into nation-states and the international economy, their cultures and patterns become more similar. I value the uniqueness and dignity of the Turkana people, in full realization that changes inevitably come.

## II THEORETICAL BACKGROUND: Sedentarization, Stratification, and Cultural Evolution

There is no body of theory about sedentarization per se, but social scientists who have studied settling nomads have described a variety of social and economic changes as results (Bates 1980, Baxter 1975, Bulliet 1980, Frantz 1980, Goldschmidt 1980a, Khazanov 1984, Lewis 1975, P. Little 1985, E. Marx 1981, Naderi 1974, Salzinan 1980, Swidler 1980). Many of these are case studies

which make no theoretical conclusions; however, several mention the appearance of social, political or economic stratification. None of these authors has pointed out this recurring, cross-cultural pattern of increasing political complexity and wealth distinctions which accompany sedentarization. This suggests that a middle-range theory with predictive potential could be developed.

Not all nomadic pastoral societies are egalitarian. Theories about pastoralism have included much debate about the presence or absence of hierarchy (e.g. Asad 1979). Some pastoralists have leaders and "classes" of wealthy herdowners and poor hired shepherds. In a review of this debate, Dyson-Hudson (1980) suggests that the key determinant is controllability of resources: if there is equal access and resources are not controllable, then the nomads will be egalitarian; if exclusive access and control are possible, then some individual or group will take control, according to her model (1980:5).

#### Examples of Other Sedentizing Nomads

According to Bulliet's historical study of Arabs in Iraq in the seventh century, sedentarization increased the power and importance of the chief families within each tribe (1980:39), Lewis (1975) noted a type of "pastoral aristocracy" that developed in Somalia, concluding that sedentarization tended to expand, centralize, and hierarchize the political groups among nomads (1975:433).

Bates found that among the Yoruk nomads in Turkey, fixed residence and land ownership led to the development of political factions (1980:132). In a review, Khazanov also concluded that private-ownership tendencies about land increased among sedentizing Turkmen and Kalmuck nomads (1984:199).

Rigby (1985) concluded from his study of the Ilparakuyo Maasai of Tanzania that they should not be "coerced" into sedentary cultivation, lest a "rural proletariat" of hired laborers should form. He wrote from a socialist perspective, which tends to use classes in society as units of analysis, and sees working class struggle as the inevitable result of a capitalist economy.

In northern Kenya, Baxter (1975) observed distinct changes when re-visiting the Boran after a 17-year interval. The inequalities in wealth and lifestyle were much greater among sedentary than pastoral Boran. The sedentary herd-owner's range of effective social relationships had greatly declined.



Also in Kenya, Peter Little (1985) studied the economics of cultivation among the Maa-speaking Il Chamus of the Baringo-Bogoria region. He found that sedentarization attracted both the very rich pastoralists, who invested in irrigated land, and the poor, who were "sloughed off" from the pastoral sector and became farm laborers (1985:256). This resembles Barth's observation about the rich and poor Basseri herders of Iran (1961).

In these studies, sedentarization is often not a single independent variable, but part of a large complex of changes with multiple causes. In Frantz's study of settling Fulke nomads in Southwest Nigeria, he preferred to use the terms "correlates" and "concomitant aspects" of sedentarization, rather than "causes" and "consequences" (1975). Naderi (1974) and Khazanov (1984) emphasized that it is not just becoming sedentary that brings culture change, but the transformation of social networks.

#### The Larger Context: Stratification in Cultural Evolution

In cultural evolution, population growth led to increased density, especially in environmentally rich areas (e.g. fertile alluvial valleys). As competition over resources increased, there grew an increased need for leadership to provide security, organize any surplus, and make decisions which would affect the larger community and region. Extracting tribute and accumulating landholdings were also carried on by these leaders, and thus political and economic stratification developed with the growth of the state. Analysts of sociocultural evolution have described the relationships of population growth, intensification of production, and technological change (Boserup 1981, Carneiro 1970, Harner 1970, Hassan 1984, Johnson and Earle 1987, Kleinman 1980, Spooner et al. 1972). These authors focus mainly on agricultural societies because they are more widespread, but there is applicability for our study of settling nomads if we view current changes in a larger evolutionary context.

In human history, sedentarization took place on a major scale during the Neolithic Revolution with the domestication of agriculture (8000 B.C.). Although some of the modern stimuli are very different from historical antecedents to sedentism, the rise of hierarchy appears to be similar.

Johnson and Earle (1987) developed an evolutionary categorization of societies which is helpful for understanding the interplay of ecological adaptation and social organization, and how complexity increases with



increasing population density. Their three major categories are:

- 1) The family-level economy has a very dispersed, nomadic population, is egalitarian, and has very limited political leadership.
- 2) The "local groups" include family units with hamlet-size aggregations and regional networks of exchange. They may be either acephalous or have Big Men, which are the incipient form of stratification (1987:193).
- 3) "Regional polities" include chiefdoms, states, and large nation-states.

In this scheme the traditional Turkana fit in as an acephalous local group, and they are actually one of the case studies used in the book to illustrate this level (1987:152-157).

Stratification occurring in cultural evolution began at this second level of "local group," and it has inevitably been tied to the control of strategic resources to minimize risk. Dyson-Hudson's (1980) similar model about pastoral hierarchies is a narrower application of this widespread correlation.

In various societies, Big Men have emerged to control technology such as dams or irrigation works, to control regional relationships or long-distance trade, to provide security, and/or to control intergroup exchange ceremonies, which reinforce their roles as leaders (Johnson and Earle 1987:193).

In many current cases, stratification is a response to actions of larger state governments on family and local groups. For example, when the Soviet Union and China closed their borders on Afghanistan, the Kirghiz nomadic pastoralists of the Pamir region experienced the need to intensify production in their bounded territory, Elite herders emerged as Big Men, began to irrigate pasture land and organize inter-regional trade, and bought up herds. Claims of land ownership resulted in differential wealth. Within one generation of the border closing, stratification and economic concentration occurred (Shahrani 1979, cited in Johnson and Earle 1987:186-191).

The hypotheses within my study (see Section IV) were specifically developed in response to a theoretical framework of cultural evolution and social stratification. Theoretically, the Turkana's social organization should change in similar ways as other sedentizing peoples, and that is what I wish to examine.

III CULTURAL BACKGROUND: Social Organization Among  
Nomadic Turkana

Traditionally, the nomadic Turkana's main social institutions have been the family herding units (awi), the multi-functional "stock-associate" (lopei) networks, and flexible neighbourhoods (adakar) (Gulliver 1951). The Turkana generally display the fluidity, mobility, decentralized and loose political organization, and egalitarianism that are characteristic of many heavily pastoral peoples (Salzman 1967, 1981, Spooner 1971).

Almost all Turkana relationships involve stock animal exchanges and rights. A family is organized practically rather than formally, and is composed of a man, his wives, children, and associated kinsmen, in-laws, or poor people willing to work for their keep. A household or camp (awi) may be shared by two or more men and their families. In general, the poverty of Turkana pastures will not allow large concentrations of people and herds. The herding families may move five to fifteen times a year (Gulliver 1951, Dyson-Hudson and McCabe 1981).

Lopei are special bond-friendships built on the exchange of animals, and they have reciprocal rights and obligations. Each man's lopei are his major support structure and insurance, and these stock-associates may extend all over the district. No two herders have the same network. In a year of poor rainfall or local disease outbreak, Turkana must seek alternate pastures or to re-stock their herds, and they go to their lopei for help and support. Gulliver reported that most Turkana men in his time had about 30 close associates (1955: 196-215). Goldschmidt, studying livestock exchange among the Sebei pastoralists in Uganda (in Kenya called the Sabaot or "Mt. Elgon Maasai"), observed that a close reading of a man's animals is a record of the major social interactions of his life (1980a).

The Turkana have a large brideprice, and the times of largest stock exchanges are at weddings. A groom may need to give 20-40 cattle or camels, and/or 100 small stock (goats and sheep) to the bride's father. Among nomadic Turkana, marriages are not considered to be permanent and official until the ceremonial ox is slaughtered and the livestock is given.

Other Turkana social groupings include clans, age-sets, and neighbourhoods (adakar). Clans intermarry, and each clan has its own basic grazing territory, but does not function as a unit. There are two age-sets, the Leopards and the Stones, which alternate generations in each family. Age-sets function as groups only during ceremonies and raids (Gulliver 1951, 1955).

Turkana "neighbourhoods" (adakar, based on adak, to graze or browse) are loose groupings of awi of friends and relatives, which may move together for part of the year, following new pastures. Adakars provide security, friendship, some sharing of food, and familiarity, but they are flexible, and often temporary.

The Turkana have no corporate institutions for justice, and they do not perceive crimes to be committed against "society", but by one individual against another. Each person's lopei stock group is his support structure in adjudication for a major offense, because most disputes involve livestock (for example, theft, or refusal to repay loans). Among traditional nomadic Turkana, the most common method of dealing with minor conflicts and stresses is to simply move away (Gulliver 1975:377-8).

The traditional social institutions have facilitated mobility. A majority of the Turkana population (est. 170,000) still live a nomadic livelihood and function with these same social groups (McCabe 1983, Weinpahl 1984). However, an increasing proportion has been settling at sites of development aid (Ecosystems Ltd 1985). Sedentism and pastoral decline will alter the social networks in various ways.

IV HYPOTHESES: Sedentarization in Turkana

A. Social Changes

The major research question for this study is, "How do loss of livestock and sedentarization bring about changes in Turkana social organization?" The first major general hypothesis is:

1. If Turkana nomadic pastoralists become sedentary, then social stratification will develop. To test this hypothesis, the following data will be considered as evidence for social hierarchy:
  - a. inequality in land ownership
  - b. unequal access or control over other resources (water, wood, vegetation)
  - c. leaders resolving disputes and conflicts
  - d. leaders making community decisions
  - e. inequality in material possessions (i.e. unequal opportunity to buy or trade for them)
  - f. common occurrence of dependent (patron-client) relationships

Other hypotheses related to social changes include:

2. Among sedentary Turkana, the stock-associate (lopei) networks will deteriorate.

Data on lopei networks of settled Turkana will be gathered by interviewing, with analysis of any changes after loss of livestock and settlement.

3. Sedentarization will increase the separation of families. (Females are often the ones to settle at irrigation or food-for-work projects, while males may continue with the few animals left or migrate to towns for jobs.)

Data to test this hypothesis will be basic census information about sample households, and movement behaviour of herders in the families.

B. Ecological Changes

The second major general hypothesis is, "Sedentarization will bring negative ecological changes." When comparing various ecological impacts on both the human society and the physical environment, a cost-benefit analysis would show more "costs" in sedentarization than benefits. This kind of comprehensive impact analysis is beyond the scope of my project, however there are some ecological aspects I will examine.

1. Human Ecological Changes

a. Hypotheses about labour Time:

- 1) Sedentary Turkana must spend more labour time on food production activities than nomadic Turkana.
- 2) Sedentary women will spend significantly more time in labour activities than men.

b. Other human ecological changes will be summarized by referring to other research on diet, general health, height-weight ratios, mortality rates, and reproductive rates. Sedentary Turkana may show improved status in some of these measures (i.e. "benefits"), depending upon the times and conditions of the research (e.g. Brainard 1986).



2. Environmental Changes

Hypothesis: Sedentarization will bring environmental degradation.

Evidence to be considered will be streambank erosion, presence or absence of vegetative regrowth, distances traveled to collect firewood, distances traveled to herd local goats, problems with sanitation and waste disposal.

C. Methods to Test These Hypotheses<sup>1</sup>

Methods used to collect data for these hypotheses include observation, interviewing, and measurement (of vegetation, distances). Since random samples of two settled communities were selected, data are presently being collected on family and awi composition, length of residence, travel patterns, agricultural involvement, beliefs about land ownership, food purchases and methods of obtaining money, use of and attitudes toward wood, water, and vegetation, male and female leadership and its functions, conflict topics and resolution, material culture surveys, and lopei networks and exchanges.

Time allocation to various activities is being observed by continual spot-check observations (Johnson 1978). Sedentary Turkana labour time estimates will be compared with Galvan's estimates of the labour activities of nomadic Turkana (1985).

There are many places in Turkana District where sedentarization is taking place. Morulem and Lokori were selected as research sites for several reasons. They are 2 and 2½ hours away from the main tarmac road in southern Turkana

---

1. This section has been rewritten to describe methods already and currently being used.



(which goes from Kitale to Lodwar) which lessens the external influences. Since its completion in 1985, this paved road has been a through-way for accelerated external influence and change in the settlement close to it. Trade goods, food, Kenyans from down-country, tourists, and information all flow northward and bring changes.

The Lokori area was also selected because it is adjacent to the Ngisonyoka section of southern Turkana, which has been the region of ten years of detailed research on traditional nomadic pastoralist conducted by the South Turkana Ecosystem Project (S.T.E.P.) (e.g. Dyson-Hudson and McCabe 1981, Ellis et al 1984, Galvan 1985, M. Little 1985, McCabe 1987, Weinpahl 1984). I will compare my findings with S.T.E.P.'s, and also Gulliver's original ethnographic work (1951, 1955). As transportation is available, I will also conduct some interviews among pastoralists in nomadic camps, to compare their responses with sedentary Turkana. Admittedly this will be "availability sampling."

Morulem is a traditional "village" in the woods by the Kerio River, where Turkana herders would stay for part of the year. In 1980-81, a canal was dug through the old bed of the Kerio to start a gravity-run irrigation scheme in the alluvial soil. This was conceived and first administered by the Africa Inland Church, built with food-for-work local labour in the aftermath of drought and raids. In the last decade, most of Morulem's residents have stayed there continually, but by outward appearances (dress, housing, and small milking goat herds), live much like traditional Turkana. There are also only a few non-Turkana Kenyans working and living in Morulem (primary school teachers and an agricultural extension worker). For these reasons, Morulem was selected to be the main research site for this study.

Lokori is more of a town than a village, and has had more influences from the various government ministries, the A.I.C. mission station, and Somali-run shops. Turkana awis with their branch and bark structures still fill and surround the town, so Lokori was selected as a comparison settlement with Morulem to test the hypotheses outlined here. In Lokori there is an added advantage: I can observe changes occurring since 1980, because I conducted part of my Master's research here on the ecology of hydatid cyst disease (Patton 1982). The following method was used to select representative samples of the two communities, Morulem and Lokori. First, sketch maps were made by viewing the settlements from high points, and using compass bearings from landmarks on the Kenyan topographic maps to plot specific points. We then divided the settlements into sections, walked through each and plotted the locations of every household (awi, or "manyatta") on our maps. We also noted the number of hut and corral structures for each awi, and presence or absence of a fence, for future identification. In Lokori, we noted the name of the head of household (many were already known by our interpreter).

When the households were numbered and totaled, a statistical random numbers table was used to select random samples for each community. The purpose of this method is to avoid bias in the sample, and to steer me to households throughout the settlements where I may have no natural inclination to go.<sup>1</sup> In Morulem, 55 households were selected to equivocate one-fourth of the population of 217 households.<sup>2</sup> In Lokori, 65 sample households were selected to represent the total of 312 households counted on the map.

- 
1. Indeed, we joked that without this exercise, my dissertation could have been called, "The Sedentary Turkana Who Live in the Shade and are Friendly".
  2. This does not include Kangitit, a place nearby Morulem but separated by a plain.

In addition to the people from these awis, various leaders are being interviewed as to their job responsibilities and involvement in solving disputes: locally recognized elders, the chief, administrative police, the management committee for the irrigation scheme, and the Divisional Officer for Lokori.

V. SUMMARY

My main purpose in this research project is to investigate how the social organization is changing among sedentarized Turkana. If social and political stratification are clearly emerging, there will be enough evidence with other case studies on sedentarization to develop a middle-range theory: Specifically, that as stratification accompanied early human settlement, so it appears with the current sedentarization of nomads. This theory will be of interest to many social scientists who have worked with concepts of cultural evolution and population pressure, but thus far have been concentrating on horticultural, agricultural, and industrial peoples.

My second aim is to examine some of the ecological consequences of sedentarization in southern Turkana.

This research is currently under way in Morulem and Lokori, October 1989 to July 1990.

REFERENCES CITED

- Asad, T. 1979. "Equality in Nomadic Social Systems? Note towards the Dis-  
solution of an Anthropological Category." In Pastoral Production  
and Society. Cambridge: Cambridge Univ. Press, pp. 419-428.
- Awuondo, C.O. 1989. "Approaches to Development of Kenya's Arid Lands." Resources 1(2): 10-13.
- Baker, R. 1975. "Development and the Pastoral Peoples of Karamoja, North-  
Eastern Uganda: An Example of the Treatment of Symptoms." In Pastoralism in Tropical Africa, ed. T. Monod. London: Oxford U.  
Press.
- Barth, F. 1961. Nomads of South Persia. Boston: Little Brown.
- Bates, D.G. 1980. "Yoruk Settlement in Southeast Turkey." In When Nomads  
Settle, ed. P. Salzman and E. Sadala. New York: Praeger.
- Baxter, P.T.W. 1975. "Some Consequences of Sedentarization for Social  
Relationship." In Pastoralism in Tropical Africa, ed. T. Monod.  
London: Oxford U. Press.
- Boserup, E. 1981. Population and Technological Change. A Study of Long-  
Term Trends. Chicago: U. of Chicago Press.
- Brainard, J. 1986. "Differential Mortality in Turkana Agriculturalists and  
Pastoralists." American J. of Physical Anthro. 70: 525-536.
- Bulliet, R. 1980. "Sedentarization of Nomads in the Seventh Century: The  
Arabs in Basra and Kufa." In When Nomads Settle.
- Carneiro, R.L. 1970. "A Theory of the Origin of the State." Science 169:  
733-38.
- Darling, F.F. and Farvar, M.A. 1968. "Ecological Consequences of Sedentar-  
ization of Nomads." In The Careless Technology, eds. M.T. Farvar and  
J.P. Milton. Garden City, N.Y.: Natural History Press, pp. 671-682.
- Dyson-Hudson, R. 1980. "Toward a General Theory of Pastoralism and Social  
Stratification." Nomadic Peoples 7:1-8.
- Dyson-Hudson, R. and McCabe, J.T. 1981. Preliminary Report to NORAD on South  
Turkana Herd Movements and Water Supplies.
- Ecosystems Ltd. 1985. Turkana District Resources Survey. Nairobi: Ecosystems  
Ltd.
- Edgerton, R.B. 1971. The Individual in Cultural Adaptation. A Study of Four  
East African Peoples. Berkeley and Los Angeles: U. of California  
Press.
- Ellis, J.E. et al. 1984. "Aspects of Energy Consumption in a Pastoral Eco-  
system: Wood Use by the South Turkana". In Wood, Energy, and House-  
holds, Perspectives on Rural Kenya, ed. C. Barnes, J. Ensminger, P.  
O'Keefe. Sweden: The Beijer Inst. and Scand. Inst. Afr. Studies, pp.  
164-187.

- Frantz, C. 1980. "The Open Niche, Pastoralism, and Sedentarization in the Mambila Grasslands of Nigeria." In When Nomads Settle, eds. Salzman and Sadala. New York: Praeger.
- Galvan, K. 1985. Food Procurement, Diet, Activities and Nutrition of Ngisonyoka, Turkana Pastoralists in an Ecological and Social Context. Ph.D. Dissertation, State Univ. of New York at Binghamton.
- Goldschmidt, W. 1980a. "Career Reorientation and Institutional Adaptation in the Process of Natural Sedentarization." In When Nomads Settle, eds. Salzman and Sadala. New York: Praeger.
- Goldschmidt, W. 1980b. "The Failure of Pastoral Economic Development Programs in Africa." In The Future of Pastoral Peoples, ed. J. Galaty et al. Ottawa: International Development Research Centre.
- Gulliver, P.H. 1951. A Preliminary Survey of the Turkana. Communication from the School of African Studies No. 26. Cape Town, South Africa: U. Cape Town.
- Gulliver, P.H. 1955. The Family Herds. London: Routledge and Kegan Paul.
- Gulliver, P.H. 1975. "Nomadic Movements: Causes and Implications." In Pastoralism in Tropical Africa, ed. T. Monod. London: Oxford U. Press.
- Harner, M.J. 1970. "Population Pressure and the Social Evolution of Agriculturalists." Southwestern Journal of Anthropology. 26:67-86.
- Hassan, F.A. 1974. "Population Growth and Cultural Evolution." Reviews in Anthro. pp. 205-212.
- Hogg, Richard. 1984. "Re-stocking in Turkana." A proposal to OXFAM.
- Homewood, K.M. and Rodgers, W.A. 1984. "Pastoralism and Conservation." Human Ecology 12(4): 431-441.
- Johnson, Allen W. 1978. Quantification in Cultural Anthropology. Stanford: Stanford U. Press.
- Johnson, A.W. and Earle, T. 1987. The Evolution of Human Societies, From Foraging Group to Agrarian State. Stanford, Stanford U. Press.
- Khazanov, A.M. 1984. Nomads and the Outside World. Cambridge U. Press.
- Kleinman, D.S. 1980. Human Adaptation and Population Growth. A Non-Malthusian Perspective. Montclair: Allanheld, Osmun & Co.
- Lamprey, H.F. and Yussuf, H. 1981. "Pastoralism and Desert Encroachment in Northern Kenya." Ambio 10(2-3): 131-134.
- Lewis, I.M. 1975. "The Dynamics of Nomadism: Prospects for Sedentarization and Social Change." In Pastoralism in Tropical Africa, ed. T. Monod. London: Oxford U. Press. (pp. 426-441).
- Little, M.A. 1985. "Multidisciplinary and Ecological Studies of Nomadic Turkana Pastoralists." Biol. Internatl. (IUBS, Paris) 11:11-16.
- Little, P.P. 1985. "Social Differentiation and Pastoralist Sedentarization in Northern Kenya." Africa 55(3): 243-261.



- Marx, E. 1981. "Economic Change among Pastoral Nomads in the Middle East." In Settling the Desert, ed. by L. Berkofsky, D. Failman and J. Gale. New York: Gordon and Breach.
- McCabe, J.T. 1983. "Land Use Among the Pastoral Turkana." Rural Africana 15-16: 109-126.
- McCabe, J.T. 1987. "Drought and Recovery: Livestock Dynamics among the Ngisonyoka Turkana of Kenya." Human Ecology 15(4): 371-389.
- Migot-Adholla, S.E. and Little, P.D. 1980. "The Evolution of Policy Towards the Development of Pastoral Areas in Kenya." University of Nairobi, Institute for Development Studies.
- Naderi, N.A. 1974. "Sedentarization and Culture Change." Paper presented at the Conference on "Settling Nomads: Psychosocial Consequences of Sedentarization," U.C.L.A. 12-14 Dec. 1974.
- OXFAM. 1983. Turkana District Livestock Development Plan. Nairobi: Oxfam East Africa Field Office.
- Patton, M.M. 1983. "The Ecology of Hydatid Disease in Turkana District, Kenya." M.A. Thesis, University of Minnesota.
- Patton, M.M. 1983. "The Values and Difficulties of Quantitative Methods for Field Research among Nomads." (Unpublished.)
- Rigby, P. 1985. Persistent Pastoralists, Nomadic Societies in Transition. London: Zed Books.
- Sadala, E.K. and Stea, D. 1974. "Nomads: Behavioral and Psychological Adjustments to Sedentarization." U.C.L.A. School of Architecture and Urban Planning, Fourth World Studies No. 11.
- Salzman, P.C. 1967. "Political Organization Among Nomadic Peoples." Proceedings American Philos. Soc. 111(2): 115-131.
- Salzman, P.C. and Sadala, E.K. eds. 1980. When Nomads Settle, Processes of Sedentarization as Adaptation and Response. New York: Praeger.
- Salzman, P.C. 1980. "Processes of Sedentarization Among the Nomads of Baluchistan." In When Nomads Settle, ed. P. Salzman and E. Sadala. New York: Praeger.
- Salzman, P.C. 1981. "Afterward: On Some General Theoretical Issues." In Change and Development in Nomadic and Pastoral Societies, ed. J.G. Galaty and P.C. Salzman. Leiden: E.J. Brill.
- Sandford, R.H.D. 1984. "Livestock Development in Turkana." Progress Report to Oxfam.
- Shahrani, M. 1979. The Kirghiz and Wakhi of Afghanistan: Adaptation to Closed Frontiers. Seattle: Univ. of Washington Press.
- Spooner, B. 1971. "Towards a Generative Model of Nomadism." In Comparative Studies of Nomadism and Pastoralism, ed. P.C. Salzman. Anthro. Quarterly, Special Issue.



- Spooner, B., ed. 1972. Population Growth: Anthropological Implications. Cambridge, Mass: MIT Press.
- Swidler, N. 1980. "Sedentarization and Modes of Economic Integration in the Middle East." In When Nomads Settle, ed. P. Salzman and E. Sadala. New York: Praeger.
- Talbot, L.M. 1986. "Demographic Factors in Resource Depletion and Environmental Degradation in East African Rangeland." Population and Devel. Review 12(3): 441-451.
- Weinpahl, J. 1984. "Women's Roles in Livestock Production Among the Turkana of Kenya." Research in Economic Anthropology. 6: 193-215.

G. H. Sneath, ed. 1953. Population Growth and Anthropology.  
 Cambridge, Mass.: MIT Press.

Sneath, G. H. 1953. Sedentarization and Modes of Economic Interaction in the  
 Middle East. In Man and Society, ed. F. S. Cole and R. S. Sneath.  
 New York: Praeger.

Sneath, G. H. 1954. Demographic Factors in Economic Interaction and  
 Social Organization in East African Pastoralism. Population and Development  
 Review 3(3): 411-421.

Sneath, G. H. 1954. Women's Roles in Livestock Production among the  
 Pastoralists of East Africa. Research in Economic Anthropology, 2: 125-135.