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# Drought and Economic Differentiation Among Ariaal Pastoralists of Kenya

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*This paper examines the effects of the 1984 drought upon household wealth differences in a community of Ariaal pastoralists of northern Kenya. The database consists of 1985 post-drought livestock counts and informants' statements of species-specific drought loss, compared to 1976 livestock counts on the same 38 households. The analysis confirms the hypothesis that the drought resulted in increased household wealth inequalities. It is suggested that the combination of differential herd growth, differential participation in the cash market, and differential loss to the drought has contributed to a polarization within Ariaal of rich and poor, resulting in rural proletarianization and urban migration.*

**KEY WORDS:** drought; Kenya; pastoralism; wealth inequality.

## INTRODUCTION

Pastoral communities are seldom homogeneous, but are marked by household inequalities in wealth and livestock ownership. This observation may appear obvious, but it is a relatively recent observation in anthropological studies which formerly treated pastoralists as a monolithic cultural type (e.g. Goldschmidt, 1971; cf. Dyson-Hudson and Dyson-Hudson, 1980). Livestock, unlike land, constitutes fluid capital for peasant producers which is used as a productive resource, a marketable surplus, and a form of stored wealth. Livestock are subject to both natural increases and catastrophic losses, and the accumulation of livestock wealth in pastoral society has been described as volatile where fortunes rise or fall (Barth,

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1964; Dahl and Hjort, 1976; Dyson-Hudson and Dyson-Hudson, 1982). Barth (1964) argued that accumulation of wealth among Basseri of Iran is inhibited by the continual risk of livestock losses from epidemics, famines, droughts, and frosts, as well as to labor shortages as herd size exceeds the ability of the stockowner to manage them. However, in the same article Barth suggests that homogeneity among Basseri is an illusion because of the elimination of the very wealthy and very poor from the nomadic community. Rich stockowners move into towns and manage their herds through hired labor, and poorer Basseri also move to the towns seeking wage-paying jobs.

Several authors maintain that livestock volatility diminishes permanent household inequalities (Dahl, 1979a; Salzman, 1980), while others argue that although wealth inequalities exist, a pastoral "ethos of egalitarianism" grounded in kinship-based redistribution mechanisms insures that no family in the community starves (Dahl, 1979b; Rigby, 1979). There is growing evidence, however, that wealth inequalities are long-term and increasing among pastoralist populations who currently face restricted grazing, privatization of land, and unequal access to markets, all of which are compounded by continual ecological hazards including drought (Galaty, 1981; Campbell, 1984; Hogg, 1986; Horowitz and Little, 1987).

Household wealth inequalities have been described both for small stock pastoralists of the Mideast (Bates, 1973; Irons, 1979; Beck, 1980; Bradburd, 1982) and segmentary cattle and camel pastoralists of East Africa (Dahl, 1979a,b; Grandin, 1983; Ensminger, 1984; Little, 1985; O'Leary, 1985; McCabe, 1987a; Sperling, 1987; Fratkin, 1989a). Several authors have pointed to the permanence of these divisions. Bates (1973, p. 134) writes, "while fortune fluctuates among the Yoruk, life histories of influential men show little of this," and Bradburd (1982, p. 96) notes of the Kommachi of Iran, "although shifts of wealth may occur they are not generally great enough to make the rich poor or the poor rich."

This paper describes how the 1984 drought of northeastern Africa resulted in increased wealth differences between rich and poor in one community of Ariaal pastoralists of Kenya. Comparing post-drought herd counts and species-specific herd losses to pre-drought counts of 38 households, we show that rich households tended to stay rich, middle or sufficient households became poor, and poor households became even poorer. We also show that those households concentrating on camel production, i.e., the wealthier households, lost proportionally less of their animals than those relying on cattle or small stock, i.e., the poorer households. Although the rich lost proportionally more of their total herds than the poor, they were able to survive the drought by having larger absolute

herds than the poor. The number of poor households doubled after the drought, where "poor" is defined as having insufficient herds to feed their household members. This drought-induced impoverishment contributed to the outmigration of Ariaal households to mission towns distributing famine-relief foods. These findings confirm what pastoralists consistently maintain as they strive to maximize their herds, that a rich man may lose half of 100 animals and survive, where a poor man will lose half of ten animals and perish.

## HOUSEHOLD INEQUALITY IN ARIAAL

The Ariaal are a small population (7000) who herd their cattle, camels, and small stock in the semi-desert and mountains of western Marsabit District, northern Kenya (see Fig. 1). The Ariaal are related by descent and marriage to both Rendille camel and small stock pastoralists (population 15,000) to the north and to the Samburu cattle pastoralists (population 70,000) to the west in the highlands of Samburu District, described in Fratkin (1991) and Spencer (1973).

The Ariaal keep cattle, camels, and small stock of goats and sheep for both subsistence (milk, meat, blood, and hides) and trade, where livestock surpluses are exchanged both in the kinship sphere of relations (gifts, bridewealth payments, and ritual sacrifices) and in the commercial market to purchase maize-meal, cloth, cooking utensils, and other livestock. Camels are kept primarily for milk and transport, small stock for meat and ready sales, and cattle for ritual consumption, bridewealth, and market trade (Fratkin, 1986).

Ariaal settlements are typically large circles of 20–50 houses with livestock pens located in the middle. These communities are patrilineal and patrilocal, composed of members of several lineages sharing the same exogamous clan identity. Lineages may include two or three full or half brothers, with their wives and families, usually living adjacent to one another and sharing herding tasks. About 15% of the settlement's households are made up of affinal relatives, usually poorer brothers of Rendille women married to Ariaal men who have joined the Ariaal to engage in small stock or cattle production.

Where lineage and clan affiliation determines settlement composition, production within the community is based on household organization. A household is defined as the smallest domestic unit with its own independent herd and which can make independent decisions over the allocation of its members' domestic and herding labor (Dahl, 1979b, p. 70). Typically, a household includes a married male stockowner, his wife or co-wives,

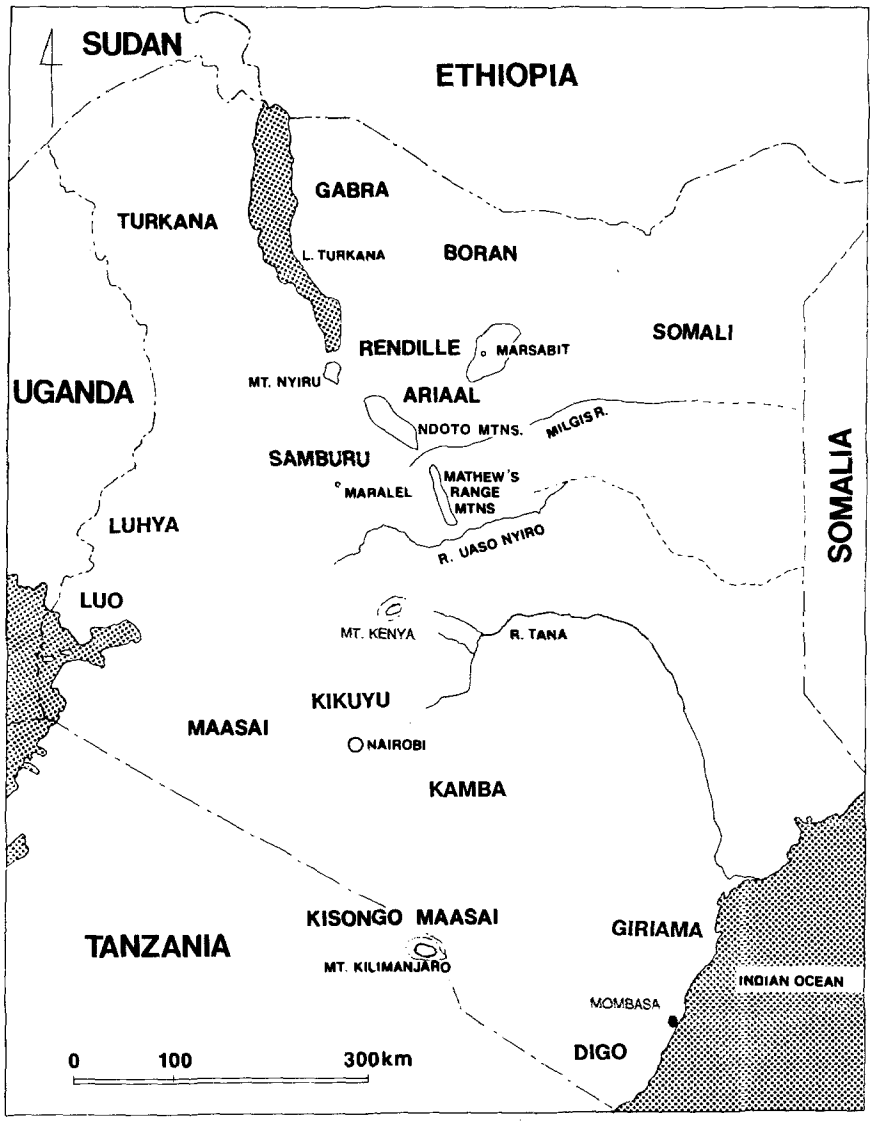


Fig. 1. Location of Ariaal and other northern Kenyan pastoralists.

children, and an occasional dependent widowed mother. Each woman builds and maintains her own house, and a household may range from one to five houses.

Households vary considerably in the composition and size of their livestock herds. Wealthier households tend to be polygynous, have large herd sizes, and greater numbers of camels and cattle than small stock. Wealth also tends to be concentrated in certain lineages, while impoverishment appears to be associated with Ariaal households owning small stock rather than large stock, and with poor Rendille immigrants who recently moved or married into the Ariaal community. Table I lists the livestock holdings of 38 households of Lewogoso Lukumai settlement, measured in 1976 and again in 1985.[3]

Table I lists household holdings in camels, cattle, and small stock, and describes household wealth in total livestock units per capita (TLU/PER).[4] Households are ranked for 1976 and 1985, with demarcations listed under WEALTH into rich (R), sufficient (S), and poor (P) based on the number and type of livestock owned. Northern Kenya suffered severe drought between 1982 and 1984, corresponding to the period of the Ethiopian famine, and pastoralists suffered losses ranging between 25–75% of their herds (Hogg, 1986; Sperling, 1987). Figure 2 shows wealth differences in Lewogoso by total livestock units per household (rather than per capita), comparing post-drought 1985 and pre-drought 1976 (a period following extensive droughts between 1968–1971). As can be seen, there was a decline of total stock for the entire settlement, with a mean ownership of 56.8 TLUs per household in 1976 and 36.1 TLUs in 1985. This reflects the large-scale loss of livestock, particularly cattle and small stock during the 1984 drought. The figure also shows that although more families had larger herds in 1976, the number of households with more than 80 TLUs had increased by 1985.

In addition to differences in total ownership of livestock, households vary in the relative numbers of camels, cattle, and small stock they own, with wealthier families concentrating in large stock (camels and cattle) and poorer households concentrating in small stock (goats and sheep). Figures 3–5 show relative ownership of cattle, camels, and small stock. Cattle losses were greatest during the drought, while camel ownership remained fairly stable. This reflects the ability of the camel to thrive on poor browse and infrequent watering, whereas cattle have higher grazing requirements and need water every second or third day. Small stock show the

[3]Data on Ariaal were collected at Lewogoso Lukumai settlement, Marsabit District, Kenya between August 1985–March 1986 and July 1974–February 1976.

[4]Livestock censuses in Lewogoso were conducted in 1976 and 1985 during *soriu* ritual ceremonies, when all owned livestock are returned to the settlement for blessings. These figures do not include animals loaned out, but do include animals "borrowed" by Lewogoso stockowners. Small herds are often rounded to ten, particularly in the larger flocks. TLU/PER designates tropical livestock unit per capita (see note 5 for calculation of TLU).

**Table I.** Household Livestock Holdings, Lewogoso Settlement, 1976–1985

| Household Number | Rank 1976 | Rank 1985 | 1976 | | | | | 1985 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CAM[a] | CAT[b] | SS[c] | TLU/per[d] | Wealth[e] | CAM | CAT | SS | TLU/per | Wealth |
| 9 | 1 | 1 | 15 | 37 | 70 | 51.6 | R | 10 | 15 | 30 | 25.0 | R |
| 28 | 2 | 5 | 18 | 148 | 277 | 32.8 | R | 18 | 50 | 17 | 9.9 | R |
| 13 | 3 | 21 | 8 | 35 | 260 | 31.0 | R | 4 | 5 | 60 | 4.7 | S |
| 25 | 4 | 3 | 0 | 62 | 100 | 29.8 | R | 0 | 60 | 40 | 17.3 | R |
| 11 | 5 | 7 | 12 | 42 | 140 | 29.8 | R | 6 | 7 | 70 | 9.3 | R |
| 10 | 6 | 4 | 27 | 70 | 90 | 23.0 | R | 20 | 30 | 40 | 16.0 | R |
| 27 | 7 | 2 | 99 | 115 | 110 | 22.4 | R | 99 | 85 | 100 | 19.7 | R |
| 31 | 8 | 15 | 12 | 27 | 100 | 21.8 | R | 5 | 7 | 30 | 6.8 | S |
| 35 | 9 | 6 | 21 | 60 | 170 | 21.5 | R | 15 | 20 | 70 | 9.5 | R |
| 17 | 10 | 10 | 18 | 43 | 652 | 16.8 | R | 17 | 16 | 252 | 7.9 | S |
| 37 | 11 | 17 | 47 | 90 | 450 | 14.9 | R | 30 | 30 | 150 | 6.2 | S |
| 24 | 12 | 13 | 10 | 41 | 70 | 12.4 | R | 66 | 26 | 30 | 7.4 | S |
| 4 | 13 | 14 | 17 | 7 | 17 | 12.2 | R | 12 | 1 | 17 | 7.3 | S |
| 33 | 14 | 8 | 10 | 40 | 290 | 11.8 | R | 10 | 25 | 250 | 9.2 | R |
| 26 | 15 | 11 | 10 | 60 | 220 | 11.4 | R | 10 | 40 | 120 | 7.7 | S |
| 5 | 16 | 19 | 4 | 22 | 210 | 10.6 | R | 2 | 3 | 210 | 5.1 | S |
| 8 | 17 | 18 | 13 | 32 | 140 | 10.5 | R | 13 | 12 | 100 | 5.4 | S |
| 3 | 18 | 12 | 4 | 29 | 31 | 10.1 | R | 4 | 20 | 26 | 7.5 | S |
| 38 | 19 | 20 | 12 | 13 | 60 | 9.4 | R | 11 | 10 | 10 | 5.0 | S |
| 6 | 20 | 9 | 6 | 15 | 160 | 8.5 | S | 6 | 15 | 160 | 8.5 | S |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 21 | 23 | 1 | 19 | 60 | 7.4 | S | 1 | 13 | 25 | 4.6 | S |
| 23 | 22 | 24 | 7 | 23 | 260 | 7.3 | S | 7 | 10 | 160 | 3.4 | P |
| 29 | 23 | 28 | 13 | 26 | 164 | 6.7 | S | 7 | 10 | 34 | 2.6 | P |
| 15 | 24 | 30 | 1 | 25 | 56 | 6.6 | S | 1 | 10 | 6 | 2.4 | P |
| 16 | 25 | 27 | 0 | 10 | 51 | 6.5 | S | 0 | 5 | 11 | 2.6 | P |
| 12 | 26 | 16 | 3 | 3 | 85 | 6.0 | S | 4 | 2 | 80 | 6.8 | S |
| 36 | 27 | 31 | 12 | 11 | 20 | 5.7 | S | 7 | 5 | 10 | 2.4 | P |
| 2 | 28 | 22 | 0 | 24 | 89 | 5.6 | S | 0 | 19 | 80 | 4.6 | S |
| 30 | 29 | 33 | 5 | 16 | 42 | 5.5 | S | 5 | 6 | 12 | 2.2 | P |
| 32 | 30 | 34 | 1 | 15 | 70 | 5.0 | S | 1 | 5 | 20 | 1.7 | P |
| 18 | 31 | 26 | 3 | 12 | 200 | 4.7 | S | 2 | 6 | 100 | 2.8 | P |
| 47 | 32 | 25 | 4 | 20 | 14 | 4.3 | P | 4 | 15 | 10 | 3.4 | P |
| 1 | 33 | 32 | 3 | 9 | 71 | 4.3 | P | 2 | 5 | 55 | 2.3 | P |
| 14 | 34 | 29 | 11 | 9 | 80 | 3.7 | P | 11 | 1 | 50 | 2.4 | P |
| 20 | 35 | 36 | 4 | 6 | 126 | 3.6 | P | 4 | 3 | 26 | 1.3 | P |
| 22 | 36 | 37 | 6 | 6 | 57 | 2.4 | P | 5 | 1 | 37 | 1.1 | P |
| 21 | 37 | 35 | 0 | 7 | 66 | 2.0 | P | 0 | 6 | 58 | 1.5 | P |
| 19 | 38 | 38 | 0 | 2 | 0 | 0.8 | P | 0 | 2 | 0 | 0.5 | P |

[a] Camels owned.

[b] Cattle owned.

[c] Small stock (goats and sheep) owned.

[d] Tropical Livestock Units per person, determined by household TLUs divided by household size. One TLU = 1 cattle, 0.8 camel, or 10 small stock.

[e] Household Wealth determined by TLU/PERSON, where rich (R) > 9.0; sufficient (S) ≥ 4.5 ≤ 9.0; poor (P) < 4.5.

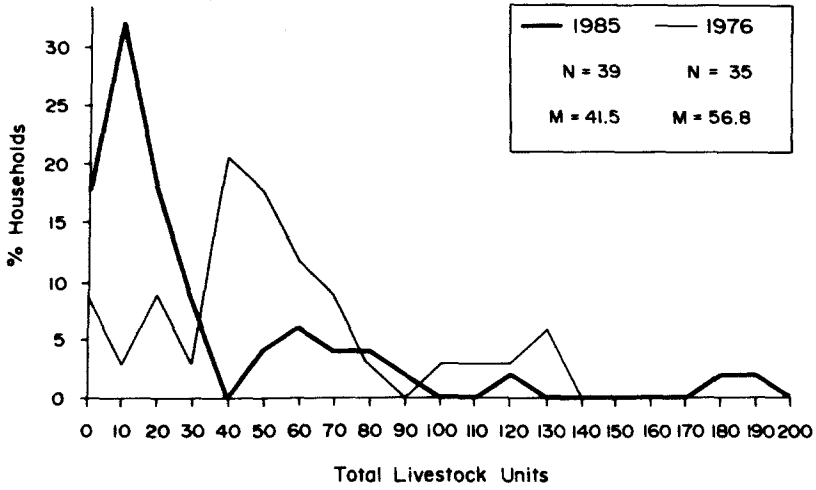


Fig. 2. Total livestock units per Ariaal households, 1976 and 1985.

quickest recovery to drought, as females are capable of reproducing twice a year and often yield twin births.

## LOSS THROUGH DROUGHT: METHODS AND MATERIALS

To quantify Ariaal livestock losses related to the drought, herd counts completed in 1976 for 38 households in Lewogoso Lukumai settlement were supplemented by livestock censuses of the same household herds in 1985. While the original 1976 Lewogoso community had by 1985 grown to over 75 households in three settlements, analysis was limited to the original group for whom livestock data were available for the two dates. Livestock censuses were obtained by direct observation and interview, conducted during ritual ceremonies when ideally all of Ariaal's livestock return from herding camps for blessings. In 1985, each household was asked to detail species-specific livestock loss directly related to the 1984 drought. While relying on informant response rather than actual observation, recall of drought losses was deemed reliable because: (1) the researcher's knowledge of 1976 herd size and composition acted as a check of accuracy and consistency on the 1985 estimates of drought loss, (2) the researcher did not promise any reward, e.g., re-stocking, for

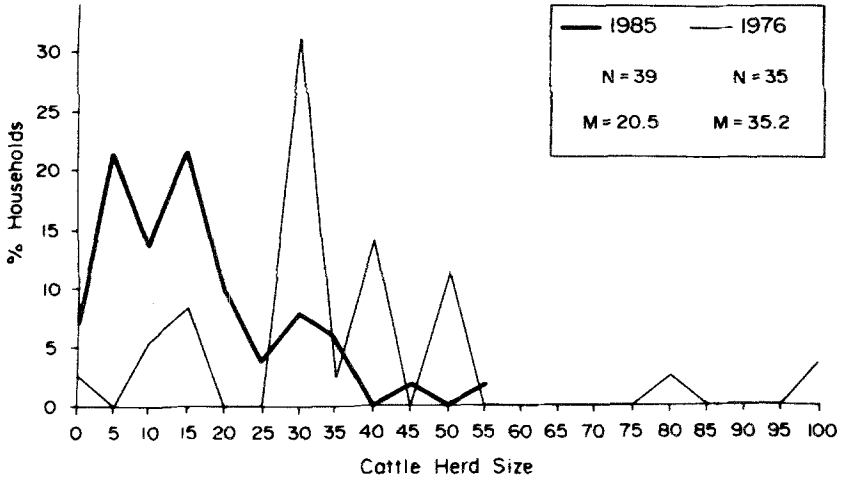


**Fig. 3.** Cattle ownership per Ariaal households, 1976 and 1985.

participation, thus negating a motive for potentially elevated claims, and (3) stockowners were interviewed in the presence of several related herd owners who knew the general (and probably exact) histories and sizes of their kins' herds.

We standardized the livestock counts into TLUs (Total or Tropical Livestock Units) representing 250 kg of weight, using the formula: 1 TLU = 1 cattle, or 0.8 camel or 10 small stock.[5] This last factor permitted calculation of per capita changes in TLUs for pre- and post-drought conditions. Furthermore, we adopt Pratt and Gwynne's (1977, p. 34-43) estimate of 4.5 TLUs per capita as the minimum level of livestock necessary to provide adequate nutrition to an individual subsisting on pastoral herds in arid lands. While we disagree with some of the tenets and variables used by Pratt and Gwynne in the construction of their scheme (including their deletion of grains from the pastoral diet and their estimate of human energy expenditures), the provision of absolute minimum requirements for

[5]Total (or Tropical) Livestock Units combine various livestock into one standard unit based usually on weight or milk yields, although there is variation in their calculation (Pratt and Gwynne 1977, p. 34). Dahl and Hjort (1976, p. 224) use the FAO Production Yearbook formula of 1 TLU = 1 camel or 0.8 cattle or 11 small stock, while researchers with the UNESCO Integrated Project in Arid Lands in Kenya use the formula 1 TLU = 1 250 kg cow, 0.8 camel, or 11 small stock (Field and Simpkin, 1985, p. 170). We use the formula of 1 TLU = 1 cattle, 0.8 camel, or 10 small stock.

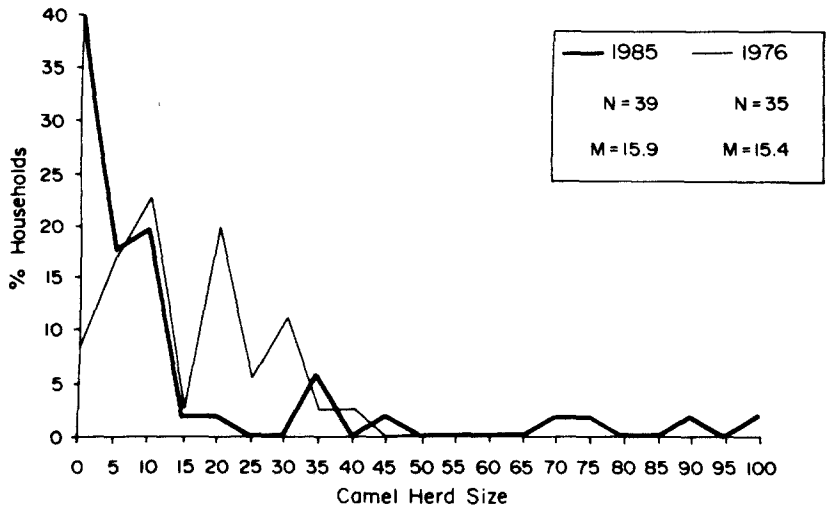


**Fig. 4.** Camel ownership per Ariaal households, 1976 and 1985.

subsistence pastoralism is advantageous.[6] For the Ariaal, 4.5 TLUs provides an individual with approximately 1.5 liters of milk, 20 grams of meat, and 70 grams of maize daily, yielding an estimated average of 1600 kcal and 105 grams of protein per day.[7]

We established the following classification to scale household self-sufficiency and wealth for Ariaal:

1. POOR — TLUs/person < 4.5.
2. SUFFICIENT — TLUs/person = 4.5–9.0.
3. RICH — TLUs/person > 9.0.

The first category represents minimal per capita nutritional requirements, while the second and third represent, respectively, up to and beyond

[6]Pratt and Gwynne assumed that 75% of subsistence pastoralists' diet consists of milk, with the remaining 25% meat. This ignores the long-standing role of grains in pastoralist diets (Fratkin, 1991; Galvin, 1985). It is estimated that milk obtained from pastoral production provides 75% of daily calories to pastoral Rendille (Field and Simpkin, 1985), 60% to the pastoral Maasai (Grandin, 1988), 60–70% to the Boran (Cossins, 1985), and 62% to the Turkana (Galvin, 1985). We also disagree with Pratt and Gwynne's (1977, p. 35) statement that "a pastoralist may be defined as an active individual doing no heavy work."

[7]Milk yields 700 kcal/kg and 38 g protein/kg, meat 1480 kcal/kg and 220 g protein/kg, and maize 3560 kcal/kg and 68 g protein/kg. Field and Simpkin (1985, pp. 171-172) estimate a Rendille household of 6.5 adults needs 27–31 TLUs to provide 2000 calories daily for each member, or approximately 4.5 TLU per capita.

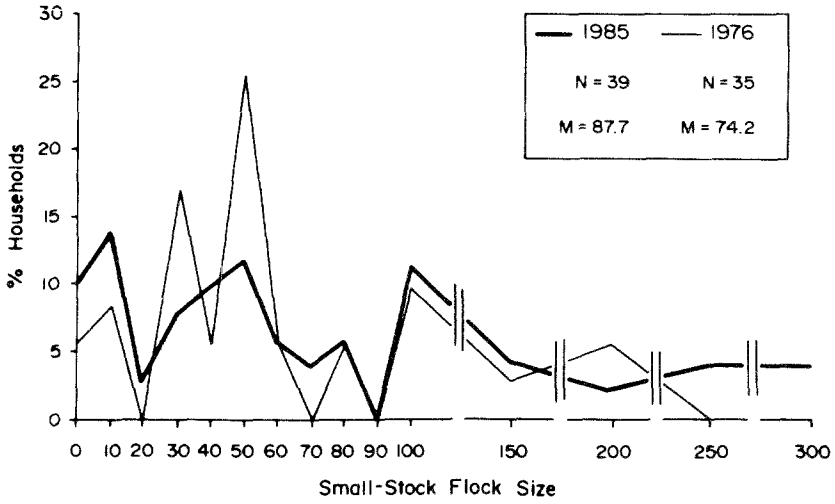


Fig. 5. Small stock ownership per Ariaal households, 1976 and 1985.

two times the minimum. Because households vary in per capita size, we use the TLU per capita rather than per household to determine wealth. At the same time, it focuses on individual household members' nutritional requirements.

## RESULTS

We first assess livestock loss per species; Table II presents data on pre- and post-drought household herd size by species and per capita TLUs. As can be seen from the mean percentage loss column, the drought resulted in a dramatic decline in total herd size, regardless of species. However, differential mortality is also apparent, with the most drought resistant animals, camels, suffering the least amount of loss (18.3%), cattle the highest (51.2%), and small stock almost as high as cattle (49.8%).

This differential mortality is apparently exacerbated by differential household loss. Inequalities in loss are reflected in two manners in Table II. First, the post-drought standard deviations are almost equal to, or in many cases greater than, average herd size. This indicates a wide range of pre- and post-drought herd size. These disparities can be standardized via the

**Table II.** Pre- and Post-Drought Household Herd Size by Species, Per Capita TLUs and Mean Percentage Loss

| Species | Pre-drought | Post-drought | $\bar{X}$ Percentage loss |
|---|---|---|---|
| Camels | | | |
| $\bar{x}$ | 11.5 | 9.4 | 18.3 |
| *SD* | 17.2 | 16.3 | |
| *CV* | 149.6 | 173.4 | |
| Cattle | | | |
| $\bar{x}$ | 32.4 | 15.8 | 51.2 |
| *SD* | 31.5 | 17.8 | |
| *CV* | 97.2 | 112.7 | |
| Small stock | | | |
| $\bar{x}$ | 134.0 | 67.3 | 49.8 |
| *SD* | 128.0 | 66.4 | |
| *CV* | 95.5 | 98.7 | |
| TLUs | | | |
| $\bar{x}$ | 12.7 | 6.4 | 49.6 |
| *SD* | 10.9 | 5.4 | |
| *CV* | 85.8 | 84.4 | |

coefficient of variation (Thomas, 1986, p. 54) defined as c.v. = standard deviation × 100/mean.

Mean herd size in pre- and post-drought conditions and their standard deviations are so different that comparisons are difficult to envision. Converting standard deviations to percentages standardizes variation regardless of mean values. For all species and per capita TLUs, the result of the drought is an increase in the coefficient of variation, suggesting differential household herd loss as represented by increased variation in livestock holdings. As Thomas (1986, p. 56) notes, coefficients of variation greater than 20% indicate non-normal distributions. In this case, the extremely high coefficients denote bimodality, with some households characterized by low levels of livestock while others possess extremely large holdings.

Table II demonstrates average herd loss for all of Lewogoso settlement. When we stratify the sample into rich, sufficient, and poor households, the differential losses are more striking. Table III shows average pre- and post-drought herd size and composition for the three wealth levels, in addition to per capita TLUs. As can be seen, rich and sufficient households concentrate more heavily on camels and cattle, while poor households emphasize small stock. In Ariaal society, as among other East African

**Table III.** Average Pre- and Post-Drought Herd Sizes, Absolute and Percentage Loss by Species and Economic Status

| Pre-species | Post-drought | Loss drought | *N* | Percent | Status |
|---|---|---|---|---|---|
| Camels | 18.8 | 15.4 | 3.4 | 18.1 | Rich |
| Cattle | 51.2 | 24.3 | 26.9 | 52.5 | |
| Small stock | 181.9 | 85.4 | 96.5 | 53.1 | |
| TLUs | 20.2 | 9.8 | 10.4 | 51.5 | |
| Camels | 4.4 | 3.4 | 1.0 | 22.7 | Sufficient |
| Cattle | 16.5 | 8.8 | 7.7 | 46.7 | |
| Small stock | 101.8 | 58.2 | 43.6 | 42.8 | |
| TLUs | 6.4 | 3.7 | 2.7 | 42.2 | |
| Camels | 4.0 | 3.7 | 0.3 | 7.5 | Poor |
| Cattle | 8.4 | 4.7 | 3.7 | 44.0 | |
| Small stock | 59.1 | 37.7 | 21.4 | 36.2 | |
| TLUs | 3.0 | 1.8 | 1.2 | 40.0 | |

pastoralists, wealth and prestige are measured in large stock whose status is related both to their copious supplies of milk and their role in ritual consumption and exchange. Cattle are particularly important for the periodic age set rituals where each warrior slaughters five oxen over a 14-year period. In addition, they are used in bridewealth payments that ideally include eight large animals.

Table III also details the pattern of species-specific loss previously noted. Regardless of economic strata, camels suffer the least amount of loss, cattle the highest, and small stock remain intermediate. Camel and cattle loss is highest for the rich and sufficient group, reflecting their concentration on large stock. Most importantly, there is a graduated loss of TLUs per level, with the rich losing the highest proportion (51.5%), sufficient households an intermediate amount (42.2%), and the poor classification the least (40.0%). But although the rich lost more animals than the poor (measured as TLUs), they did not suffer the same consequences.

Since economic status is directly linked to absolute herd size, we examined livestock loss by economic level, as shown in Table IV. Once again, the pattern of rich households suffering the worst livestock loss emerges. In 1985, only eight of the original 19 families remained in this classification. In contrast, the sufficient and poor groups increased in size, reflecting the general loss of TLUs for all households as a result of drought. Poor households increased from seven in 1976 to 15 in 1985.

**Table IV.** Pre- and Post-Drought Status, Based on Per Capita TLU Scale

| Status | Pre-drought | | Post-drought | | Percentage change |
|---|---|---|---|---|---|
| | *N* | % | *N* | % | |
| Rich | 19 | 50.0 | 8 | 21.0 | -29.0 |
| Sufficient | 12 | 31.6 | 15 | 39.5 | +7.9 |
| Poor | 7 | 18.4 | 15 | 39.5 | +21.1 |
| Totals | 38 | 100.0 | 38 | 100.0 | |

**Table V.** Status Change by Household

| Pre-drought status | Post-drought status (*N*) | | Percentage |
|---|---|---|---|
| Rich (19) | Rich | (8) | 42% |
| | Sufficient | (11) | 58% |
| | Poor | (0) | 0% |
| Sufficient (11) | Sufficient | (4) | 33% |
| | Poor | (8) | 67% |
| Poor | Poor | (7) | 100% |

While Table IV pertains to categorical change, it does not consider individual households' fate. Table V depicts pre- and post-drought household status based on individual households within each level. Combined with previous results, these data indicate that while rich households' large herds suffered the highest absolute loss of animals, their very size buffered them from falling below the minimum TLU per capita level. Eleven of the pre-drought rich households (58%) do change category in post-drought 1985, yet all fall into the sufficient classification, none into the poor. In effect, none became marginal. In comparison, an even larger proportion of the sufficient group (67%) shift from their pre-drought classification, but all enter the poor sample.

## SUMMARY AND DISCUSSION

Analysis of the effects of the 1984 drought upon the household livestock holdings of Lewogoso Lukumai settlement reveal differential loss based on herd composition, size, and household wealth. Comparison of

absolute numbers of household herds before and after the drought support the hypothesis that the drought led to increased wealth differentials, as evidenced by increased coefficients of variation for the post-drought sample. Where the category of poor pastoralists doubled and sufficient and rich pastoralists decreased by more than 50%, eight of the ten wealthiest households of 1976 nevertheless remained the only rich households in 1985. Furthermore, these rich households actually increased their ownership of camels, while poor and sufficient households took losses in all three livestock types. This finding of maintenance and even increases in wealth differences contradicts the view that drought or other catastrophes level household inequalities.

Examination of loss per species revealed species-specific mortality, with cattle and small stock suffering greater loss than camels. This in turn was linked to economic status, with wealthier families concentrating on large stock and particularly camels, while poorer households emphasized small stock. Although large herds (and wealthy herd owners) suffered the most severe losses, the rich were able to maintain high or sufficient herd sizes (measured as TLU per capita), ensuring their subsistence base, while poorer households had herds insufficient to feed their household members.

The combined results of absolute and categorical analysis of livestock loss point to the efficiency of maximizing herd size for Ariaal pastoralists. As pointed out in an analysis of Turkman nomadic pastoralists by Irons (1979), maximizing economic strategies for pastoralists act as a buffer against environmental calamities as well as providing surplus animals for ritual and social use, e.g., age-set ceremonies and/or bride-price. At the same time, ecologists (cf. Pratt and Gwynne, 1977) criticize pastoralists for purportedly herding 50–100% more animals than required for subsistence, citing such excesses as prime agents in rangeland degradation and desertification. While other studies dispute these criticisms (cf. Coughenour *et al.,* 1985; Horowitz, 1979; Western and Finch, 1986), the Ariaal data indicate that regardless of the long-term environmental impact, maximizing strategies function well in times of ecological stress.

Rather than acting as an equalizing force on household wealth, drought increased disparities in both absolute and categorical livestock holdings. For households falling below the minimum level of per capita TLUs, three alternative economic strategies are now available to insure self-sufficiency. One is the long-standing tradition of herding for other, more affluent households in return for the loan of milk animals to feed their households. Of the 38 male stock-owners in Lewogoso in 1985, five (13.1%) were poor Rendille affines and one was an unrelated age-mate.

A second, more recent avenue is increased reliance on the cash economy, through the sale of remaining livestock. In many cases, poorer families utilize both strategies by selling stock to purchase food while herding for other households. A third strategy is to abandon the pastoral economy altogether, migrating to small towns or large cities in search of wage paying jobs as laborers or watchmen.

Regardless of which approach (or combination of approaches) is adopted, the net result is increased dependency and a decrease in the ability to be self-sufficient in the pastoral economy. It is not clear if this dependency is temporary or not. McCabe (1987b) observed that of four Turkana households suffering drought-related livestock loss, one had achieved pre-drought levels in only 3 years. However, Hjort (1979) describes the fate of Kenya Boran deprived of their livestock by the political turmoil in the 1960s, which led to a permanent stockless population seeking economic alternatives in the town of Isiolo.

The loss of poor households driven out of the pastoral economy is not new. Among Maasai, for example, poor stockowners in the past moved into the forests to forage and raise honey, becoming "Dorrobo" (literally "poor ones"), or seeking alternative livelihoods including fishing or agriculture (Sobania, 1988; Waller, 1988). However, the large and rapid integration of pastoralists into regional and national markets today has increased this differentiation process, leading to the formation of an underclass of rural proletarians, the "new Dorrobo" as Richard Waller terms them, individuals who herd for wealthy stockowners or drift into large cities in search of jobs as watchmen (Hogg, 1986; Waller, personal communication). This loss of pastoral specialization may not always be disadvantageous, however, as sedentary town life also offers new opportunities in education, wage-labor, market entrepreneurship, and access to social services (Ensminger, 1984; Fratkin, 1989b; O'Leary, 1990; Roth, 1991).

The immediate stresses of large-scale loss to drought, both socially and nutritionally, must be significant. The frequent recurrence of drought in this region and the effectiveness of maximizing economic strategies argue for the persistence of household wealth differentials as a consequence of social and environmental factors. The settling of Rendille around towns distributing famine-relief and the increase in urban migration of Rendille and Ariaal seeking wage-labor suggest a shrinking and transformation of their subsistence pastoral economy to include new alternatives (O'Leary, 1990; Fratkin, 1991). It remains to be seen whether permanent classes of rich and poor will develop among the Ariaal as they have among other pastoral societies.

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