GAMBLING WITH GOATS: VARIABILITY IN

HERD GROWTH AMONG RESTOCKED

PASTORALISTS IN KENYA

by

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AMONG RESTOCKED PASTORALISTS IN KENYA

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Summary

The growth of individual, north Kenyan, pastoralist families'
herds of smallstock, given to them in restocking schemes, is
followed over several years. Very poor families given similar
herds at the start of the project showed great variation in
herd sizes by the end of the period analysed. There were
highly significant between-year differences in mean herd
growth, which appeared to be ultimately caused by climatic
variation. But there were no significant between-family
effects. That is to say, families that did worse than average
in one year were no more likely to do worse than average in
another year than was any other family.

The extent to which families depended on income from sources
other than their herd is clearly shown to decrease as herd
size increases, but families with well over 100 goats were
still dependent on some additional source of income for at
least 50% of the time.

It is concluded that although families are, in general,
managing their herds to the best of their ability,
unpredictable livestock mortality is inevitable and will lead
to wide variation in household success. The factors causing
this variation are largely unavoidable in the environment in
which these pastoralists live. Its existence should therefore
be accepted and taken into account in the planning and
assessment of restocking schemes, and in any other
interventions concerning pastoralists' herds.

Introduction

The number of animals needed to support a household in a
nomadic pastoral system is a key parameter needed for the
assessment of many aspects of the state of pastoral systems.

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The relationship between herd size and the viability of a household unit will depend on many factors. These include the species of livestock and their average contribution to household food and income needs, but also the variability in the quantity of food they yield, which will in turn depend on the variability of their rates of reproduction and survival.

In 1983, and over the subsequent years, many pastoralist families in northern Kenya that had recently lost most or all of their herds were 'restocked' with herds of smallstock by a charitable organisation. Stock were given out in four different tribal areas to families who were chosen both on the grounds of need and of ability to return to pastoralism as a way of life. The progress of the families' herds was then monitored, at varying intervals, over the following years. In this paper I analyse data from two of the regions where restocking was carried out. These two regions were chosen for analysis because it was possible to extract, from the records and notes kept by those monitoring the schemes, data on herd sizes from the same, individual families for several, consecutive years.

<u>Variation in household herd growth rates</u>

In region A, families selected for restocking were headed by women who had been recently widowed (and thus left destitute). In 1984, 17 households were each given 30 goats, of which 29 were mature females, and another 16 households were given similar herds in 1985. Families were given enough maize on restocking to support them for the next 8 months. They were instructed not to sell or slaughter any of their donated stock in the first year after restocking, and were only allowed to sell males in the second year. In practice, very few live, donated stock were sold at all over the next four years, even when families were allow to do so. Some free veterinary treatment was provided.

Figure 1. Mean herd growth for families restocked in 1984 and 1985 in region A..

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Figure 1 shows the trends in mean annual herd growth for donated stock for these families between 1984 and 1988. The annual herd growth for those restocked in 1984 and in 1985 were remarkably similar (it should be borne in mind that, in the first few years after restocking, these herds will contain a much higher proportion of reproductive females than most pastoral herds). These mean values conceal a wide range of variation in herd growth across households. Figure 2 shows the variation in herd size, for those families restocked in 1984, that resulted over the next four years. As sale and slaughter were negligible, this variation results almost entirely from natural variation in birth and death rates. Herders attributed livestock deaths to a variety of causes, described either as drought or starvation, ticks, diarrhoea, occasionally predators or snakes, and the heavy losses in 1988 were attributed either to drought or to the effects of the heavy rain which followed the long dry season causing pneumonia in weakened animals or, in some cases, literally washed them away in the flood.

An analysis of variance of percentage herd growth by year and by family showed that year to year variation in herd growth was highly significant but there was no significant effect of family. That is, although there were a few families that appeared to do consistently well and some that did consistently badly, there were no more of these than would be expected if herd growth each year was entirely random and not influence by whether or not that family did badly last year. A family that does badly one year is no more likely to fare worse than average in another year than is any other family. This being the case, there is no point in looking for family characteristics that might correlate with herd growth in this sample.

Figure 2. Variance in herd growth for families restocked in region A in 1984.

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Figure 2 cont.

Figure 3 shows similar data for families restocked in region
B. These were herders where most families were headed by men.
Families were all restocked in 1983 and each were given
roughly 35 goats and 15 sheep, of which about 45 animals were
mature females. Families were given enough maize on
restocking to support them for the next 9 months, but there
were no restrictions on sale and slaughter of donated stock
after the first year. This occurred much more often than in
region A, although precise figures are not available. Once
again, there is considerable variation across households which
shows highly significant between-year effects, but again no
significant between-family effects. This is despite the fact
that, at this site, animals were being sold and slaughtered to
meet household requirements.

The relationship between household herd size and other sources of income

In region A, every three months between August 1986 and August
1988 each herder was asked how she had supported her family.
Herders reported whether they were surviving off the herd
alone or whether they were getting any income in cash or kind
from elsewhere. Only the nature, not the quantity, of these
other sources of income were recorded. This enabled the
relationship between the number of stock owned and these other
income-generating activities to be investigated. There was a
remarkably clear link.

I have grouped the income status of each of the 33 families in
each of the 8 three month periods into three categories:
either they were surviving off milk alone, or they were
surviving off milk and cash generated by selling the skins of
stock that died (or were slaughtered in a small minority of
cases), or they were surviving with the help of another source
of income. Families moved between these categories
frequently.

Figure 3. Variance in herd growth for families restocked in region B in 1983.

Figure 3 cont.

Out of the 264 (33x8) three month periods or 'family-quartiles', in less than 20% of them were families in a state of living off only the produce of the herd. In the rest, they were either selling firewood for cash in town or receiving help from relatives. This help came either as a straight gift of cash or food, or came through the loan of cattle or camels that were producing milk. Gum arabic was also a source of income for a small number of families. Figure 4 shows the percentage of family-quartiles that were in each different bracket of income generation.

Figure 5a shows the relationship between the income status of a household and the total number of goats in their herd. This number was made up of donated goats, their offspring, any goats that the family owned on restocking (which varied between 0 and 15) and their offspring. It is immediately clear that other sources of income diminish steadily as herd size increases. But even when herd sizes are well over 100 goats, these small families were reliant on these other income sources in over 50% of the family-quartiles. The movement of families between different categories of income status is illustrated by plotting the trajectory of one family over the two year period. Each arrow represents the progress made by the family between the end of one three month period and the next. Hence this family was surviving, initially with the help of relatives; then as the herd grew, they lived off milk from the herd for a while, later supplementing this with cash from the sale of skins. Most of this arose from drought deaths which eventually reduced the herd to less than it had been at the beginning of the two year period, and the family was once again dependent on help from relatives.

Families rarely survived off milk alone, although it can be seen from Figure 5 that this does occur occasionally with a herd size greater than about 50 animals. Whether a family can be supported by milk alone obviously depends upon how many animals are in milk, which varies considerably.

Figure 4. Percentage of 'family-quartiles' (8 three month time periods from 33 families) in which families were depending on various forms of income. 'Goats only' is equivalent to income status 1 or 2 in Figure 5. All other forms of income are additional to that from the goats, and are equivalent to income status 3 in Figure 5.

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Figure 5.
a) The effect of herd size on the proportion of family-quartiles in each income status. Right-handed shading = status 1 (surviving off milk only), cross-hatching = status 2 (surviving off milk and the sale of skins), left-handed shading = status 3 (surviving with the help of another source of income).

b) The trajectory of one family through different herd sizes and states of income over the two year period between August 86 and August 88. Each arrow represents the change over three months.

Figure 6a shows the variation in the birth rate, and hence in the number likely to be giving milk, over the two year period. The sale of skins was an important source of income, staving off the need to turn to other modes of income-generation for some of the families which had more than about 70 goats. Income from skins obviously depends on the death rate in the herd, which is also variable, and shown in Figure 6b. However it should be noted that income status is plotted against the herd size at the beginning of the three month period, not the end. Sale of skins was most important in periods 7 and 8, as many animals had died, after which the family was likely to find itself back down in a lower income bracket. Hence this income is an important mollifier of the effect of drought but does not provide much sustainable income at these herd sizes.

Conclusions

Data on the variation in herd sizes of a large number of individual pastoralist households over a number of years are quite rare. Data on how this affects household income generation are even more rare. The data set resulting from the monitoring of these restocking schemes in Kenya provides this information and enables an attempt at quantifying the relationship between herd size and household viability.

The overriding impression is that herd growth shows very great variation both between years but also between families. Although families are, in general, managing their herds to the best of their ability, unpredictable livestock mortality is largely unavoidable in the environment in which these pastoralists live, and will lead to wide variation in household success. Statistical analysis suggests not the existence of good or bad herders so much as good or bad luck. This variability should therefore be accepted and taken into account in the planning and assessment of restocking schemes and any other interventions concerning pastoralists' herds.

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Figure 6.
a) The number of births per goat in the herd every three months over the two year periods from August 1986.

b) The number of deaths per goat in the herd over the same period.

In the case of herders in region B, there is not enough
information on income and outgoings to know what proportion of
the households needs are being met by the herd. However,
involvement in the cash economy was greater than in the case
of the widows in region A, with particular emphasis on raising
funds for the education of children. The strategy of
restocked households in region A appeared to limit sales and
slaughter so as to foster herd growth, to diminish reliance on
other sources of income (which either involved back-breaking
work or requests to relatives) and eventually to obtain large
stock. These may be described as the 'traditional' strategies
of poor pastoralists. However, among the restocked region B
households there was frequent selling of animals to pay for
educating children, perhaps implying that more faith was being
placed in future income from outside the pastoral sector than
in nurturing herds to provide more future income from within
it (Fry, unpub.). This means that variability in herd growth
could reflect not only biological variation but variation in
household expenditure, which is not necessarily related to
household size.

In the case of region A households, it is clear that long-term
survival off goats alone is not possible in their environment
without making use of other sources of income. This was
frequently provided by relatives, in many cases a husband who
married the restocked widow after restocking. This help was
quite commonly provided in the form of a loan of a largestock
female in milk, and in richer pastoralist households the
owning of largestock would provide that part of the
subsistence requirement that is obviously not being met by
goat herds of up to 150 animals. Whether larger herds of
goats could ever meet all the families' income requirements is
not known, but it is more likely that if the herds grew larger
some goats would be exchanged for cattle or camels, and hence
fulfil the role of the largestock lent by relatives. The two
women with the largest herds were discussing the possibility
of buying either cows or camels next year should their goat

herds increase further, to around 150 to 200 animals (Y Muktar pers. comm.), but in the event the heavy losses in 1988 meant that this circumstance is unlikely to arise imminently.

For those widows without family support, the cutting and selling of firewood was the main option for supplementing income. This traditional earner for impoverished pastoralists is extremely hard work and restricts the household and herd to within 5 miles or so of the town. Nonetheless, this did not appear to have any noticeably adverse effects on herd performance. However, if one of the aims of restocking is to enable families to disperse away from the more heavily utilised areas, then enough stock would have to be given to reduce dependence on firewood selling to a minimum.

Both communities welcomed the restocking, and in general the standard of living of the restocked families was successfully enhanced, in some cases dramatically. Whilst still depending on other sources of income, most families were enabled to re-enter a pastoral system from which many had previously been virtually excluded by their destitution. For the widows in region A, remarriage may have been hastened in many cases by restocking. However, the unpredictable nature of herd growth in these environments, to which smallstock are particularly susceptible compared to camels, means that luck as much as judgement will play a major part in determining whether these families are likely to become impoverished again in the future.