# Camel Herd Dynamics in Southern Somalia: Long Term Development and Milk Production Implications

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## Introduction and Method

The last ten or 15 years have seen a bandwagon effect in the study of dryland problems; much has been written in response to the critical situation prevailing not least in African drylands. But limited insights into what kinds of issues need to be studied have led to a rather fragmented picture. Many have studied similar problem fields whereas other issues have not been touched upon at all to the extent needed for proper action. When it comes to the study of pastoral systems there are severe gaps of knowledge, generated both by differencies in perspectives beween, say natural and social sciences, and by practical difficulties involved in carrying out long-term research in hot and dry climates.

The prevailing ecological perspective, by no means comprehensive enough to explain living conditions today in drylands, is based on balances or imbalances between the components people, animals and land (Hjort 1981). Lacking, generally speaking, are detailed insights, for instance into age structures of pastoral herds, decision-making and competence levels, how different plants are differentiated depending on fodder utility, and the implications of seasonality (see Hjort 1985 for further discussion on this point).

This kind of knowledge gaps also exist in the Somali context. There is for instance no information on the composition of family herds of camels detailed enough to allow for any «demographical» calculations of long-term developments. The present paper is a pilot effort to test to what extent such problems can be overcome by means of serial surveying. It presents a way which could be multiplied and carried out in a more comprehensive way if desired.

This paper reports the camel herd dynamics subproject within the Somali Camel Research Project. It is based particularly on aerial survey from R.M. Watson (1985) and on ground surveying by Mohamed Ali Hussein. Our prime concern is to analyse the camel herd compositions in southern Somalia presented in Watson (*ibid*) by looking at long-term implications in terms of herd growth and at milk production possibilities in eleven selected camel herds. The locations of the herds surveyed are given on Map 1, derived from Krokfors (in press). The method used in the aerial surveying is presented in Watson (*ibid*). Measurements of camel

Table 1: *Population structures of the surveyed eleven herds (Sources: Watson 1985)*

% of population structures of the age/sex category

| Population | 0-½ M | 0-½ F | ½-1 M | ½-1 F | 1-1½ M | 1-1½ F | 1½ M | 1½ F | 2-3 M | 2-3 F | 3-4 M | 3-4 F | 4-5 M | 4-5 F | 5-6 M | 5-6 F | 6-7 M | 6-7 F | 7-8 M | 7-8 F | 8-9 M | 8-9 F | 9-10 M | 9-10 F | 10 M | 10 F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.8 | 1.1 3.7 | 8.0 | 1.3 6.7 | 6.7 | 0.9 5.8 | 8.0 | 0.9 7.1 | 13.3 | 1.7 11.6 | 13.6 | 2.2 11.4 | 13.4 | 2.5 10.9 | 5.0 | 1.0 4.0 | 3.4 | 0.2 3.2 | 2.2 | 0.5 1.7 | 3.1 | 0.6 2.5 | 4.1 | 0.9 3.2 | 11.4 | 2.1 9.3 |
| 2 | 15.2 | 3.5 11.7 | 14.6 | 2.4 12.2 | 12.4 | 1.7 10.7 | 6.1 | 0.7 5.4 | 19.2 | 2.4 16.8 | 10.4 | 1.7 8.7 | 9.6 | 1.8 7.8 | 3.8 | 0.8 3.0 | 3.0 | 0.6 2.4 | 0.3 | 0.1 0.2 | 1.3 | 0.3 1.0 | 1.3 | 0.3 1.0 | 3.0 | 0.5 2.5 |
| 3 | 13.5 | 3.1 10.4 | 9.5 | 1.5 8.0 | 6.3 | 0.9 5.4 | 6.8 | 0.8 6.0 | 7.7 | 1.0 6.7 | 14.0 | 2.2 11.8 | 9.9 | 1.8 8.1 | 9.5 | 1.9 7.6 | 3.2 | 0.7 2.5 | 3.2 | 0.7 2.5 | 1.4 | 0.3 1.1 | 1.8 | 0.4 1.4 | 13.5 | 2.5 11.0 |
| 4 | 3.8 | 0.9 2.9 | 7.4 | 1.2 6.2 | 9.3 | 1.3 8.0 | 5.8 | 0.7 5.1 | 12.8 | 1.6 11.2 | 11.9 | 1.9 10.0 | 9.3 | 1.7 7.6 | 7.1 | 1.4 5.7 | 2.2 | 0.5 1.7 | 1.0 | 0.2 0.8 | 5.1 | 1.1 4.0 | 3.5 | 0.7 2.8 | 20.8 | 3.8 17.0 |
| 5 | 7.7 | 1.8 5.9 | 12.8 | 2.1 10.9 | 6.4 | 0.9 5.5 | 2.6 | 0.3 2.3 | 11.5 | 1.5 10.0 | 14.1 | 2.3 11.8 | 15.4 | 2.9 12.5 | 12.8 | 2.6 10.2 | 1.3 | 0.3 1.0 | 5.1 | 1.1 4.0 | 2.6 | 0.5 2.1 | 1.3 | 0.3 1.0 | 6.4 | 1.2 5.2 |
| 6 | 4.7 | 1.1 3.6 | 3.5 | 0.6 2.9 | 12.9 | 1.7 11.2 | 5.9 | 0.7 5.2 | 20.0 | 2.5 17.5 | 5.9 | 0.9 5.0 | 11.8 | 2.2 9.6 | 4.7 | 0.9 3.8 | 7.1 | 1.5 5.6 | 4.7 | 1.0 3.7 | 2.4 | 0.5 1.9 | 2.4 | 0.5 1.9 | 14.1 | 2.6 11.5 |
| 7 | 8.0 | 1.8 6.2 | 9.6 | 1.6 8.0 | 8.8 | 1.2 7.6 | 6.8 | 0.8 6.0 | 12.7 | 1.6 11.1 | 9.4 | 1.5 7.9 | 9.9 | 1.8 8.1 | 8.4 | 1.7 6.7 | 1.3 | 0.3 1.0 | 5.0 | 1.0 4.0 | 2.0 | 0.4 1.6 | 5.3 | 1.1 4.2 | 13.0 | 2.4 10.6 |
| 8 | 0 | 0 0 | 6.9 | 1.1 5.8 | 6.9 | 0.9 6.0 | 6.9 | 0.8 6.1 | 10.3 | 1.3 9.0 | 3.4 | 0.5 2.9 | 10.3 | 1.9 8.4 | 3.4 | 0.7 2.7 | 6.9 | 1.4 5.5 | 0 | 0 0 | 3.4 | 0.7 2.7 | 0 | 0 0 | 41.4 | 7.6 33.8 |
| 9 | 0 | 0 0 | 1.2 | 0.2 1.0 | 4.8 | 0.6 4.2 | 4.8 | 0.6 4.2 | 19.3 | 2.5 16.8 | 12.0 | 1.9 10.1 | 4.8 | 0.9 3.9 | 9.6 | 1.9 7.7 | 2.4 | 0.5 1.9 | 1.2 | 0.3 0.8 | 3.6 | 0.8 2.8 | 3.6 | 0.8 2.8 | 32.5 | 0.6 26.5 |
| 10 | 6.4 | 1.5 4.9 | 8.4 | 1.4 7.0 | 7.0 | 0.9 6.1 | 6.6 | 0.8 5.8 | 12.3 | 1.6 10.7 | 12.8 | 2.0 10.8 | 9.7 | 1.8 7.9 | 9.0 | 1.8 7.2 | 1.6 | 0.3 1.3 | 3.0 | 0.6 2.4 | 3.3 | 0.7 2.6 | 2.1 | 0.4 1.7 | 18.0 | 3.3 14.7 |
| 11 | 2.8 | 0.6 2.2 | 10.6 | 1.7 8.9 | 8.3 | 1.1 7.2 | 6.9 | 0.8 6.1 | 8.7 | 1.1 7.6 | 13.3 | 2.1 11.2 | 7.3 | 1.4 5.9 | 10.6 | 2.1 8.5 | 0.5 | 0.1 0.4 | 0.9 | 0.2 0.7 | 3.2 | 0.7 2.5 | 2.3 | 0.5 1.8 | 24.8 | 4.5 20.3 |
| All | 7.27 | 1.68 5.59 | 9.18 | 1.50 7.68 | 8.19 | 1.11 7.08 | 6.60 | 0.77 5.83 | 12.91 | 1.64 11.27 | 11.54 | 1.84 9.70 | 10.10 | 1.87 8.23 | 7.81 | 1.57 6.24 | 20.4 | 0.43 1.61 | 3.01 | 0.63 2.38 | 3.19 | 0.67 2.52 | 3.38 | 0.71 2.57 | 14.86 | 2.72 12.14 |

sizes lead after a calibration by means of ground surveying to a correlation curve between age and size. The ground surveyng also creates the possibility of establishing sex. The curve has been established up to the age of ten years. This means that the method is but a partial way of solving the problem of age distributions. We may even have doubts whether it is efficient up to ten years; the slope in the correlation curve tends towards O already at the age of eight. In this paper we do not utilize the findings beyond the age class 7-8 years.

## Herd Composition

The age and sex compositions of the surveyed eleven herds is given in table 1.

There are a few tendencies in table I which can be immediately observed. To begin with we see more females than males already in the age interval 1/2-1. The reason behind this tendency is herd management practice which gives preferences to females. Male calves are to a considerable extent slaughtered at birth. Since calf mortalities are high (Williamson and Payne 1965, 298) one prefers to slaughter surviving males rather than risking the whole calf population.

The ratio of mature males in the herds is slightly below 1:10. These animals may be both for transport and reproduction. Normally remaining males are castrated at the age of 4-6 years (Mares 1954, 418) in order to improve handling. The number of bulls needed for reproduction is small. One male can serve at least 30 females and many sources have it that he may serve as many as 100 females. This is also in accordance with what herdsmen claim.

Diagrammes I-VIII below plot the proportion of females per one-year interval. This is done only until the interval 7-8 years, since we need to be a bit caution against the figures above the age of eight in the aerial survey. Average proportions are lifted out from the diagrammes. These are summarized in table II. In that

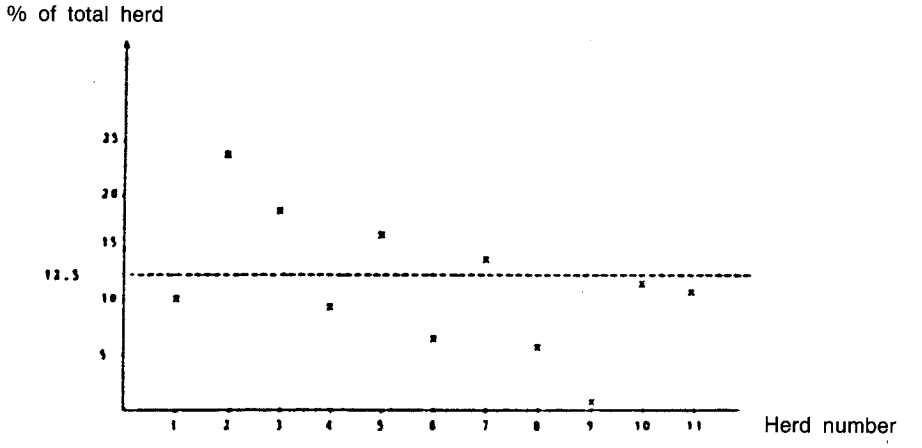


Diagramme I: Female calves 0-1 years in proportion of total herd surveyed

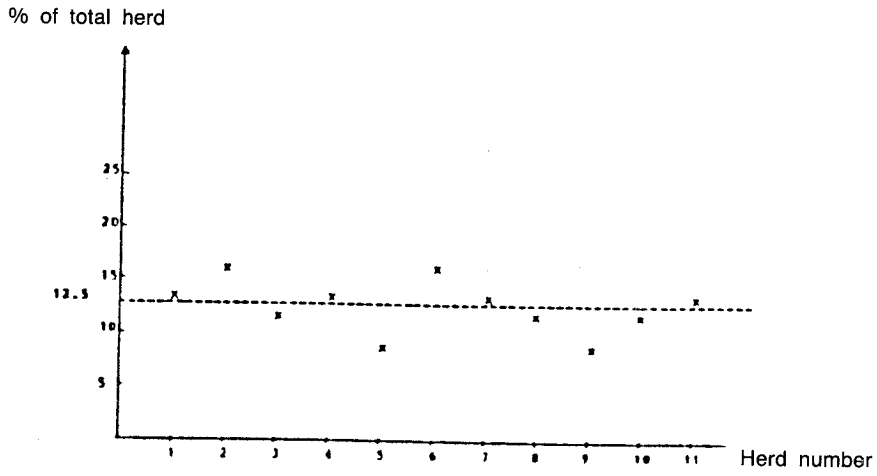


Diagramme II: Females 1-2 years old in proportion of total herd surveyed

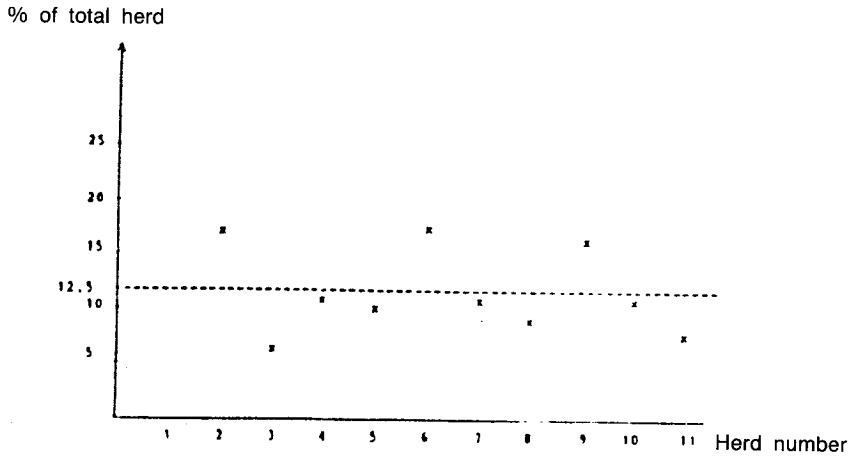


Diagramme III: Female 2-3 years old in proportion of total herd surveyed

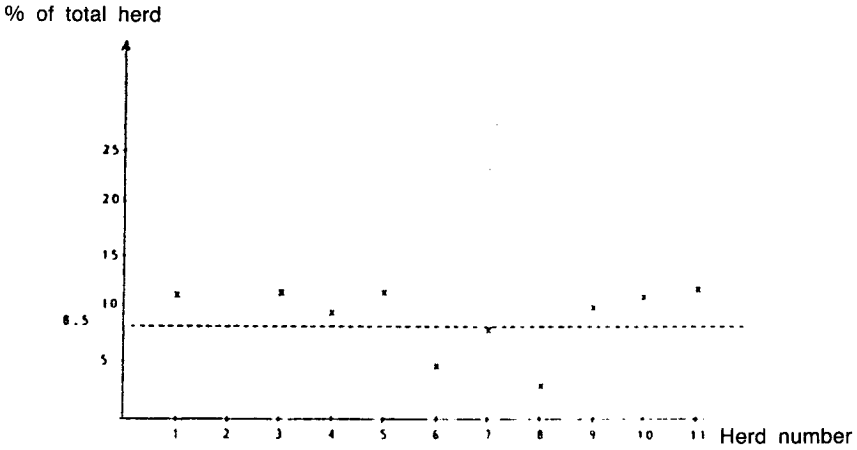


Diagramme IV: Females 3-4 years old in proportion of total herd surveyed

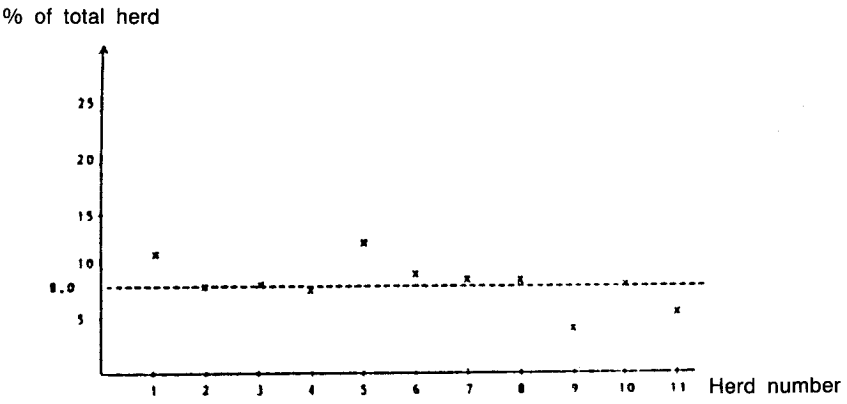


Diagramme V: Females 4-5 years old in proportion of total herd surveyed

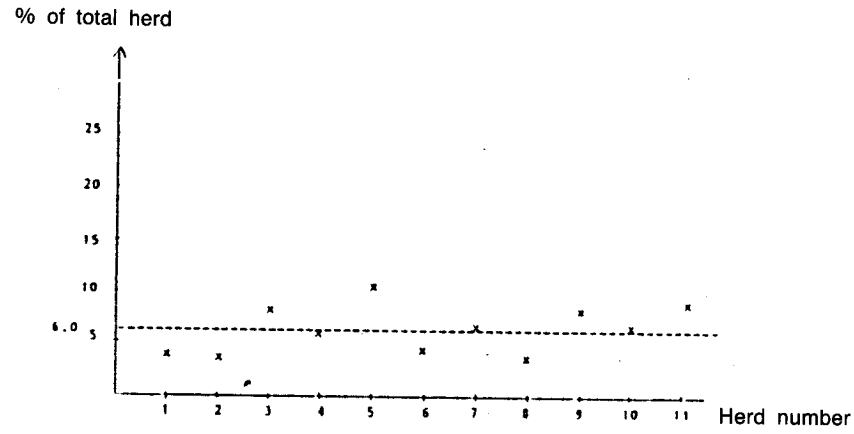


Diagramme VI: Females 5-6 years old in proportion of total herd surveyed

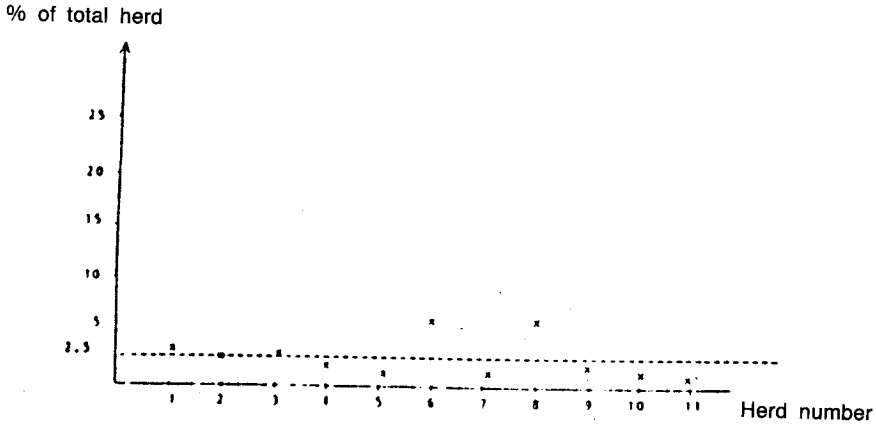


Diagramme VII: Females 6-7 years old in proportion of total herd surveyed

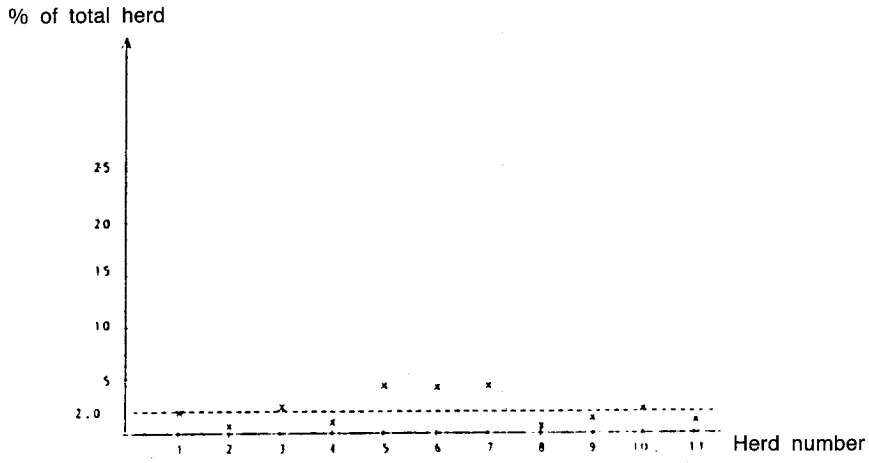


Diagramme VIII: Females 7-8 years old in proportion of total herd surveyed

Table 2: *An age distribution model for female camels*

| | % of total herd | % of total female herd |
|---|---|---|
| 0-1 | 12.5 | 15.2 |
| 1-2 | 12.5 | 15.2 |
| 2-3 | 12.0 | 14.5 |
| 3-4 | 8.5 | 10.3 |
| 4-5 | 8.0 | 9.7 |
| 5-6 | 6.0 | 7.3 |
| 6-7 | 2.5 | 3.0 |
| 7-8 | 2.0 | 2.4 |
| 8-9 | 1.5 | 1.8 |
| 9-10 | 1.5 | 1.8 |
| 10-11 | 1.5 | 1.8 |
| 11-12 | 1.5 | 1.8 |
| 12-13 | 1.5 | 1.8 |
| 13-14 | 1.5 | 1.8 |
| 14-15 | 1.5 | 1.8 |
| 15-16 | 1.5 | 1.8 |
| 16-17 | 1.5 | 1.8 |
| 17-18 | 1.5 | 1.8 |
| 18-19 | 1.5 | 1.8 |
| 19-20 | 1.0 | 1.2 |
| 20-21 | 1.0 | 1.2 |
| | 82.5 | 99.8 |

table we have distributed remaining animals evenly; that is a proportion of 1.5% of the total herd per age class from 8-9 until 18-19. The last two age-classes in the table however, have been somewhat diminished, representing only 1.0% each of the total herd. We assume in that table that no animals live after the age

of 21 years; they are presumed to be slaughtered at 21. We rely in this assumption not only on Mares (1954, 417f) but also on our own empirical impressions. Thus table II represents a model for age distribution. This is used for simulations of female herd growth after the proportions of female herds have been calculated.

## Conclusions

The data from Section 2 on herd composition is accordingly not comprehensive for the discussions on long-term growth in family herds of camels on Section 3 of the longer version of this paper presented at the conference. In that section we have been forced to estimate age distributions above the age of 10 and until 22 (when we have assumed animals to be slaughtered). Still the analysis becomes considerably more pregnant than without the surveying, especially if we were to cover a time-span of 1-2 generations.

In terms of possible milk production from the family herds, also presented in the study but not here, the data on herd composition prove more reliable, granted that proper herd management leads to a decision to keep only those adult females. which can safely be assumed to be fertile. The conclusion is that herd sizes required for the case of a household with its entire food production from a family herd are of the magnitude of 28 animals.

## Reference

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