CHANGES IN THE SPECIES COMPOSITION OF PASTORAL HERDS IN BAY REGION, SOMALIA

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Introduction

This paper provides evidence for shifts in the species composition of Somali livestock herds, and offers possible explanations for such changes. Different species held together make efficient use of range vegetation, since camels and goats are primarily browsers, while cattle and sheep are largely grazers. A combination of different types of livestock also provides pastoral groups with a wide array of different animal products. Finally, herd diversification is an important strategy for household security in terms of ensuring minimum subsistence if one herd species is affected by disease, lack of drinking water or forage (Dahl 1981). Change in herd species can therefore have a significant impact on both rangeland ecosystems and pastoral production strategies.

The paper analyses the species composition of livestock herds and examines the ratios among herd species. The paper also shows how changes in herd composition have been caused by technical and economic factors such as the provision of new water supplies and changes in livestock export demand.

This work is based on a larger study (Al-Najim 1989) which employed several methods of data collection, including formal questionnaires, checklist surveys and informal discussions with local inhabitants and government officials. The topics discussed covered issues related to herd management techniques, water supply and veterinary care. Field work was conducted in 1984. Published and unpublished material on livestock numbers and livestock management practices was also consulted.

The Study Area

In Somalia, forage and water supplies are mostly obtained freely from rangelands which are estimated to be about 80 per cent of the nation’s land area. Livestock are the main source of livelihood for the Somali people, and more than 60 per cent of the Somali population is involved in pastoralism (Ministry of National Planning 1982, CSD 1984).

The Bay Region, the focus of this study, lies between the Juba and Shebelle rivers in the southern part of Somalia (Figure 1) and covers about

40,000 square kilometres. The geological structure of Bay Region provides a series of aquifer systems which meet the water demand of local people and their animals, mainly during the dry seasons.

Bay Region lies within the semi-arid tropics, and the Region's climate is characterised by marked annual variations in rainfall. The mean annual rainfall within Bay Region and its surrounding areas generally ranges between 200 and 600 mm (Meigs 1953). The year is locally divided into four seasons according to rainfall pattern:

Gu	April-May	heavy rains
Hagai	June-September	mild dry season
Dayr	October-November	light rains
Jilaal	December-March	hard dry season

The two wet seasons and the two dry seasons are not identical, for the heavy rains (*Gu*) are followed by a mild dry season (*Hagai*), while the light rains (*Dayr*) are followed by a hard dry season (*Jilaal*). In the latter case, the failure of the light rains and then a prolonged dry season are not unusual.

Three-quarters of Bay Region is covered by semi-arid tree and shrub steppe (HTS 1982) typical of the semi-arid zone in the Horn of Africa and East Africa (Pichi-Sermolli 1955). Woody species, in the form of shrubs, bushes and trees, constitute the bulk of range cover. Such vegetation provides much of the diet of browsing animals, and it has been estimated that between 60 and 70 per cent of the diet of camels in Somalia is obtained from non-herbaceous species. In contrast, cattle obtain only 10 to 30 per cent of their diet from these sources (Field 1980). The vegetation of Bay Region is not, therefore, wholly appropriate for the raising of grazing animals such as cattle.

In 1982 the Region's population was estimated by the Somali government to be about 451,000 persons with a 3% annual rate of population growth (CSD 1983). This population has been divided by the government into three economic groups: agro-pastoralists, nomadic pastoralists, and town dwellers. The agro-pastoralists are the largest single group constituting about 54 per cent of the Region's population. About 31 per cent of the Region's population are nomadic pastoralists who are only marginally involved in cultivation, and only about 15 per cent are town dwellers (CSD 1984). About 85 per cent of the population are therefore involved in animal husbandry and most of the Region's land, including crop residues from cultivated areas, is used as pasture when there is sufficient rainfall.

Herd Species Composition

Pastoral people in Bay Region raise mixed herds of camels, cattle, goats and

Table 1: Species Composition of Livestock Ownership in Bay Region

Type of livestock	**Number of households**	**%**
Camels only	14	5.9
Cattle only	73	30.8
Smallstock only	1	0.4
Camels and cattle	50	21.1
Camels and smallstock	14	5.9
Cattle and smallstock	24	10.1
Camels, cattle & smallstock	61	25.8
	237	**100.0**

Source: Author's 1984 formal survey

sheep. Table 1 shows that a substantial percentage (62.9 per cent) of the pastoral households keep two or more types of livestock, whilst only 37.1 per cent of those households keep only one type of livestock. This pattern is confirmed by a second study which reported that 70 percent of the Region's livestock owners held more than one herd species (HTS 1982). Cattle are, however, the dominant grazing animals in the pastoral economy of Bay Region, since more than 80 per cent of the pastoral households hold cattle alone or cattle with some other herd species (Table 1).

Pastoral groups in Bay Region maintain a mixture of animal species in order to take advantage of the availability of different plant species in terms of livestock feeding habits, and drought resistance and socio-economic uses. Camels normally provide milk throughout the year, and have the highest market prices. A mature camel in 1984 could be sold for approximately 10,000 Somali shillings or easily exchanged for other types of livestock. Camels are the herd species most resistant to drought, and are used as beasts of burden. Cattle supply milk, which can be made into ghee for home consumption or sale. They have a good market value if sold for meat - at approximately 5,000 Somali shillings per bull in 1984. Cattle are often slaughtered on special occasions, such as wedding feasts, while their skins are used as carpets. Smallstock produce milk which can be made into ghee, and provide a small cash return when sold. They are often slaughtered at small social gatherings and to provide hospitality to guests. The exploitation of different species thus constitutes a rational strategy for balancing the objectives of subsistence needs, drought security and cash income (Behnke and Kerven 1984).

Changing Herd Species Composition

Available data for the Bay Region document a change in herd composition over the 30 years prior to 1984, with a clear shift from a dependence on camels and smallstock to a dependence on cattle (Table 2). A similar shift has also been reported in other parts of Somalia over approximately the same time period, especially in the northern regions (ILO/JASPA 1977), and elsewhere in Africa, as in the Butana region of northern Sudan (ILO 1965).

Table 2: Changing Species Structure of Livestock Ownership in Bay Region

Year	**Camels:Cattle ratio**	**Smallstock:Cattle ratio**	**Camels:Smallstock ratio**
1952*	276:100	596:100	46:100
1975	122:100	97:100	126:100
1982	87:100	106:100	83:100
1984	70:100	60:100	110:100

Source: The ratios for 1952 are derived from LSC(1968); those for 1975 are based on unpublished data obtained from the Central Statistical Department, Ministry of National Planning, Mogadishu; 1982 figures are from HTS; and 1984 figures are from the author's formal survey.

**The 1952 ratios are calculated from the livestock numbers of Upper Juba province which in 1969 was divided into three regions: Bay (the study area), Gedo and Bakool.*

These shifts in herd species composition suggest a trend towards restricted nomadic movement by pastoral groups. Cattle require a greater density of watering points and more reliable watering points than smallstock and camels. According to Somali pastoralists, in the dry season cattle must be watered every second day, whilst smallstock every three days and camels often need water only once weekly. In comparison with the other herd species, especially camels, cattle are restricted to the vicinity of watering points throughout the year. This has implications in terms of reducing both the frequency and geographic spread of pastoral movements in the region.

Explanations of Changing Species Composition

Change in herd composition can be related to the influence of technical and economic factors including water supplies, veterinary services and livestock exports.

Water Supplies

Groundwater in Bay Region is available from excavated wells (*ceelal*), or from natural springs (*isha*). Wells are mostly hand-dug to depths of 5-20 metres. The number of these shallow wells in early 1982 was estimated to be about 10,000 (HTS 1982) (see Figure 2). In addition to these shallow wells, there are some deep wells of 60 to 120 metres. The number of these drilled wells is unknown, but only 23 were equipped with diesel-driven pumps under the control of the government at the time of the study. There are also some springs, found mostly to the east of the town of Baydhabo. The total number of springs is unknown, but only twenty have been reported as having perennial water available.

Rainwater for drinking is obtained from excavated ponds (*waro*) usually built out of earth. These *waro* are mostly small hand dug in low lying areas to a depth of about two metres. The storage capacity ranges between 100 and 1,500 cubic metres of rainwater per *war*. The majority of *waro* dry up in the dry seasons, mainly during the hard dry season of *Jilaal*. The number of *waro* in early 1982 was estimated to be about 9,000 (HTS 1982), and these were mostly found on the cultivated areas where agro-pastoral communities were to be found.

In addition to these small *waro*, 24 large *waro* were constructed in 1973-1974 by the EEC on the major livestock routes to the markets of Mogadishu and Kismayo (Figure 2). Each of these has a capacity of more than 20,000 cubic metres and a depth of about six metres. Pumping systems deliver water into troughs and the *waro* are lined with heavy plastic sheets to prevent water losses through seepage.

Estimates show that the number of wells increased by about 162 per cent per year during the nine year period from 1973-1982, whilst the number of *waro* increased by about 34 per cent per annum during the same period (HTS 1982). These increases imply that the density of wells per square kilometre has increased by a factor of 16, whilst that of *waro* by about four during this period.

Because water development has been concentrated in central Bay Region, these increases do not ensure that all of the Region’s rangelands have been provided with livestock watering points. Nonetheless, the increased number of watering points has given less hardy animals such as cattle easier and more reliable access to the forage available in newly-watered rangelands. Previously, these range areas were unavailable for cattle grazing because of the lack of water and could only be used by camels. In addition, the forage in the newly-

opened rangelands contained many herbaceous species, this type of vegetation having been only lightly grazed, since only camels had previously browsed in these areas. As a result of this combination of new, reliable water facilities and suitable grazing, camels and smallstock have diminished in importance relative to cattle in the last few decades. The development of reliable water supplies is one of the key factors contributing to change in herd species composition in Bay Region, as cattle can be kept with greater security and utilise more of the Region's forage than was previously possible.

The availability of water is also affected by changes in the type of supply and by the use of modern equipment such as diesel-driven pumps. As noted previously, 24 large *waro* were constructed in the Region, each of which could store more than 20,000 cubic metres of rainwater, compared with the domestic *war* which has an average capacity of 800 cubic metres. These large *waro* can potentially maintain a total of one million head of cattle, whilst a domestic *war* can water 40,000 head of cattle, based on an estimated requirement of about 20 litres of water per head per day for cattle. Consequently, more cattle are kept close to these large *waro*, which also provide a quick way to water cattle, although charges are imposed by the government for this service.

Veterinary Services

Veterinary services in Bay Region were improved in the decades prior to 1984, and the spread of contagious diseases was reduced through the vaccination of livestock against rinderpest, anthrax, foot and mouth disease, bovine and caprine pleuropneumonia, black-quarter and haemorrhagic septicaemia. This was done by travelling teams of veterinary staff, officially without charge to the pastoralists since the vaccines were locally produced by the Serum and Vaccine Institute in Mogadishu. The purpose of this service was to ensure the cooperation of livestock owners in checking the spread of epizootic diseases.

Vaccinations were usually carried out in the dry seasons (*Jilaal* and *Hagai*), when the livestock were easily accessible around watering points and relatively large numbers of animals could be quickly vaccinated. The vaccination campaigns were, therefore, well timed, since they took place when fodder was scarce and when livestock in general and cattle in particular were weak and susceptible to disease. While these campaigns may have reduced livestock mortality at the time of the field study, only rinderpest was under control as a result of a comprehensive plan of vaccination started in 1969 when Somalia joined the 'Pan-African Rinderpest Control Project'. With the assistance of this project, the Somali government made progress in meeting the objectives of vaccinating all adult cattle at least once a year, vaccinating the calf crop at least once in two years, and, finally, informing neighbouring countries of any new outbreak. About 90 per cent of Somali cattle were by the mid-1970s vaccinated

Table 3: Recorded Exports of Live Animals from Somalia, 1955 to 1981 (in thousands of heads)

Year	Camels	Cattle	Smallstock
1955	1.7	8.8	320.0
1960	6.3	12.4	574.5
1961	7.7	24.9	627.7
1962	10.4	31.5	747.4
1963	16.6	49.4	860.2
1964	17.1	56.6	1,015.5
1965	24.1	38.1	791.6
1966	24.1	39.1	1,097.7
1967	36.7	35.7	933.4
1968	17.0	41.6	1,302.2
1969	25.3	34.3	1,406.5
1970	26.0	45.0	1,151.0
1971	26.0	59.0	1,186.0
1972	22.0	81.0	1,635.0
1973	29.0	68.0	1,384.0
1974	24.0	31.0	1,238.0
1975	34.0	40.0	1,536.0
1976	33.0	58.0	766.0
1977	33.0	55.0	926.0
1978	22.0	77.0	1,454.0
1979	13.0	68.0	1,422.0
1980	17.0	93.0	1,481.0
1981	14.0	116.0	1,314.0

Sources: The 1955 to 1965 figures are compiled from the Planning Commission (1968); the 1966-1969 figures are compiled from the Ministry of Planning and Co-ordination (1971); the 1970-1981 figures are compiled from the Ministry of National Planning (1982).

against rinderpest (State Planning Commission 1979).

Treatment for endo- and ecto-parasites, such as trypanosomiasis, helminthiasis and tick-borne diseases, was given without cost from 1970 to 1976, for demonstration purposes. This operation contributed to a rise in the number of livestock, since more stock survived and the pastoralists were not required to finance the service by selling livestock. After 1976 it became necessary to charge the pastoralists for such treatments in order to cover the operational costs of drug importation. Informal discussions with the local people

of Bay Region in 1984 showed that the livestock owners were in fact willing to pay for the drugs they needed to treat these diseases, but that the drugs were frequently unavailable from the local veterinary services. The veterinary officers in the departments of livestock health in Baydhabo and Mogadishu attributed the scarcity of the drugs to the irregular system of importing them from abroad by the Ministry of Livestock, Forestry and Range. Consequently, the incidence of some parasites, especially tick-borne diseases, has increased in the last decades mainly because of the difficulty in controlling the vectors within the increased population of livestock; moreover, information on the occurrence and spread of ticks is insufficient, not merely in Bay Region, but in Somalia as a whole (Holtzman 1982).

Tsetse-fly control, started in 1974, has been reasonably successful in the riverine lands along the Shebelle river, according to reports by officials in the Ministry of Livestock, Forestry and Range in 1984. The region between Balad and Afgoi, which is part of the middle Shebelle drainage, has been cleared of the infestation of tsetse-fly with the financial and technical assistance of United Kingdom. The problem of trypanosomiasis (borne by tsetse-fly) has been correspondingly reduced in Bay Region, since herds are less exposed to trypanosomiasis during their long journey to the riverine areas in the dry seasons.

Livestock Sales for Exports

The available data on animals exported from Somalia during the 22 year period from the early 1960s to the early 1980s (Table 3) shows that the highest increases in livestock exports were of cattle, with the number of cattle exports in 1981 having increased about ninefold compared to the 1960 figure. Camels and smallstock exports grew rather more slowly, and by 1981 official export figures for each species were about double what they were in 1960.

There are many factors behind the rapid growth of the Somali livestock trade in general and cattle trade in particular (Konczacki 1978, Swift 1979, Holtzman 1982, Reusse 1982). One important factor was the increased demand for live animals (mainly cattle) in the regional markets of the Middle East, especially Saudi Arabia. This was caused by the large influx of foreign workers to those petroleum-producing countries. Secondly, after the 1960s three new deep water ports at Kismayo, Berbera and Mogadishu were constructed. These improved shipping facilities, reduced delays and the risk of mortality in shipping. The provision of veterinary care, water, and fodder at these ports also contributed to the health of exported animals and thus to reduced mortality rates. Finally, the increased number of watering points along the main export routes, as in Bay Region (see Figure 2), reduced the pressures of thirst and attendant health problems for animals trekking long distances to the ports.

Despite the overall increase in the number of livestock exports, there were considerable fluctuations in animal trading from one year to another (see Table 3). Holtzman (1982), Reusse (1982) and Clark (1985) have given two reasons for this fluctuation. Firstly, there were droughts as in 1973-1975, which caused a marked decline in the reproduction rates of livestock in general and of cattle in particular, and fewer animals were available for export in the following years. Secondly, available shipping capacity for livestock varied and was often inadequate, particularly during the peak periods of exports during the Islamic pilgrimage season (*haj*). However, the relatively greater growth in cattle exports is a further explanation of the shifting species structure of Somali livestock, from a reliance on camels and smallstock to cattle.

Consequences of Changing Herd Species Composition

Change in herd species composition has had a significant impact on both pastoral production strategies and rangeland ecosystems in the Bay Region. With respect to production, this change has brought about a modification in herd management techniques, from a dependence on a principally subsistence economy, in the form of camels and smallstock for household use, to a much more market-oriented economy, in the form of cattle for sale and eventual export. Higher pastoral cash incomes led to a marked shift from reliance on livestock as a form of currency towards a greater use of cash. This has resulted in an expansion of non-pastoral activities such as the growth in the number of small rural shops which sell basic necessities (salt, sugar, tea, cloth, soap, kerosene, matches and batteries), rather than in improvements in the quality of livestock raising (Al-Najim 1989). Livestock trading also provided a source of hard currency for the Somali government, with 70 and 90 per cent of foreign exchange earnings coming from the export of livestock in the 1970s (Ministry of National Planning 1982).

A negative consequence of this change was reduced pastoral insurance against droughts, since cattle are less resistant to drought than either smallstock or camels. Moreover, rangeland ecosystems have been put under increased grazing pressure, especially since these rangelands consist predominantly of shrubs or trees which are not suited for cattle rearing on a large scale. The overall effect of these pressures was reflected in the decline of the availability of herbaceous species preferred by cattle. In 1984 local inhabitants were well aware of the decline of such species, and many names of overgrazed herbaceous species were gathered over different parts of the study area. Thus, the changing species composition of herds has made the rangeland ecosystems highly susceptible to environmental problems like overgrazing (Al-Najim and Briggs 1990), especially in the vicinity of watering points, as cattle drink more frequently than the other herd animals. As a result, the range has become

progressively less able to sustain cattle herds.

Conclusions

This study shows that there has been a clear shift in the species composition of Somali livestock within Bay Region, from a reliance on subsistence production in the form of camels and smallstock, to a reliance on market production in the form of cattle. The latter production system has been encouraged by three main technical and economic factors: the increase in the provision of reliable water supplies, the improvement in veterinary services and the development of livestock marketing facilities. Cattle are less resistant to thirst and are more susceptible to infectious diseases than the other species. Demand for export cattle grew more quickly than demand for the other herd species, at least up until the mid 1980s. As such, livestock owners managed to build up their cattle herds in response to market requirements.

The shift in herd species composition has, however, led to some problems in terms of reduced pastoral resistance to drought and the depletion of palatable herbaceous species of vegetation.

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