Development Projects and Somali Pastoralism

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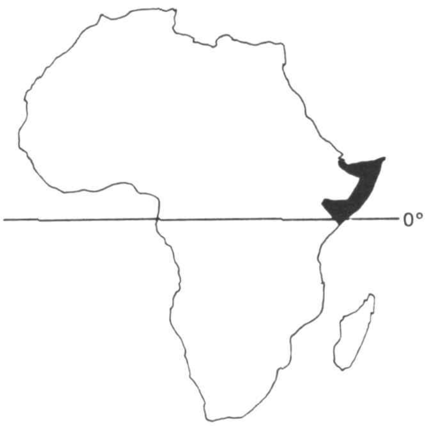
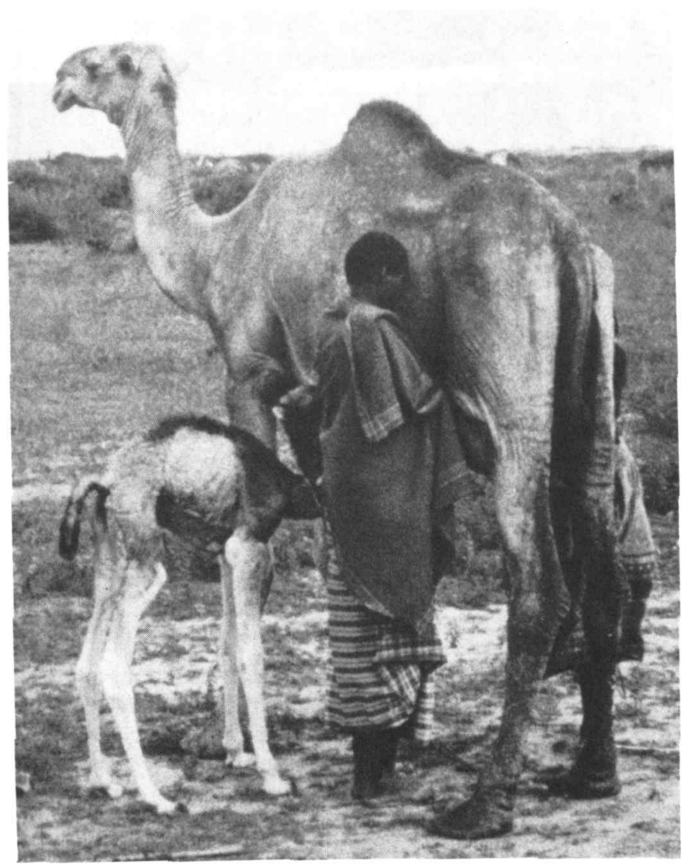
Somalia is a predominantly arid to semi-arid Texas-sized country located on the Horn of Africa. Vegetation ranges from desert grassland to subhumid montane forest but is predominantly a deciduous shrubland. Rainfall is low (50 to 830 mm/yr), erratic in annual distribution and amount, and mainly confined to two rainy seasons (April to June and October to November). Dry monsoonal winds in July to September and December to January (monthly wind speeds average up to 36 km/hr) and warm mean monthly temperatures throughout the year (25 to 30° C) create a situation where rainfall is only 3 to 50% of evaporative demand (UNSO 1984).



The erratic seasonal precipitation precludes reliable dryland grain production in most of the country. Irrigated agriculture is mainly limited to the flood plains of the only two rivers (Juba and Shabelli) in the country. Pastoralism has been and continues to be the major livelihood of the country's population of approximately 5 million people. About 70% of the population are pastoralist, and livestock products contribute 75 to 80% of Somalia's foreign exchange earnings. Somali pastoralists traditionally relied on milk production for their sustenance. Herd management emphasizing meat production is viable only if reliable markets exist and if food products are available for purchase with the sale proceeds. Without these preconditions, reliance on milk has been the most rational strategy for self-sufficiency. This system provided a long-term subsistence support for more people per unit area than any other available production system. The pastoral production system is well adapted to its environment and for centuries provided a reliable source of food.

Implementation of the Somali pastoral system has relied on a number of strategies chosen to enable sustainable sustenance from rangelands. They are:

Communal Access To Forage. Brief intense storms often leave a trail of precipitation only several kilometers wide. This local variability in annual precipitation results in variable forage production. Mobility is a vital strategy of the pastoralist for utilizing available forage, for migrating from regions when water becomes scarce and avoiding biting flies, ticks or disease. Pastoralists use mobility to optimize stock health and productivity (closely monitored through variation in milk yield). This flexibility temporarily enables higher densities of livestock at any one point than could be sustained over the long-term under sedentarized pastoralism (Sandford 1978). The mobility



Milking a camel. Milk is the primary component of the diet of Somali nomads.

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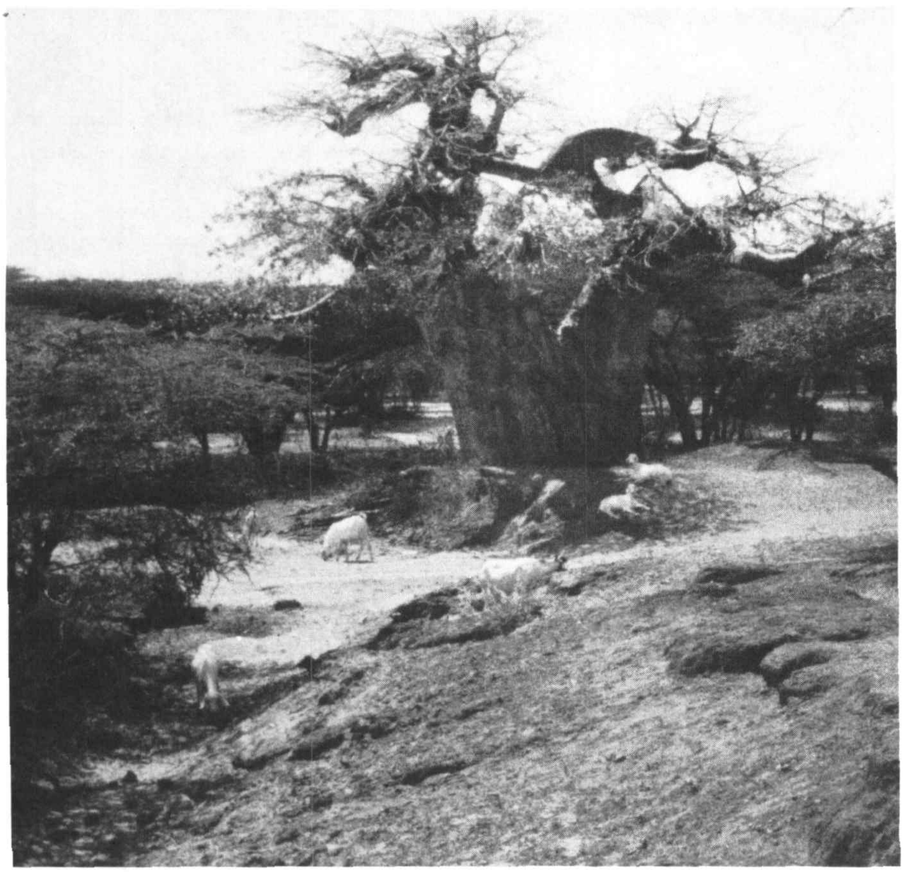
requires access to a large area. Communal access to rangelands are maintained with few restrictions on its use. Somali pastoralists are loath to restrict use of traditional grazing areas by others, even if there is perceived rangeland degradation, for fear that when rain eventually fails in their own area, they may be excluded from neighboring regions.



Deciduous shrubland characterizes much of the Somali rangeland. The typically scarce herbaceous forage during the dormant season is attributable to termites and heavy livestock use.

Herd Diversification. Multi-species herding allows the pastoralist to more fully exploit the mixed grassland-shrubland environment. Camels, sheep, and goats are the dominant livestock in the xeric central and northern regions with cattle the most common in the more mesic south. Camels are particularly important in the central rangelands where forage is primarily browse species and permanent water sources are 20 to 60 km apart. Camels (which have a lactation period of 12–18 months) are the only reliable source of milk during extended dry seasons. Small stock enable the pastoralist to respond to favorable rainfall periods. The maximum potential annual population growth rate of goats may be as high as 45% whereas the maximum potential annual population growth rate of camels is 7% (Dahl and Hjort 1976). Another advantage of mixed herds is that losses are limited if a particular species is struck by disease. Mixed herds also allow the old and young family members to care for small stock close to the camp.

Herd Dispersion. A well-developed social system exists which facilitates loans of livestock among families. By dispersing the herd the owner reduces the risk of losses from drought, disease, or aggression. This practice strengthens goodwill between neighboring families (the milk and some of the offspring may be kept by the caretaker) and increases the prestige of the loaner.

Emphasize Females. A large proportion of female animals is desirable for greater milk production and enhances the potential for rapid increase in herd size. Consequently, females are rarely sold and compose at least 70% of the herd.

Maintain Large Herds. Large herds increase the likelihood of sufficient milk being produced to sustain the family throughout dry seasons. Also, large herds maximize the chance of having sufficient animals after a drought to rebuild the herd. This is important since livestock cannot be marketed at a reasonable price in bad years (eg., market price was equivalent to US $13 for an adult cow at the end of the 1986–87 drought) nor can they be repurchased in good years since productive females are rarely available in markets.

Factors Contributing to Pastoralism Changes

The historical balance between the environment and production system has been altered over the past several decades, forcing the traditional pastoral system into a state of transition. Water availability in the dry season was the critical factor that limited livestock populations and pasture access. Traditional water sources had well-defined rules governing access. Disease limited human and livestock population build-up. These natural checks prevented intensive land use and environmental degradation which would cause a reduction of the overall carrying capacity. The effectiveness of these traditional controlling mechanisms has been reduced in recent years. Successful vaccination campaigns reduced the chance of catastrophic disease outbreaks. Government-funded wells increased water availability. Emergency relief supplies provide grain which reduced human starvation during drought.

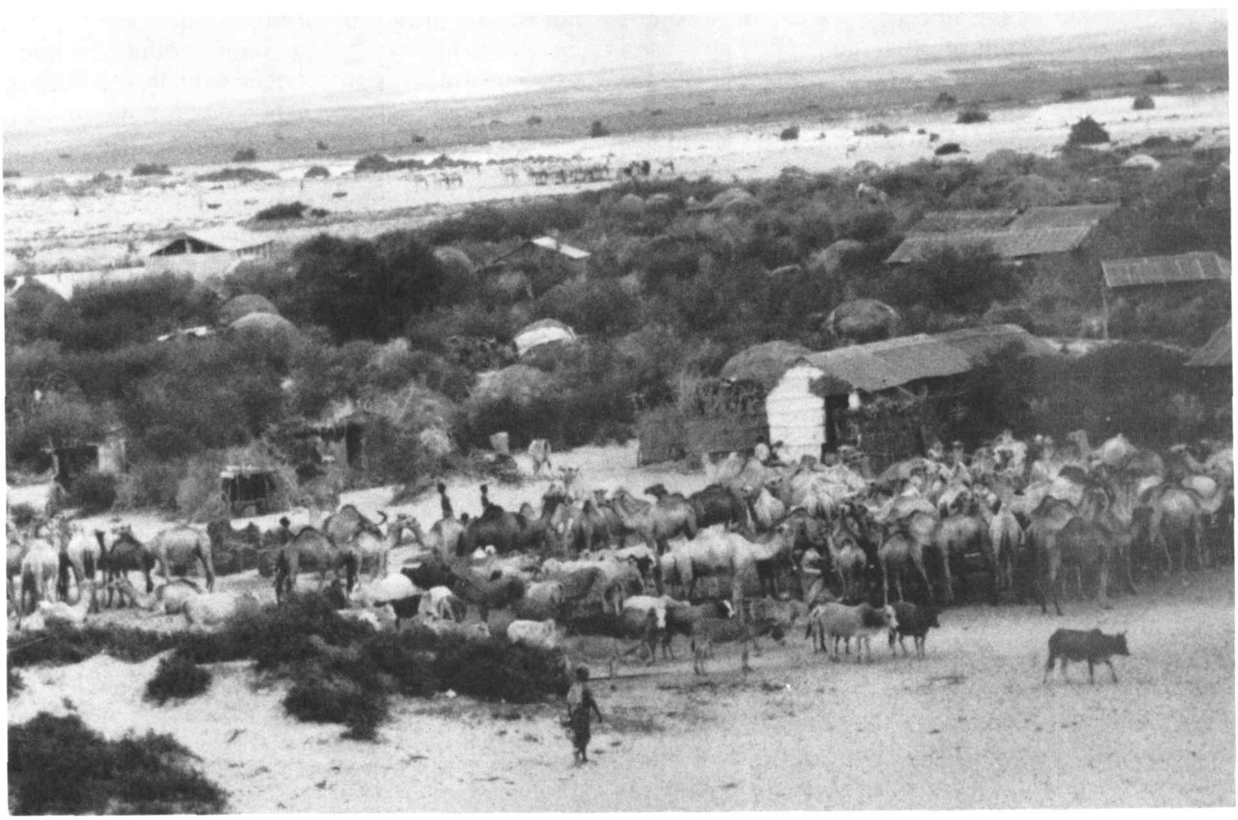
The humanitarian benefits of these programs in terms of decreasing human mortality are self-evident. Also, permanent wells eased the rigorous pastoral migration and labor demands during the dry season. The success of these programs has created new and pressing challenges for range management.

Brown (1971) was among the first to recognize that it is increasing human populations that force overstocking on many pastoral rangelands. Pastoralists are keenly aware that the rangeland is deteriorating, but they are unlikely to respond by decreasing livestock density because that would jeopardize their subsistence livelihood. The range resource itself is shrinking due to pressure for agricultural development of critical dry season pastures. Water boreholes do permit use of some areas that historically had limited use because of a lack of water. However, these boreholes often become the focal point for increased use by livestock, changes in land use (Behnke 1987), and decreased range condition (Herlocker et al. 1987, 1988).

Boreholes, which provide a source of water throughout the year, facilitate settlement and are often associated with an increase of farming and range enclosure. Indeed, it is common practice to fence and claim plots of land near a drilling rig even prior to water being discovered. A trend has developed over the past several decades for agropastoralists to fence not only their cultivated fields but also adjacent fallow and virgin rangeland. This protects crops, controls grazing, and provides an incentive to manage the native forage resource. However, it may result in the withdrawal of most land within a 3- to 6-km radius of the well from communal grazing. This creates conflicts with nomads who must bring their livestock to wells in the dry season but do not have access to forage within a convenient distance. The legal status of land tenure under these conditions is currently evolving. While the settlements may be ecologically undesirable they do provide easier administrative government control and thus are not discouraged. Since these pressures do exist, it is vital that the site and size of the well be considered in the context of the surrounding rangeland resource carrying capacity. It is necessary that rules be created and enforced to govern the use and maintenance of the facility.

Increased human survival has contributed to herd fragmentation among heirs and a resultant decrease in individual herd size, even though the total livestock population is increasing. Reduced herd size places the pastoral family in a precarious position for coping with periods when milk production declines and livestock die. It increases the reluctance to destock overgrazed localities since the loss of any animals may materially affect a family's subsistence. The decreasing herd size limits the ability of pastoral families to subsist on livestock products alone.

The shift in pastoralist diet over the past four decades has been dramatic. Grain composes 40 to 45% of the diet today compared to about five percent 40 years ago (Ahmed and Thurow 1988). Similar trends have been cited in pastoral societies throughout subsaharan Africa (Cossins 1983). Because both livestock marketing and grain supply are unreliable, meat production is still not emphasized. Pastoralists understandably prefer to control their own fate by remaining self-sufficient in milk production. Another factor for maintaining the emphasis on the milk element of herd management is that the range must provide a livelihood for an increasing human population. It has been estimated that if the Somalis re-



Ceel Dhere (Somali translation: deep well) village. Heavy livestock use at well sites results in soil destabilization and problems with sand dune formation.

organized their land use in the form of modern ranching, the pastoral population would have to be reduced by a factor of 50 (Jahnke 1982). Such an approach is currently unfeasible since unemployment in the cities is already chronically high.

Development of transportation, water, and export markets has also affected the relative value of livestock. The value ration of small stock (sheep and goats) to camels has historically been maintained at approximately 15:1. In recent years this value ratio has been reduced to about 6:1 (Ahmed and Thurow 1988). Factors contributing to this change include: (a) increased availability of water for small stock in regions previously used primarily by camels which could travel long distances between wells, (b) sale of small stock to gain money for grain purchase which is relatively easy compared with the major financial transaction of selling a camel, (c) increased grain availability which makes reliance on camel milk less crucial, (d) increased export markets for small stock, and (e) decreased utility of camels as a commodity in which to store capital. Camel ownership was the dominant form by which status and wealth was measured and was the required medium of exchange for bridal doweries, feud settlement, etc. Now, however, money, trucks, reservoir ownership, etc. are increasingly recognized signs of status and wealth.

The trend toward increasing emphasis on small stock has ecological implications. Sheep and goats browse and graze vegetation very close to the ground and their sharp hooves disrupt the soil surface. The browsing patterns and padded feet of camels have a less destabilizing influence on the soil surface. Camels utilize an entire height zone of shrubs unavailable to other stock and can forage further afield for longer periods of time with less need for water. The importance of the contrast between these traits is particularly important in Somalia where long dry seasons characterized by strong winds make soil erosion and sand dune formation a serious problem.

The climatic history of Somalia shows a recurrence of long, severe droughts. During droughts, camels are the most likely type of livestock to survive and provide the necessary sustenance to the pastoral population. Increased reliance on small stock commits the pastoralist to a more market-oriented existence which is dependent on exchanges of stock for gain for survival rather than on milk production. As market reliability improves, the advantages of the inherently conservative camel husbandry are reduced in favor of short-term gains associated with the high reproductive rate of sheep and goats. This shift in herd composition could contribute to instability when superimposed on annual climatic variability with the added grazing pressure.

Development Challenges

The changes affecting the traditional Somalia pastoral livelihood have been relatively rapid and the entire pastoral system is in transition. The changes present challenges to the pastoralist, who is already struggling to adapt to new opportunities and constraints, and the national government and international foreign aid community who should be concerned with easing the pastoralist through this transition while trying to maintain or increase the rangeland resource production potential.

Conflicting issues pertaining to production, marketing, natural resource management and human survival need to be solved simultaneously since lasting solutions are interdependent. A coordinated effort of both national and international organizations, which transcends the special interest of individual agencies, is needed to achieve success through the simultaneous development of interrelated sectors. Development programs are commonly unilateral, single sector approaches, often lacking an adequate understanding of the ecological and sociological systems they are dealing with. While such programs result in a great waste of money, they have had less serious environmental or social effects than one might fear, since after several years few such projects still function (Sanford 1983). Nonetheless, on a local scale and ultimately in a broader context, these programs may collectively contribute to social and environmental disruption.

Many range/livestock development projects in Africa are perceived to have been generally unsuccessful (cf. Moris 1981, Goldschmidt 1981, Oxley 1983, Atherton 1984, Teele 1984). As a result, there is growing reluctance of development agencies to get involved in such programs even though these countries remain dependent on rangeland products. Expectations from national and international range/livestock development efforts should be realistic. Results will almost certainly be slow in coming, of low profile upon arrival, and are dependent on sustained, flexible "grass-roots" inputs over many years. A successful program must be sensitive to fluctuations in political, socio-economic and environmental conditions. Without a focused, integrated long-term effort with realistic expectations, development programs can be expected to continue their high failure rate and the natural rangeland resources will remain vulnerable. The limited alternative livelihoods presently available to Somali pastoralists and the susceptibility of Somali rangelands to degradation underscore the urgency of addressing the current challenges.

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Low Volume Spring Developments

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Reduced federal and state cost-share funds for conservation practices plus higher costs have necessitated the need for less costly range improvements. Though traditional methods of spring development are not as expensive as some stockwater systems, substantial cost reductions for all developments are desirable. A low-cost alternative to the traditional spring development designs used by the Soil Conservation Service (SCS) has been utilized in Kansas to develop sites with low volume springs or seeps that require three collection lines or less. Expense is reduced by elimination of the traditional spring box (Soil Conservation Service 1982).

Construction Methods

The traditional design (Fig. 1) that meets Kansas SCS specifications for federal cost-share funds consists of: collection system of perforated plastic pipe, metal spring box with lid and foundation, delivery line of pvc pipe, stock tank, and pvc pipe outlet. The collection system, delivery line, and outlet pipes are installed in the bottom of a trench dug by backhoe to the proper grade. The trench for the collection system should extend far enough below the seep area to intercept flow and permit the collection of water. A filter of clean gravel encloses the collection system, and a retainer wall is constructed at the downstream end of the perforated pipe. The spring box is constructed of durable materials with inlet and outlet pipes at least six inches above its floor to trap sediments and allow air to escape the delivery line. Delivery lines and outlet pipes must be installed with a slope that allows air to escape from the system and water to fill the tank. The trench is backfilled after the installation of all pipe, gravel filter, and retainer wall. The site for the stock tank is leveled and the design includes measures to protect the development from trampling and other hazards, such as freezing.

An alternative system, developed in 1980, removes the spring box from the design and utilizes less costly components (Fig. 2). A four-inch pvc pipe with a vented cap is used as a riser and positioned at the junction of the collection line(s). Additionally, a brass flush valve, housed in a covered meter box for protection and access, is installed in the delivery line 30 to 40 feet beyond the inlet pipe of the tank. Overflow from the tank is routed to the outlet pipe beyond the flush valve. The vented riser allows air to escape the system and permits the clearing of airlocks. The pipe between the inlet of the tank and flush valve acts as a settling basin, and sediments are removed from the system by opening the flush valve and allowing the water in the system to eliminate sediments by gravity.

The riser-flush valve system differs greatly from the many traditional designs used (Evans 1960, Secrist 1981, Soil Conservation Service 1982). Although removal of the spring box might increase problems with operation and maintenance, components that replace it function adequately and provide certain advantages, if properly maintained. Lower investment cost is a major advantage of the riser-flush valve system. Traditional designs are applica-

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