CHAPTER 9A

LARGE-SCALE MOVEMENTS OF LARGE HERBIVORES

Livestock following changes in seasonal forage supply

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Abstract. Large-scale movements allow large herbivores to cope with changes in seasonal forage supply. Pastoralists use mobility to convert low-value ephemeral forage into high-value livestock. Transhumant pastoralists may move livestock less than ten to hundreds of kilometres. In semi-arid tropical sites, water and forage shortages in the dry season cause pastoral livestock to move to water or key resource areas. In temperate summers, livestock may be moved to higher-elevation snow-free meadows. In winters, animals may be moved lower to warmer sites, or to mountain valleys protected from steppe winds. Despite the recognised value of mobility, pastoral mobility is being reduced around the world. Changes in the mobility of three pastoral groups are reviewed, the Aymara of the South-American highlands, Mongolians, and the Maasai of Kenya and Tanzania, for which quantitative results are given. The Maasai of Kajiado District, Kenya are subdividing some group ranches into individually owned parcels. In subdivided Osilalei Group Ranch, herders moved an average of 5.6 km per day, whereas in undivided northern Imbirikani, herders moved 12.5 km per day. Residents of northern Imbirikani accessed more green vegetation the more they moved, whereas those in subdivided southern Imbirikani did not. Maasai selected areas with more heterogeneous vegetation during the dry season than found at their permanent households. In modelling, subdividing to 100-ha parcels allowed Eselengei Group Ranch to support 25% fewer livestock by mass, even though the area remained the same. For any pastoralist, the costs of mobility must be weighed against benefits, but pastoralists have demonstrated flexibility in their mobility, if constraints such as human population growth and limitations in land access are not too great. We show that pastoralists have successfully evolved methods of herding livestock to access adequate forage in areas of variable climate.
Keywords. Aymara; fragmentation; Kenya; Maasai; Mongolia; pastoralism; subdivision

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INTRODUCTION

Semi-arid and arid rangelands that are generally too dry to support rain-fed agriculture but have vegetation comprise about 25% of the landscapes of the world, excluding Antarctica (reviewed in Groombridge 1992). Twenty million or more households make their living as pastoralists on these lands, and ten times as many obtain a significant source of income from raising livestock (De Haan et al. 1997). Some form of pastoralism is practiced in every continent, excluding Australia and Antarctica, and a diversity of pastoral cultures and subcultures have evolved, especially in Africa, the Near East and West Asia, and the Indian region (FAO 2001). Most of these groups must contend with rainfall that is more variable within years, between years and across space than in more mesic regions (Ellis 1994). At its most basic, pastoralists have had to develop means of converting a spatially and temporally variable resource of little intrinsic value (grass) into a more stable, mobile resource of greater nutritional, economic and social value (livestock) (Swift 1977; Goldschmidt 1979). Adaptations allowing pastoralists to use areas with spatially and temporally variable rainfall are varied, but a central adaptation is through movements of livestock to make use of ephemeral forage resources. Livestock herders move their animals to different degrees (Box 9.1). This chapter focuses on transhumance and the effects of seasonal movements on livestock.

Movement of livestock is a crucial adaptation allowing pastoralists to use areas with spatially and temporally variable rainfall

Box 9.1. *Livestock and pastoral movements*

Livestock herders move their animals in ways that may be broadly categorised into three classes (FAO 2001), although a continuum exists. Some movements are nomadic, using a given foraging resource, then moving on to other pastures following variable rainfall, with movement patterns notably different from year to year. Other movements are transhumant, where animals and people move between locations where forage is available seasonally. Movements may be short (< 10 km) or long (hundreds of km), and may be absent in years of very good rainfall (Kavoori 1999) or extreme in years of severe drought (Bekure et al. 1991), but movements in years of typical rainfall follow a predictable pattern. Agropastoralism is practiced by those that cultivate lands and raise livestock. Their livestock movements tend to be short, allowing family members to remain close-by and to work their agricultural plots.

In rangelands around the world, the mobility of pastoralists has been, or is being, reduced. Reductions are due to exogenous sources, such as increased transportation costs, land subdivision and changing government policies, as well as endogenous sources reflecting the pastoralists' desires, such as to be near schools, hospitals and other services, or to work agricultural plots. The literature of the past 15 years includes pleas for the mobility and land access of pastoral peoples to be maintained (e.g., Behnke and Scoones 1993; Scoones 1995; Niamir-Fuller 1999; Chatty and Colchester 2002). However, mobility has been reduced, as evident in the case