

# Pastoralism

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Pastoralism comprises livestock production systems based on mobile herds, grazing or browsing natural vegetation across extensive rangelands. Up to 120 million people across the developing world make their living primarily from pastoralism and/or self-identify as pastoralists. The rangelands they inhabit encompass tropical and subtropical arid and semiarid lands (ASALs), temperate steppe, Alpine and high-latitude systems. In these environments, with plant growth commonly variable, unpredictable, and patchy in time and space, cultivation is risky but pastoralism based on mobile herds can sustain livelihoods from lands of otherwise poor agroecological potential.

With domestication of grazing and browsing species over the past 10,000 years, different pastoralist systems emerged independently in the New World (Andean camelids) and the Old (Middle Eastern sheep and goats, Mediterranean and African cattle, central Asian steppe horse, high-altitude yak, and high-latitude reindeer-based systems). Millennia of spread and interaction between these and other production systems culminated in the colonization of the savannas and plains of the Americas, Canada, Australia, and New Zealand by European-derived, Western-dominated cattle and sheep production. These ranching systems, generally on private or leased land, are sometimes termed pastoralism but are not considered further here. Instead, the entry focuses on the wider diversity of systems more deeply rooted in their regional histories.

The entry uses the term “mobile pastoralist” rather than “nomad”: the latter emphasizes people’s lifestyle rather than the mobility required for herd management. However, “nomad” and “nomadism” remain important official designations in the francophone Sahel region of North Africa and some national statistics.

An immense range of biophysical, social, and historical factors shape the local characteristics of pastoralism in any given place. However, the mobility, extensive land use, and reliance on natural vegetation common to pastoralist systems entail widely observed correlates, particularly the ecological and economic characteristics of pastoralism, its social, cultural, and political correlates, and present-day development and change in postcolonial and post-Soviet contexts. At the outset of the twenty-first century, pastoralism is widely recognized as being under threat and in decline (Galvin 2009). With concerns around global climatic change, biodiversity decline, and the food–water–energy nexus, rangelands that have underpinned pastoralism for millennia are now aggressively targeted by competing interests. States and global investors convert rangelands to cultivate foods, fuels, and fibers for global markets or set them aside for conservation and tourism. The discourse around this land grab, and

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the narratives facilitating it, focus on pastoralism's productivity and environmental implications.

## **Ecology of pastoralism**

In rangeland ecosystems supporting pastoralism, wild grasses, lichens, shrubs, and/or trees provide forage for wild and domestic grazers and browsers. Rangelands are created and maintained by a mix of biophysical (rainfall, temperature, soils, groundwater) and anthropogenic factors (fire, clearing, grazing, nutrient redistribution). Rangelands occur under a wide range of ecoclimatic conditions, from wetlands to deserts, from lowlands to high Alpine pastures, and from tropical to Arctic latitudes. For all this diversity, rangelands share common features of ecological dynamics. Most are primarily drylands, though patches of wetland or forest represent key seasonal or drought refuges for wild and domestic animals. Forage availability is patchy in space and time. Production depends on the rains' timing and extent in tropical ASALs; on warmer weather as well as precipitation in Central Asian steppes. This seasonality forces herds to move according to pasture availability at different times of year.

### *Transhumance*

Pastoralism thus involves transhumance: regular movement between wet and dry season or summer and winter pastures. Transhumance is driven not only by push and pull factors of pasture availability and quality. Environmental diseases associated with ticks, biting flies, or parasites are also patchy in space and time, with vector populations (and hence disease challenge) increasing in warmer, wetter conditions; declining in colder or drier times. Transhumance allows pastoralism to exploit shifting optimal forage patches but also to minimize livestock disease challenges while maintaining low-level exposure, stimulating immunity and underpinning evolution of locally resistant breeds.

The scale of transhumance varies from a few kilometers' displacement between high- and lowland sites (e.g., East African Maasai; Swiss Alpine transhumance), to hundreds of kilometers (e.g., West African Fulani cattle pastoralists' latitudinal transhumance between northerly arid areas during the summer rains and southern humid Sudanian savanna in dry seasons), to vast distances covered by Tuareg camel pastoralists moving between Saharan montane refuges, cure salée salt lick gatherings, and southerly Sahelian agropastoral zones, with successive moves totaling well over 1,000 kilometers annually. Central Asian pastoralists alternate between high-nutrient, high-biomass summer pastures and winter pastures whose local microclimates offer shelter against drastically low temperatures and impenetrable snowdrifts.

### *Ecological dynamics*

Some forms of pastoralism enjoy relatively predictable seasons and environmental conditions (e.g., European montane systems). However, for many pastoralists in

tropical ASALs, or Central Asian steppes, year-to-year fluctuations in timing, location, duration, and scale of forage production are unpredictable. Severe ASAL droughts or other extreme climatic events, such as exceptionally cold steppe winters with unusually heavy snow (*dzud*), cause often catastrophic livestock mortalities. Classical ecology, developed in Western temperate systems, sees ecosystem state as dictated by “equilibrium dynamics,” with density-dependent population limitation balancing animal numbers with available forage, and with plant assemblages progressing along a successional sequence to ecoclimatically determined climax vegetation. For tropical ASALs, the lower the average rainfall, the higher its variance and the more unpredictable forage availability will become because of randomly interacting biophysical factors of rain, temperature, flood, fire, and wild herbivores. The more arid the area, and the more variable and unpredictable the forage production, the less well can “equilibrium” models predict vegetation growth. Conversely, pastoralist systems must depend all the more on mobility to access forage patches and avoid shifting disease challenges.

### *Herd ecology*

Pastoralist herds differ in composition from intensive production systems. Pastoralism commonly maintains mixed-species herds, divided into separate herding units according to animals’ needs and available labor. The species mix offers ecological and economic complementarities—using the full range of forage types available, dovetailing production cycles of different livestock species, trading on differences in their market values. Pastoralists with mixed-species herds can often maintain milk production—the basis of many pastoral economies—throughout the year.

Besides mixed-species herds, pastoralism has commonly relied on local breeds selected over generations for hardiness under local conditions of drought and disease. Pastoralists pay close attention to individual animals’ physical and behavioral characteristics and family pedigrees in maintaining, developing, and culling their herds. Pastoralism also maintains distinctive herd age/sex structures. Sub-Saharan African pastoralist cattle herds commonly average 60 percent females, with 60 percent of females being adult. Classic analyses suggest this optimizes speed and resilience of recovery from livestock losses.

## **Economics of pastoralism**

The economics of pastoralism encompasses management of land, labor, and capital; terms of trade between pastoral and other products; livelihoods and food systems associated with pastoralism.

### *Land and land-tenure systems*

Mobility and the extensive land use characteristic of pastoralism set up certain land-tenure and resource-access correlates (Niamir-Fuller 1999). Grazing lands are generally managed as common-property resources (CPRs). Similarly some key

limiting resources, such as traditional deep wells needing complex cooperative construction and maintenance, may be communally held and managed. CPR management may operate alongside private tenure: for example, of high-quality farmland (particularly fertile or irrigated sites); special calf pastures created near permanent homesteads; individually constructed water points; individual trees of economic or other significance.

CPR management of grazing, water, and other shared resources involves establishing rules, monitoring, and enforcement. The governing body may be a council of elders, with younger men as enforcers, as for many East African pastoralists. In some Islamic groups, CPR management merges with and is reinforced by religion, as for *agdal* (associated with Moroccan Atlas saints), *habous* (religious foundation), and *hema* (Middle Eastern) reserve pastures. In socially stratified pastoralist groups, particular castes dictate what pastures are reserved, when, and for whom. The Dina system controlling access to the Niger River's inland delta in Mali, established by a Fulani pastoralist elite following their nineteenth-century jihad, dictated fishers', pastoralists', and farmers' access in the annual cycle of flood and drawdown. Postindependence, the national (largely nonpastoralist) government now makes these decisions.

### *Labor*

Pastoralist division of labor allocates roles by gender and age, by caste in hierarchical, and by wealth or kin status in "egalitarian" societies. Day-to-day herding is often carried out by boys; experienced men take on complex herd movements, labor-intensive watering from hard-to-access wells, and difficult or dangerous predator defense. Increasingly, better-off households educate their children, hiring in herders from poorer families.

Milk management involves judging what to take for people or leave for calves; partitioning milk for direct use as food, for storage, processing, or trade; and social distribution of milk and its products for consumption by different people. Processing milk may include making soured milk, yoghurt, butter, ghee, cheese, and sun-dried milk powder (as reportedly carried by Kublai Khan's Tatars). More generally milk and milk products are sold in the market. Some groups debar women from milking, as being likely to strip too much from the animal to feed their children. Some Islamic women of reproductive age are not allowed to market milk, shielding them from public view. Elsewhere, women milk the animals and market pastoral produce. Women also commonly tan hides and may control the proceeds of their sale.

Marketing animals is a man's job. Young men establish themselves as herd owners in part through buying and selling animals on at a profit, responding to cross-border and other market price differentials. Patterns of labor and people:animal ratios change with commercialization, driving more market sales of live animals and meat, as opposed to more labor-intensive milk-based pastoralism.

Women's domestic labor roles often include house construction (making reed mats, leather or felt tents for mobile encampments; packing, moving, and setting up camp; constructing and repairing more permanent houses). Women commonly

gather fuelwood, water, nontimber forest products (NTFPs), and wild foods and cook. They take care of young, sick, or old people and animals and hold ethnomedical, ethnoveterinary, and NTFP knowledge. By contrast men manage most conflict and security matters. In most pastoralist systems men customarily raided livestock to build their own herds and conversely defend home herds against raiders. Commonly senior men (elders, nobles) manage politico-legal negotiations over conflict, alliances, resource access, and punishments.

### *Capital: Livestock herds*

Pastoralism manages livestock as capital for sustainable yield, alongside maintaining long-term survival and reproduction of the herd as wealth store. Mixed-species herds offer economic as well as ecological complementarities. Small stock—sheep and goats—represent small change, readily cashed in for food, for school, or for hospital fees. Large stock such as cattle and camels represent significant units of wealth. Given its biophysical and socioeconomic environments' boom-and-bust nature, much pastoralism turns on managing risk. If a Maasai sells a full-grown steer, he will often reinvest part of the money in a young heifer, or small stock, ensuring the herd's future.

It is common, though not universal, that men customarily own most livestock, particularly larger stock such as camels or cattle. A Maasai woman is customarily allocated cattle to milk but holds them in trust from her husband or sons, not owning them outright. She might be gifted small stock by a doting husband or buy her own from proceeds of petty trade. Elsewhere, religion shapes gendered ownership of livestock. Mid-twentieth century ethnographies show non-Islamic Fulani women owning cattle in their own right while Islamicized Fulani followed inheritance rules making this unlikely. Among twenty-first century Sámi, men dominate reindeer pastoralism, their wives and daughters being more often sedentary, educated teachers, health workers, or administrators, taking their children to join the menfolk for extended summer camping associated with reindeer migration.

### *Terms of trade*

Pastoralist economies commonly hinge on terms of trade for pastoral against cultivated products. Pastoral produce is nutritionally of a higher quality, commanding higher prices than crops. While some remote, specialized pastoralists subsist year round purely on milk and meat, supplemented by wild foods, most pastoralists trade livestock products for farm produce. The basic equations underpinning pastoralism's ecological and economic rationality are thus that: (1) in rangelands, rain-fed cultivation is risky but mobile pastoralism can yield high-quality produce from land of otherwise poor agroecological potential; and (2) a small amount of pastoral produce buys in calorific terms a much larger amount of crop food. However, in times of drought, *dzud*, or disease, crop prices rise while milk production ceases and livestock condition and associated prices fall. The pastoral produce terms of trade collapse, driving distress sales of livestock and, potentially, destitution. Where pastoralist milk, meat, animal fiber, or

leather products are integrated into international markets, comparable disruption may be triggered by imposed quarantines or by subsidies to competing Western producers.

### *Milk production and markets*

Where transhumant pastoralists move seasonally to exploit remote pastures, part or all of the family may move, too, subsisting largely or wholly on seasonally abundant milk. In Somalia, women pastoralists link with lorry drivers to transport surplus milk from remote grazing areas to urban markets. In parts of Nigeria, Fulani women liaise with Hausa women traders who buy milk to sell on in urban centers. In some cases, people process surplus milk as ghee or cheese to be preserved and sold once they are closer to markets again, as with cheese making in traditional European and Mediterranean montane transhumance. Where transhumant animals' surplus milk cannot be marketed, it is invested in the future herd through robust calf growth. Where transhumance splits the family, some milking animals may be left at the permanent base with family members staying behind to farm, trade, work in urban jobs, or attend school or hospital.

### *Livestock trade and meat production*

Some systems are based entirely on meat production, such as high-latitude reindeer pastoralism. Elsewhere pastoralism may shift between milk and meat production in response to changing demand. With Libya's 1960s oil boom, people moved to relatively highly paid oil-related jobs, increasing urban demand for meat and reducing the numbers available to manage labor-intensive subsistence pastoralism. Rather than herding small flocks and processing every possible animal product, herders took on larger numbers of animals, dropped much of the husbandry and processing and supplied live animals to meet the new demand for meat. Elsewhere Islamicization may drive the shift to meat production, as in West Africa, where the withdrawal of Fulani women from marketing milk meshed with rising urban demand for meat. Livestock production in remote regions of Mongolia's Gobi desert, the Horn of Africa, or the Sahel all link to booming urban markets for meat (in Russia and China, Gulf Arab states, and West African coastal cities, respectively). These are centuries-old and now multi-million-dollar international commodity chains. Rural producers interact with traders and middlemen operating through trust, often rooted in shared ethnicity. The advent of mobile phones has helped producers respond to market prices and mobile-phone money transfers facilitate the financial transactions involved.

### *Animal fibers*

Andean pastoralism based on indigenous domesticated and wild camelids, and still operating on the Bolivian altiplano, is thought to have developed primarily for production of wool, immensely important to the Inca empire. While camelids were central to military and trade transport, and culled animals were and still are eaten, there is no evidence their milk was ever used. Several Andean and other systems produce luxury fiber (angora, cashmere, alpaca) or high-grade leather as their main commodity.

**Table 1** Staying pastoralists, moving out, or left behind?

		<i>Other Assets and Income</i>	
		<i>Below Average</i>	<i>Above Average</i>
<i>Livestock Assets and Income</i>	<i>Above Average</i> <i>Below Average</i>	Staying as pastoralists Left behind	Combining Moving out of pastoralism

### *Pastoralism and livelihoods*

The seasonality of pasture and livestock production means most pastoralists complement pastoral produce with other foods through exchange or through other income-earning activities alongside herding. Historically, pastoralists who lost their animals to drought, disease, *dzud*, or raids would use other ways of making a living to reestablish themselves in due course as herd owners. Individuals, households, families, and whole groups are continually moving out of pastoralism and (sometimes) back in again over time. Table 1 captures this dynamism and the implications for people in different economic circumstances, with different levels of investment in/reliance on livestock as opposed to other assets.

Pastoralism is not isolated from national economies: rather, diversification is widespread. Agropastoralism is common across rural sub-Saharan Africa, dividing household labor between settled farms and mobile herds, balancing complementarities (ox plows increase cropped area; manure increases yields; draft animals transport crops to market; animals act as a wealth store; crop residues used as fodder) with conflicts (labor bottlenecks; crop damage by herds; herd mobility competing with farm care).

Other activities commonly complementing pastoralism include hunting, fishing, and gathering; wildlife tourism; long-distance trade; and seasonal or longer-term outmigration, often as circular (return) labor migration.

### **Pastoralist societies**

Pastoralism encompasses an immense diversity of ethnicities and social forms. Pastoralism is a central means of production for some thirty broad ethnolinguistic groups across sub-Saharan Africa alone, with multiple ethnicities in each. The Fulani share a common language but comprise multiple subethnic groups ranging from the West African coast to the Ethiopia/Sudan border and from the fringes of the Sahara in Mali, Niger, and Chad to humid West-Central African forests of Cameroon and Central African Republic. Tuareg are all Tamasheq-speakers but encompass multiple different groups, each stretching north–south from the Saharan Hoggar, Tibesti, or Air massifs, to semi-arid zones of Mali and Niger, which are farmed by former slave Bella. Some pastoralist societies have been seen as egalitarian, structured by age set, age grade, clan, and section (Maasai, Turkana, Boran). Others, like the Tuareg, were customarily strongly stratified into nobles, slaves, and religious and military specialists. Different Tuareg groups, each

with its own internal hierarchy, linked into the Sultanate of Air's pan-Saharan trading federation. Colonial forces disrupted this network and the slavery, caravan trade, and tribute payments underpinning the Tuareg economy.

Social forms vary within as well as between groups. The Fulani represent a vast, widely dispersed supraethnic group, with a common linguistic heritage, sharing certain cultural ideals, but with individual subethnic groups ranging from intensely hierarchical (such as the Islamic emirates associated with northern Nigerian Fulani) to broadly egalitarian (such as the agropastoralist Fulani of the Senegal River valley).

Earlier theories saw pastoralism as being organized along patrilineal descent principles as the basis for political mobilization in the absence of centralized political leadership (as for the Somali or Pashtun). A much wider diversity is now recognized: some pastoralist societies have matrilineal descent (Tuareg), others have neither unilineal descent groups nor elaborate genealogies (reindeer-herding Sámi and Chukchi). Many are clan based, others have formed politically complex federations (Tuareg), even empires (Incas, Mongols).

Though not exhibiting particular societal or kinship structures, pastoralism seems universally associated with social mechanisms for managing risk. Through herd owners' management of livestock gifts and loans, young men's peer-group activities, and women's milk management, people cultivate and maintain social networks ensuring access to key resources, avenues for restocking after loss to drought, disease, or raiding, and support in times of need.

Livestock redistribution often operates along clan and kinship networks (e.g., Maasai, Fulani) but also through political patronage (such as the Tswana *kgamelo*, "milk-jug," system), complemented by stock friendships sealed between otherwise unrelated individuals and formalized with specialized terminologies for specific categories of livestock gifts or loans. Most grazing lands are customarily managed as CPRs, with flexible access rights within fuzzy social and spatial boundaries. There are multiple mechanisms for negotiating access to neighboring groups' grazing and water resources, and for reciprocating access, whether through offering tokens of respect or building enduring individual relations of marriage or adoption.

Institutions for managing potential conflicts complement social mechanisms for redistribution and access. Raiding was often a culturally valued avenue to manhood and herd building. Numerous analyses lay out customary pathways for reconciliation after such violent events. However, nation-states and centralized law enforcement have largely suppressed customary raiding. Conversely predatory raiding with automatic weapons, bankrolled by businessmen selling to butchers, and potentially killing people as well as taking animals is increasing in many remote pastoralist areas (Andes, Siberia, East Africa).

Social mechanisms for risk management are bound up with pastoral sociocultural values centered on ideals of physical endurance and military prowess. The tension between taking from the herd while maintaining it into the future, universal in pastoralism, means ideals of restraint are common and self-respect rests on one's reputation for such (e.g., *enkanyit*: Maasai; *pulaaku*: Fulani). Wise management, whether of herds (for men) or their products (for women), commands respect. Milk-based pastoralism accords high social value to women's giving milk to their

children, men, and guests. For men, gifting and receiving animals is essential to any significant event—betrothal, wedding, birth, coming of age, or payment of social and legal dues. Livestock and their transfers constitute a symbolic language and social world: individual animals each embody a whole history of social relations.

## **Development and change**

Pastoralism is a dynamic and responsive production system always set within specific social, historical, and biophysical contexts. Historically, mobile pastoralism has at times been politically dominant (thirteenth-century Mongolian empire; eighteenth- to nineteenth-century West African pastoral jihad; militarily dominant nineteenth-century East African pastoralism). Colonialism pushed mobile pastoralist systems into political eclipse. By the mid-twentieth century, they were marginalized by Africa's emerging national bureaucracies and by socialist collectivization across Central Asia (Khazanov 2013). The twenty-first century sees pastoralism in retreat across rangelands worldwide and this is not because of any failure to innovate (Catley, Lind, and Scoones 2012). However, mobile pastoralism remains beyond easy reach of state services, leaving pastoralists at a disadvantage. National boundaries originally drawn through seemingly peripheral, underpopulated rangelands split pastoralist ethnicities between neighboring countries, creating fragmented minorities with suspect cross-border loyalties (Bonte and Galaty 1991).

Being so poorly visible to the official gaze, pastoralism's contribution to national economies remains grossly undervalued. Pastoralism underpins multi-million-dollar livestock and associated trades. Pastoralism's poor productivity is a myth deeply entrenched in official thinking and policies, systematically used against pastoralism to favor more intensive "modern" systems managed by national and global elites (whether livestock production, cultivation, tourism, or conservation). A parallel narrative presents pastoralism as causing overgrazing and degradation. Yet the weight of scientific and development research suggests that customary pastoralism is commonly a highly productive, resilient, and sustainable social-ecological system, contributing as much to GDP as does crop farming in countries like Kenya (Behnke and Muthami 2011). Nonetheless, grazing lands in Africa, Central Asia, and Western China are rarely recognized as being in productive use and pastoralism is denied the tenure security accorded to farmland. Unsubstantiated narratives around poor productivity and environmental degradation are widely used to dislodge pastoralism and capture the commons, denying pastoralism the key resources and mobility fundamental to its survival. While there are international moves to protect pastoral mobility and pastoral lands (e.g., African Union 2010), states and global investors are rapidly taking over the rangelands of Africa, South America, and Western China for cultivation of food, fuels, and fibers; large-scale mining and conservation interventions take much of what is left. Pastoralism displays declining livestock:person ratios, widening poverty gaps, dwindling political representation, spiraling land loss and increasing marginalization. Pastoralism's future now seems bleak.

SEE ALSO: Age Systems and Kinship; Animal Management and Stock Keeping; Arctic Environments and Peoples; Bells; Biocultural Diversity; Climate Change; Common Property; Cults, Male and Female; Deserts and Desertification; Ecological Anthropology; Environmental Anthropology; Environmental Institutions and Governance; Environmental Sustainability; Fishing and Marine Resources; Global Environmental Change; Historical Linguistics; Indigenous and Local Knowledge and Science: From Validation to Knowledge Coproduction; Land Rights; Mountain Environments; Nomads/Pastoralists and Development; Pastoralists; Political Ecology; Protected Areas; Risk and Uncertainty; Rural Development; Transhumance; Umesao, Tadao (1920–2010)

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