NO-06 Pastoral commons: governing a moving resource

The Governance of Moving Resources in Non-Equilibrium Environments

The governance of pastoral commons represents one of the most enduring, complex, and high-stakes forms of resource management in human history. Unlike static resources—such as arable land or timber—pasture and water in arid, semi-arid, and alpine environments are temporally and spatially volatile. In these non-equilibrium ecosystems, pastoralism relies on extensive, rapid mobility to exploit a patchy resource base. This ecological reality necessitates institutional arrangements that can coordinate access across vast landscapes, negotiate seasonal boundaries, and prevent the tragedy of open access. The primary challenge of governing a moving resource is aligning the scale of the governance institution with the scale of the ecological resource, while preventing free-riding and elite capture.

Elinor Ostrom's eight design principles for robust common-pool resource (CPR) management provide a powerful analytical framework for evaluating these systems. Her principles dictate that sustainable commons require: (1) clear boundaries, (2) proportional equivalence of benefits and costs, (3) collective-choice arrangements, (4) monitoring, (5) graduated sanctions, (6) fast and fair conflict resolution, (7) recognition of the right to organize, and (8) nested enterprises[1]. Historical and ethnographic data reveal that pastoral commons which survive deep time are not egalitarian utopias; they are highly negotiated, often inherently hierarchical systems of survival. Furthermore, they are intensely susceptible to capture by individuals exhibiting dark-triad traits—narcissism, Machiavellianism, and psychopathy—who exploit information asymmetries, monopolize bottleneck resources (such as deep wells or winter shelters), and subvert collective-choice arrangements for personal enrichment. Understanding the structural resilience and eventual failure of these systems provides the foundational architecture for reconstituting governance after the permanent loss of industrial supply chains and the reach of the state.

The Sámi Siida of Fennoscandia

The Sámi *siida* (or *sijte* in southern regions) is a cooperative herding group operating across the northern regions of Norway, Sweden, and Finland. Historically, it evolved as a highly flexible institutional adaptation tailored first to the dynamic demands of hunting, and subsequently to reindeer pastoralism[4].

System Mechanics and Quantitative Outcomes

The foundational unit of Sámi governance is the *siida-share*, an independent household ownership unit[5]. According to Tim Ingold (1978, 1980) and Robert Paine (1994), the transition from hunting to reindeer pastoralism forced a severe contraction in the demographic scale of the *siida*[4]. The original hunting *siida* comprised 10 to 40 households (or 10 to 30 among Sea-Sami bands) operating within geographically demarcated territories[4]. With the

17th-century shift to pastoralism—driven heavily by state taxation requiring payments in reindeer hides—the pastoral *siida* contracted to 2 to 6 families (most often 3) herding a collective unit of 1,500 to 2,000 reindeer[4].

The system relies on profound temporal flexibility. Summer *siidas* typically gather larger herds of up to 51 persons in a band to exploit abundant summer forage, which subsequently segment into smaller winter bands of 7 to 28 persons to avoid overgrazing scarce, slow-growing winter lichen[4]. Modern Norwegian legislation, beginning heavily in the late 1970s, attempted to rationalize the system based on Western agricultural carrying-capacity models. In West Finnmark, the state limited concessions to 200 owners, with no owner permitted more than 500 reindeer[9]. This forced technological adoption—such as expensive fencing and snowmobiles—and increased state subsidies, which now constitute up to 50% of herder income, with 60% of households reporting that a spouse's wage labor is essential for survival[6]. Today, there are 99 summer *siidas* and 150 winter *siidas* in Norway, managing approximately 210,000 semi-domesticated reindeer[6].

Tripartite Separation: Sámi Siida

Perspective	Analytical Assessment
What they said	The Sámi describe the *siida* as a partnership of equals based on non-hierarchical togetherness ("everybody decides together") and deep reverence for the reindeer's autonomy and the natural environment[4].
What the record shows	The historical record demonstrates severe vulnerability to external state taxation and interference. State-mandated fencing and fixed pasture borders have actively degraded the commons by forcing overgrazing along fence lines and undermining winter mobility[8].
What modern scholarship infers	Scholars infer that the pastoral *siida* operates less on pure kinship and more on a "contractual aspect" of shared labor requirements. Individual ownership of animals combined with collective herding creates constant internal tension regarding herd size versus pasture capacity[4].

Ostrom Scoring: 5/8

The traditional *siida* excelled in nested enterprises (8), conflict resolution (6), and proportionality (2). However, modern iterations fail Ostrom's Principle 7 (recognition of the right to organize) because the state has imposed artificial boundaries and centralized meat-production quotas that override indigenous management, alongside failing Principle 1 (clear boundaries) as traditional fluid borders were replaced by rigid state-mandated fences[1].

Scale Ledger: Sámi Siida

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Worked**	The basic independent ownership unit (husbandry unit), currently defined by the state as a *siida-share*[5].
Hamlet/Band (30 to 50)	**Operated/Worked**	The pastoral *siida* scale (3-6 households) optimizing labor for a 1,500-2,000 head herd[4].
Village (150 to 500)	**Failed**	Pastoral aggregation at this scale leads to immediate localized overgrazing of slow-growing winter lichen[4].
Parish/District (1,500 to 5,000)	**State Imposed**	Modern state "districts" force herders into rigid bureaucratic zones, causing fence-line degradation and cross-boundary disputes[6].
Town to Planet	**Never Tried**	Sub-Arctic ecology cannot support pastoral aggregation at these scales.

Capture Test: Sámi Siida

Element	Description

Mechanics of Capture	A Machiavellian actor exploits flexible boundary rules by accumulating massive personal herds (exceeding state limits via proxies) while relying on the collective labor of poorer relatives in the *siida*, socializing grazing costs while privatizing meat-sale profits.
Historical Cases	During the post-1970s privatization of meat sales, wealthy herders leveraged political connections to secure superior winter pastures, effectively displacing smaller, traditional *siida* groups who lacked capital for motorized transport[8].
Resistance Features	The strict tradition of individual earmarks (where each individual, including children, builds their own herd) diffuses absolute wealth concentration, while the cultural requirement for unanimous decision-making heavily stigmatizes dictatorial behavior[4].

The Mongolian Khot Ail and Community-Based Rangeland Management

Mongolia contains the largest contiguous area of common grazing land in the world, covering approximately 126 million hectares[14]. The foundational unit of governance is the *khot ail*, a camp of nomadic households sharing labor, information, and resources in a highly variable continental climate.

System Mechanics and Quantitative Outcomes

Maria Fernandez-Gimenez (1999, 2012) details how the traditional *khot ail* consists of 2 to 13 households that camp together and manage herds cooperatively[15]. Mongolia's governance history is characterized by severe oscillations. In the 1950s, the state collectivized pastures and livestock, transforming the nomadic economy into a centrally planned system with state-mandated livestock purchases, known as "state purchase"[18]. Following the 1992 democratic transition, state-owned livestock were abruptly privatized while the land remained state-owned[19].

This institutional mismatch spurred an explosion in livestock and herder numbers. Between 1989 and 1999, the national herd increased by 36% (from 24.7 million to 33.6 million), and the number of herding households doubled from 75,000 to over 150,000[20]. By 2003, livestock

numbers reached 1.97 million horses, 1.79 million cows and yaks, 0.26 million camels, 10.76 million sheep, and 10.65 million goats[14].

The tragedy of this unregulated open-access system was brutally exposed during the *dzud* (severe winter weather disasters) of 1999–2002, which eradicated 30% of the national herd. A subsequent *dzud* in 2009–2010 killed 8.5 million animals, approximately 20% of the national total, affecting 769,000 people (28% of the human population)[22]. In response to widespread ecological degradation—with 78% of Mongolian grasslands degraded by the late 2000s—international donors funded Community-Based Rangeland Management (CBRM) initiatives[18]. Fernandez-Gimenez et al. (2015) quantified that herders in CBRM groups demonstrated significantly higher adaptive capacity and resilience compared to non-CBRM communities, actively monitoring plant community composition and rotating pastures to prevent degradation[16].

Tripartite Separation: Mongolian Khot Ail

Perspective	Analytical Assessment
What they said	Herders historically believed in a limitless "wealth of nature" and framed mobility (*otor*) as a natural, harmonious response to ecological variability, relying on ancient ecological knowledge[14].
What the record shows	The post-socialist period saw a catastrophic breakdown in mobility. Wealthier herders occupied optimal winter shelters near urban centers year-round, forcing poorer herders to overgraze marginal lands, directly precipitating massive livestock mortality during *dzud* events[18].
What modern scholarship infers	Non-equilibrium ecological theory better explains the steppes than carrying-capacity models. Degradation is driven not solely by livestock numbers, but by the loss of temporal mobility and the collapse of nested institutional scales that previously coordinated cross-boundary movement during crises[18].

Ostrom Scoring: 4/8 (Pre-CBRM) to 6/8 (Post-CBRM)

Post-1990 Mongolia lacked clear boundaries (1) and nested enterprises (8), resulting in a

tragedy of open access[1]. CBRM interventions explicitly re-established monitoring (4) and collective-choice arrangements (3), raising the system's robustness, though legal recognition of territorial boundaries by the central state remains weak (7)[23].

Scale Ledger: Mongolian Khot Ail

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Worked**	Individual livestock ownership and fundamental economic unit[15].
Hamlet/Band (30 to 50)	**Operated/Worked**	The *khot ail* (2-13 households). Highly effective for daily labor sharing and predator defense[15].
Village (150 to 500)	**Operated/Mixed**	The *saahalt* (neighborhood) scale. Worked well under customary law for rotating seasonal pastures; failed post-1990 without enforcement[15].
Parish/District (1,500 to 5,000)	**Failed**	Post-socialist *soum* (district) governments lacked the authority or budget to enforce pasture boundaries or maintain wells[22].
Region (0.5 to 5 million)	**Failed**	During *dzud*, massive influxes of out-of-district livestock overrun local pastures, triggering systemic collapse of the commons[22].
Nation to Planet	**Failed**	National state ownership of land without local enforcement created an

		open-access vacuum[19].

Capture Test: Mongolian Khot Ail

Element	Description
Mechanics of Capture	A psychopathic actor leverages the absence of formal land titles to construct permanent, illegal winter shelters in high-yield river valleys, deploying large herds to deliberately graze out the perimeter, effectively fencing off the commons without spending capital on wire.
Historical Cases	"Ninja" artisanal miners and wealthy absentee herd owners (urban politicians) monopolized key water sources and winter pastures in the Gobi desert-steppe during the 1990s and 2000s[16].
Resistance Features	Formalized CBRM user-group contracts with local governments re-established spatial boundaries and provided legal mechanisms to evict trespassers, alongside collective monitoring of pasture biomass[22].

Borana Wells and the Gadaa System of Ethiopia

The Borana Oromo of southern Ethiopia manage an arid environment heavily dependent on deep, hand-dug *tula* wells. Their governance is embedded within the *Gadaa* system, an extraordinarily complex indigenous democratic institution structured around generational classes[25].

System Mechanics and Quantitative Outcomes

Marco Bassi (2005, 2024) and Boku Tache detail how the Borana divide resource management: pastures are managed by mixed-clan elders residing in a specific region (*dheeda*), whereas water wells are the strict property of the specific clans that excavated them[26]. The *Gadaa* system operates on an eight-year generational grade transition, creating a 40-year generational cycle (*gogeessa*). A macro-historical cycle resets every 360 years[25].

Water is the absolute ecological bottleneck. The well council, composed of 6 to 7 elders and led by the *konfi* (the "well father," representing the lineage that excavated the well), strictly allocates watering days[27]. The *konfi* cannot deny access arbitrarily; water allocation must reflect clan affiliation, participation in the massive manual labor required for well maintenance, and

emergency needs. A series of nested assemblies—from the *kora dheebuu* (assembly of the thirst, regulating ponds) to the *Gumii Gaayoo* (the pan-Borana general assembly held every eight years)—acts as the ultimate legislative and judicial authority[28].

Tripartite Separation: Borana Gadaa

Perspective	Analytical Assessment
What they said	The Borana conceptualize the *Gadaa* as a perfect egalitarian democracy that ensures peace (*Nagaa Boranaa*) and equitable survival for all humans and cattle under divine law[29].
What the record shows	The system achieved a highly successful pastoral production system for centuries, successfully mobilizing the massive collective labor required to maintain deep wells and fielding formidable cavalry to defend the territory[25].
What modern scholarship infers	Scholars note that while *Gadaa* is highly democratic for those inside the system, it operates on structural exclusion. Women are excluded from formal *Gadaa* power, and the system historically required continuous territorial expansion to alleviate internal demographic pressures[25].

Ostrom Scoring: 8/8

The Borana system perfectly exemplifies Ostrom's principles, particularly nested enterprises (8), graduated sanctions (5), and proportional equivalence (2) where physical labor in well-digging translates directly to water access rights[1].

Scale Ledger: Borana Gadaa

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Worked**	Base unit of labor for herding and well maintenance[26].

Hamlet/Band (30 to 50)	**Operated/Worked**	The immediate users of a single well on a given rotation day[27].
Village (150 to 500)	**Operated/Worked**	The clan-based well council (6-7 elders governing hundreds of users)[27].
Parish/District (1,500 to 5,000)	**Operated/Worked**	Regional grazing zones (*dheeda*) governed by local mixed-clan elders[27].
Region (0.5 to 5 million)	**Operated/Worked**	The *Gumii Gaayoo* (general assembly) coordinates the entire Borana nation across southern Ethiopia and northern Kenya[28].
Nation to Planet	**Failed**	Subjugated by the modern Ethiopian state, which repeatedly attempted to dismantle indigenous structures[29].

Capture Test: Borana Gadaa

Element	Description
Mechanics of Capture	A narcissistic *konfi* attempts to extort political loyalty or livestock from desperate herders during a drought by threatening to exclude them from the watering rotation, leveraging the life-or-death power of the well bottleneck.
Historical Cases	Subversion by the Ethiopian state during imperial and Marxist eras, which attempted to install proxy chiefs (*balabats*) who bypassed the *Gadaa* assemblies to monopolize land and water rights[29].

Resistance Features	The *Gumii Gaayoo* allows any Borana male to bypass immediate superiors and bring grievances to the supreme assembly. A corrupt *konfi* can be stripped of their title and socially ostracized, severing them from the mutual insurance networks required to survive[28].

Fulani and Tuareg Transhumance Corridors

In West Africa and the Sahel, the Fulani and Tuareg represent the largest pastoralist groups, practicing extensive transhumance across multiple national borders to track highly variable seasonal rainfall and forage across the Sahelian and Sudanian savannas[31].

System Mechanics and Quantitative Outcomes

Transhumance routes are massive, continental-scale corridors. The governance of these corridors traditionally relied on symbiotic, highly negotiated relationships with sedentary farmers. Herds provided manure for post-harvest fields in exchange for crop residues and water access. However, explosive population growth, the proliferation of automatic firearms, and agricultural expansion have blocked these traditional routes[31].

In response to escalating violence, states like Guinea (1995) and Niger (2010) enacted the "Code Pastoral" to legally enshrine free access to pastoral areas and protect transhumance corridors from agricultural encroachment[31]. Simultaneously, the ECOWAS International Transhumance Certificate was implemented to regulate cross-border livestock movements[31].

Despite these formal legal frameworks, violence has escalated drastically. Farmer-herder conflicts, compounded by jihadist insurgencies, rural banditry, and state collapse, have resulted in thousands of fatalities and the permanent displacement of pastoral communities across Nigeria, Mali, and Burkina Faso[31].

Tripartite Separation: Sahelian Transhumance

Perspective	Analytical Assessment
What they said	Pastoralists argue that unhindered mobility is a fundamental human and cultural right, essential for the economic survival and food security of the entire Sahel[31].
What the record shows	The historical record shows that when corridors are blocked, pastoralists are forced to divert herds directly into unharvested agricultural fields, triggering instant, often lethal, retaliation from farming

	communities[31].
What modern scholarship infers	The statutory "Code Pastoral" is largely performative. Scholars infer that while laws exist on paper, the state lacks the monopoly on violence required to enforce them. Conflicts are deeply political, driven by land-tenure insecurity and the weaponization of ethnic identities by political elites[31].

Ostrom Scoring: 2/8

The system currently fails across almost all of Ostrom's principles due to the lack of clear boundaries (1), ineffective conflict resolution mechanisms (6), and a total breakdown of state recognition (7) at the local enforcement level, leaving communities to rely on self-arming[1].

Scale Ledger: Sahelian Transhumance

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Worked**	The basic livestock ownership unit[34].
Hamlet/Band (30 to 50)	**Operated/Worked**	The moving transhumant camp managing a specific herd along the corridor[34].
Village (150 to 500)	**Failed**	Traditional negotiation between pastoral chiefs and farming village headmen has collapsed due to population pressure and loss of trust[31].
Parish/District (1,500 to 5,000)	**Failed**	Local government authorities are frequently corrupt, siding with whichever ethnic group holds demographic majority[31].
Nation (50 to 500 million)	**Failed**	National "Code Pastoral"

		laws are systematically ignored by agricultural lobbies and lack enforcement mechanisms[31].
Continent	**Attempted**	ECOWAS protocols attempt cross-border management but fail entirely at the rural implementation phase[31].

Capture Test: Sahelian Transhumance

Element	Description
Mechanics of Capture	A Machiavellian political elite in a farming district intentionally sells land titles overlapping with traditional pastoral corridors to foreign agribusiness or local loyalists. When herders inevitably trespass, the elite arms local farming militias, framing the ecological conflict as an ethnic or religious insurgency to secure national military backing.
Historical Cases	Nigerian and Malian contexts in recent years, where state governors and national politicians have leveraged farmer-herder clashes to consolidate ethno-religious voting blocs[31].
Resistance Features	None currently robust enough to withstand automatic weapons; traditional dispute resolution (paying blood money or livestock compensation) has been completely overwhelmed by the scale and lethality of the violence[31].

Tyrolean and Swiss Alp Commons

In the European Alps, isolated communities have governed high-altitude pastures and forests for centuries, famously documented by John Cole and Eric Wolf (1974) in *The Hidden Frontier: Ecology and Ethnicity in an Alpine Valley*, and Robert Netting (1981) in *Balancing on an Alp*[36].

System Mechanics and Quantitative Outcomes

Cole and Wolf compared two neighboring villages in the Trentino-South Tyrol region: St. Felix (German-speaking) and Tret (Romance-speaking). Despite linguistic and cultural differences, both communities faced identical ecological constraints and developed rigorous, nearly identical collective-action institutions[36]. The *Magnifica Comunità di Fiemme*, established in 1111, exemplifies the longevity of these structures[39].

Governance was codified in the *Carte di Regola* (Rules of the Commons), which strictly regulated pasture access, timber harvesting, road maintenance, and even religious life. Punishments for damaging the commons were severe and swift[39]. To prevent the classic tragedy of the commons—whereby a herder increases their summer herd infinitely to maximize personal profit at the expense of the pasture—access to the high Alpine summer pastures was strictly limited by the principle of wintering. A household could only graze as many animals on the summer commons as they could independently keep alive on their private hay reserves during the harsh winter[36].

Tripartite Separation: Tyrolean Alps

Perspective	Analytical Assessment
What they said	The villagers framed the commons as a sacred, intergenerational trust, essential for community survival, local independence from external feudal lords, and spiritual harmony with the mountain environment[36].
What the record shows	The *Regole* successfully sustained continuous human habitation and averted ecological collapse for over eight centuries, creating a meticulously manicured, highly productive anthropogenic landscape[39].
What modern scholarship infers	Cole, Wolf, and Netting infer that the Alpine commons were not egalitarian utopias but "elective hegemonies" controlled by wealthy, land-owning adult men. Social mobility was highly restricted, and surplus population was systematically forced to out-migrate, remain celibate, or enter military service to prevent demographic pressure from breaking the ecological carrying capacity[38].

Ostrom Scoring: 7/8

The Alpine *Regole* are classic Ostrom success stories, exhibiting crystal-clear boundaries (1), superb monitoring (4), and brilliant proportional equivalence (2) via the wintering rule. They score lower on inclusive collective choice (3), as women and the landless were systematically excluded from governance[1].

Scale Ledger: Tyrolean Alps

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Worked**	The core economic unit producing winter hay on private plots[41].
Hamlet/Band (30 to 50)	**Operated/Worked**	Extended family networks managing localized timber extraction.
Village (150 to 500)	**Operated/Worked**	The primary unit of the *Regola*, governing the immediate mountain watershed and summer pastures[39].
Parish/District (1,500 to 5,000)	**Operated/Worked**	The *Magnifica Comunità*, coordinating multiple villages to manage vast contiguous forests and mediate inter-village disputes since 1111[39].
Region to Planet	**Never Tried**	Deep valleys created severe natural geographic isolation, preventing larger-scale ecological integration or administrative scaling.

Capture Test: Tyrolean Alps

Element	Description

Mechanics of Capture	A wealthy patrician family attempts to dominate the *Regola* council, rewriting the *Carte di Regola* to allow them to import cheap grain from the lowlands to artificially inflate their wintering capacity, thereby flooding the summer commons with their commercial livestock and starving out smaller farmers.
Historical Cases	In Biddenden and various Alpine valleys, the wealthy created an "elective hegemony," securing their own status during economic downturns while pushing small farmers into absolute precarity or forcing out-migration[38].
Resistance Features	The strict physical limitation of the valley itself and the reliance on local reputation. If a patrician destroyed the commons, they destroyed the foundation of their own wealth; mutual interdependence for avalanche and flood control forced a baseline of cooperation[41].

The Spanish Mesta (1273–1836)

The *Concejo de la Mesta*, established by King Alfonso X of Castile in 1273, was an extraordinarily powerful guild of sheep owners that governed the migratory routes (*cañadas reales*) of millions of Merino sheep across the Iberian Peninsula[42].

System Mechanics and Quantitative Outcomes

Julius Klein's (1920) exhaustive study documents how the institution coordinated the annual migration from the northern summer pastures (Soria, Segovia, Cuenca, and León) to the southern wintering grounds in Andalusia and Extremadura[42]. The scale of the Mesta was massive: in the 16th century, there were between 3,000 and 4,000 owners. While two-thirds of the sheep migrated in small flocks of less than 100, by the 18th century, several elite owners possessed flocks exceeding 20,000 sheep[43].

The Mesta held biannual assemblies and employed traveling judges (*entregadores*) to ruthlessly enforce transhumance rights against local farmers[43]. The Crown heavily subsidized and protected the Mesta to secure revenues from the *servicio y montazgo* (sheep tax) and the highly lucrative European export monopoly on Merino wool[46].

Tripartite Separation: The Mesta

Perspective	Analytical Assessment
What they said	The Mesta portrayed itself as the economic lifeblood of Castile, a democratic guild where any member who paid dues had an equal vote in the assemblies, protecting the weak from local tyranny[43].
What the record shows	The Mesta was an extractive monopoly that systematically crushed agricultural innovation in Spain. By allowing millions of sheep to trample farmlands and fixing artificially low prices for local pasturage, it caused severe ecological degradation and rural poverty[43].
What modern scholarship infers	The Mesta is the ultimate historical example of a state-captured commons. While it theoretically protected the mobility of small herders, it functioned primarily as a royal tax-extraction machine and a cartel for the high nobility and major monasteries[43].

Ostrom Scoring: 3/8

The Mesta possessed strong boundaries (1) and robust, albeit tyrannical, conflict resolution via *entregadores* (6). However, it catastrophically failed proportional equivalence (2) and nested enterprises (8), as the central state imposed the Mesta's rules destructively over local village authorities[1].

Scale Ledger: The Mesta

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Worked**	The small owners (flocks <100) who initially grouped their sheep for the migration[43].
Village/District	**Crushed**	Local governance of agriculture and local commons was completely overridden by the Mesta's

		royal charters[43].
Region (0.5 to 5 million)	**Operated/Worked**	The *cuadrillas* successfully organized millions of sheep across vast topographies[43].
Nation (50 to 500 million)	**Captured**	Functioned for 500 years purely because the absolute monarchy backed it with overwhelming military and legal force[43].
Planet	**Never Tried**	N/A

Capture Test: The Mesta

Element	Description
Mechanics of Capture	A psychopathic noble utilizes the nominal rule that "all votes are equal" by packing the sparsely attended biannual assemblies in Madrid with paid retainers, voting to ban small flocks from pooling together. This forces smallholders to either abandon migration or become wage-shepherds for the noble's massive flocks.
Historical Cases	By the 18th century, this exact scenario occurred. The President of the Mesta was always chosen from the Royal Council, and the elite passed regulations preventing small owners from grouping their sheep, concentrating vast wealth into flocks of 20,000+[43].
Resistance Features	None effectively existed until the 18th-century Enlightenment reforms of Pedro Rodríguez, Count of Campomanes, who systematically dismantled the Mesta's monopoly to promote general agriculture[43].

Privatisation Failure: Kenyan Group Ranches

In the 1960s and 70s, the Kenyan government, heavily influenced by foreign aid, colonial precedent (ALDEV grazing schemes), and World Bank directives, attempted to formalize Maasai pastoralism in the Kajiado district through the creation of "Group Ranches"[47]. The theoretical aim was to prevent landlessness, curb environmental degradation, and commercialize livestock production by containing herds within fixed boundaries[48].

System Mechanics and Quantitative Outcomes

Esther Mwangi (2006, 2007) and Shauna BurnSilver extensively document the total collapse of this system. Initially, group ranches held land communally while livestock remained privately owned[50]. However, citing massive corruption by ranch committees and fears of land expropriation by political elites, young Maasai agitated for the subdivision of the massive ranches (e.g., Osilalei at 53,600 ha, Imbirikani at 122,893 ha) into private, individually titled parcels[47].

The results of subdivision and privatization were ecologically and economically devastating. The estimated cost of fencing a mere 40-hectare parcel in Kajiado was Ksh. 150,000—nine times the annual income of an unskilled Kenyan laborer[49]. Unable to move herds to track erratic rainfall, pastoralist wealth collapsed instantly. Between 1977 and 1996, the average pastoralist's cattle holdings fell by 60%, and sheep and goat holdings plummeted by 90%[49]. Despite World Bank goals of commercialization, the creation of private property rights destroyed social wealth, dropping Kajiado pastoralist incomes to just 65% of the Kenyan national average[49].

Tripartite Separation: Kenyan Group Ranches

Perspective	Analytical Assessment
What they said	The government and colonial administrators claimed subdivision would incentivize land conservation, end the tragedy of the commons, and create a prosperous class of modern commercial ranchers[48].
What the record shows	Subdivision fragmented the landscape, truncated wildlife migratory corridors, and spawned a massive spike in violent conflict as cattle inevitably trespassed across newly erected private boundaries during droughts[47].
What modern scholarship infers	Mwangi and BurnSilver infer that privatization in highly variable arid

	ecosystems is an ontological and ecological mismatch. The destruction of the commons led to "re-aggregation" efforts, where Maasai are now using traditional clan networks to informally combine their private parcels to regain the mobility required for survival[50].

Ostrom Scoring: 1/8

Group ranches failed fundamentally because collective-choice arrangements (3) were captured by corrupt committees, and the eventual subdivision destroyed the ecological boundaries (1) and mobility necessary for pastoral viability[1].

Scale Ledger: Kenyan Group Ranches

Rung	Status	Explanation
Household (4 to 10 people)	**Operated/Failed**	Trapped on unviable 40ha private parcels; herd sizes crashed 60-90% due to loss of mobility[49].
Village/Hamlet (30 to 500)	**Operated/Mixed**	Post-subdivision "re-aggregation" via traditional clan networks is attempting to reconstruct the commons informally[50].
Parish/District (1,500 to 5,000)	**Failed**	The Group Ranch committees at this scale were completely unaccountable to members, driving the demand for subdivision[52].
Town to Planet	**Never Tried**	N/A

Capture Test: Kenyan Group Ranches

Element	Description

Mechanics of Capture	A Machiavellian group ranch committee chairman secretly negotiates with national politicians and international wildlife NGOs to sell off the most fertile, water-rich sections of the communal ranch, pocketing the proceeds and leaving the community with arid wasteland.
Historical Cases	Corrupt mismanagement by committee chairmen was the primary driver pushing ordinary Maasai to demand the disastrous subdivision of the land; they preferred absolute poverty on private land to being continually robbed by their own elite[50].
Resistance Features	Grassroots youth movements and NGOs (e.g., Mainyoito Pastoralist Integrated Development Organization) have recently mobilized to place legal freezes on land sales and deter land speculators[55].

The Strongest Case Against Pastoral Commons

The most formidable intellectual argument against pastoral commons remains Garrett Hardin's 1968 thesis, *The Tragedy of the Commons*. Hardin argued that in a system where pasture is shared but animals are privately owned, the rational herdsman is locked into a dynamic compelling him to increase his herd without limit to maximize individual profit, leading inevitably to the ruination of the commons[36].

While Ostrom empirically dismantled Hardin's assumption that commons equate to "unregulated open access," modern bureaucratic ecologists and state modernization theorists maintain a highly relevant modified critique. They argue that traditional pastoral commons only function effectively under low population densities and high natural mortality rates. Once human and livestock demographics surpass the absolute carrying capacity of the ecosystem—often due to modern veterinary medicine and international food aid removing natural mortality checks—traditional conflict resolution and boundary monitoring break down completely[18]. Critics point to the catastrophic degradation of the Mongolian steppes post-1990 and the bloody collapse of Sahelian transhumance as empirical evidence that traditional, nested governance cannot adapt quickly enough to exponential demographic growth, climate change, and market-driven incentives. In this view, avoiding the naturalistic fallacy means accepting that traditional commons relied on brutal mechanisms of exclusion—starvation, forced out-migration, and the subjugation of women and minorities—to maintain ecological balance. Without these mechanisms, critics argue, strong state intervention or privatization is the only way to force the load-shedding of excess livestock[20].

10-Line Summary of Robust Findings

#	Finding
1	Pastoral commons are not unmanaged open-access free-for-alls; they require meticulous, often rigid rules for survival.
2	Mobility is the absolute primary mechanism for mitigating risk in highly variable arid and alpine ecosystems.
3	Privatizing moving resources via fencing and subdivision routinely destroys social wealth and accelerates ecological degradation.
4	Successful long-term commons enforce strict proportional equivalence, explicitly linking resource extraction to physical labor or private winter capacity.
5	State intervention frequently undermines traditional commons by imposing rigid spatial boundaries and illegible, easily corrupted bureaucratic structures.
6	The *siida* and *khot ail* demonstrate that small, flexible bands of 3 to 13 households are the optimal scale for day-to-day labor and herd management.
7	Scale jumping—such as the Spanish Mesta—only works through massive state coercion and invariably devastates local agricultural communities.
8	The most common vector for dark-triad capture is the monopolization of a narrow bottleneck resource, such as deep wells or

	winter shelters, by local elites.
9	Extreme hierarchy and exclusion of certain demographics are historically common features of successful, long-lasting commons seeking to maintain carrying capacity.
10	The breakdown of traditional commons usually precedes explosive violence (e.g., Sahel, Kenya) or catastrophic ecological die-offs (e.g., Mongolia).

Contested or Open Questions

- Can traditional pastoral governance structures be scaled to accommodate modern population densities and demographic pressures without reverting to coercive state control or mass starvation?
- How can nested institutions successfully mediate between conflicting epistemologies, such as traditional ecological knowledge (e.g., Borana *Gadaa* weather cycles) and remote-sensing climate data?
- Does the formal legal codification of customary laws (e.g., the Sahelian *Code Pastoral*) inherently destroy the flexibility required for the system to function in non-equilibrium environments?

Sources to Read in Full

1. **Ostrom, Elinor (1990).** *Governing the Commons: The Evolution of Institutions for Collective Action*.
2. **Cole, John W. & Wolf, Eric R. (1974).** *The Hidden Frontier: Ecology and Ethnicity in an Alpine Valley*.
3. **Klein, Julius (1920).** *The Mesta: A Study in Spanish Economic History, 1273-1836*.
4. **Bassi, Marco (2024).** *Gadaa Across Domains: A Long-Term Study of an African Democratic Institution*.
5. **Fernandez-Gimenez, Maria E. (1999).** *Sustaining the Steppes: A Geographical History of Pastoral Land Use in Mongolia*.
6. **Mwangi, Esther (2007).** *Socioeconomic change and land use in Africa: The transformation of property rights in Maasailand*.
7. **Paine, Robert (1994).** *Herds of the Tundra: A Portrait of Saami Reindeer Pastoralism*.
8. **Ingold, Tim (1980).** *Hunters, pastoralists and ranchers*.

Implementability after the Fall

If industrial supply chains and state reach permanently collapse, implementing the minimum viable version of a pastoral commons requires specific structural prerequisites based on historical successes.

- **For a Household (4 to 10 people):** Requires the establishment of private herds but a strict cultural commitment to labor-sharing (replicating the *khot ail* or *siida* model). It needs a shared mental or physical calendar for seasonal rotation and basic numeracy to track herd yields and winter fodder capacity. **The first failure to expect:** A harsh winter (*dzud*) that wipes out the isolated household's entire herd because they lacked a reciprocal, wider-band insurance network to borrow breeding stock for recovery.
- **For a Village (300 people):** Requires the establishment of a *Regola*-style council. It needs a physical, secure meeting place, a written or strictly memorized ledger of rules (*Carte di Regola*), and a binding metric for proportional access (e.g., the Alpine wintering rule limiting summer grazing to winter hay production). **The first failure to expect:** The wealthiest family dominates the council during an economic shock and rewrites the rules to exempt their herds from grazing limits, crushing poorer households.
- **For a District (3,000 people):** Requires a nested assembly structure mirroring the Borana *Gadaa*. It needs high-trust emissaries capable of traveling safely between villages, a shared macro-calendar to coordinate multi-year assemblies (*Gumii Gaayoo*), and absolute consensus on the boundaries of critical bottleneck resources. **The first failure to expect:** A local clan at the geographical center monopolizes a critical deep well, refusing access to peripheral clans during a drought, triggering violent internal resource wars before the general assembly can convene to mediate.

Principles

- **Principle of Proportional Risk:** A governance arrangement will only survive if the rights to exploit the summer commons are mathematically capped by the individual's ability to survive the winter bottleneck.
- **Principle of Ontological Mismatch:** The imposition of static, rigid boundaries on a temporally and spatially volatile resource guarantees ecological degradation and social conflict.
- **Principle of Bottleneck Capture:** Dark-triad capture of a commons does not require controlling the entire territory; it only requires monopolizing the system's narrowest ecological or administrative bottleneck.
- **Principle of Nested Redundancy:** Localized corruption by immediate leaders can only be reversed if commoners possess the structural right to appeal directly to a supreme, macro-scale assembly.
- **Principle of Artificial Scale:** Any pastoral governance system that successfully scales beyond the regional watershed to the national level is functioning as an extractive monopoly backed by state coercion, rather than a true self-governing commons.

Works cited

1. Applying Elinor Ostrom's Design Principles to Guide Co ... - PMC, https://pmc.ncbi.nlm.nih.gov/articles/PMC7879991/

2. The Ostrom principles and Sociocracy - Ted Rau, https://jenrau.medium.com/the-shared-ostrom-principles-and-sociocracy-5ccc226d5799
3. (PDF) How Ostrom's design principles apply to large-scale commons, https://www.researchgate.net/publication/354915438_How_Ostrom's_design_principles_apply_to_large-scale_commons_Cooperation_over_international_river_basins
4. The Sami cooperative herding group: the siida system from past to, https://www.researchgate.net/publication/354290747_The_Sami_cooperative_herding_group_the_siida_system_from_past_to_present
5. The Relative Importance of “Cooperative Context” and Kinship in, https://pmc.ncbi.nlm.nih.gov/articles/PMC8526998/
6. The Sami cooperative herding group: the siida system from past to, https://www.tandfonline.com/doi/full/10.1080/08003831.2021.1972265
7. Sami Reindeer Pastoralism as an Indigenous ... - Researcher.Life, https://artefacts-discovery.researcher.life/full_text/DA-2/bd/bdc6619a16153324a9019a92387d760d/full_text/6418eb98585627031aa3ab1d7ca235e9.pdf
8. Reindeer Herding in Norway - ut laits, https://www.laits.utexas.edu/sami/diehtu/siida/herding/herding-nr.htm
9. (PDF) Sámi reindeer governance in Norway as competing, https://www.researchgate.net/publication/321508060_Sami_reindeer_governance_in_Norway_as_competing_knowledge_systems_a_participatory_study
10. Siida and Traditional Sámi Reindeer Herding Knowledge, https://thenorthernreview.ca/index.php/nr/article/download/9/8/33
11. The Saami cooperative herding group: the siida system from ... - OSF, https://osf.io/download/d6hm5
12. Reindeer pastoralism in Fennoscandia - DiVA portal, https://www.diva-portal.org/smash/get/diva2:1727744/FULLTEXT01.pdf
13. The legal basis of Sami reindeer herding rights in Sweden, https://www.diva-portal.org/smash/get/diva2%3A711715/FULLTEXT01.pdf
14. Rangelands of Central Asia, https://research.fs.usda.gov/download/treesearch/22856.pdf
15. Collective Action in Mongolian Pastoralism | PDF - Scribd, https://www.scribd.com/document/670534235/Re-Imagining-Collective-Action-Institutions-Pastoralism-in-Mongolia
16. Opportunities to integrate herders' indicators into formal rangeland, https://pmc.ncbi.nlm.nih.gov/articles/PMC6851969/
17. Building Resilience of Mongolian Rangelands: A Trans- disciplinary, https://mountainscholar.org/bitstreams/e674b2c6-3956-43e6-a218-423e832909e5/download
18. (PDF) Sustainable governance of the Mongolian grasslands, https://www.researchgate.net/publication/285719754_Sustainable_governance_of_the_Mongolian_grasslands_comparing_ecological_and_social-institutional_changes_in_the_context_of_climate_change_in_Mongolia_and_Inner_Mongolia_China
19. Mongolia: Nomadic Pastoralism in the Mongolian Plateau,

https://satoyamainitiative.org/case_studies/mongolia-nomadic-pastoralism-in-the-mongolian-plateau/
20. ecological resilience of rural mongolian communities, https://mountainscholar.org/bitstreams/a77e2330-0017-40fe-8c36-56008eefde22/download
21. Perceiving the climate crisis: pastoral futures and ecosystem, https://www.frontierspartnerships.org/journals/pastoralism-research-policy-and-practice/articles/10.3389/past.2025.15020/pdf
22. Global Environmental Change, https://cdn.greensoft.mn/uploads/users/1277/files/Greenmongolia/%D0%93%D0%B0%D0%B4%D0%B0%D0%B0%D0%B4/Mongolian_steppe_studies/Article_Gadaad_PDF/FernandezGimenez_dzudvulnerability_GEC_2012.pdf
23. Meaningful Learning for Resilience-Building Among Mongolian, https://www.liverpooluniversitypress.co.uk/doi/pdf/10.3167/np.2012.160205?download=true
24. Pastoral property rights in Central Asia - OpenEdition Journals, https://journals.openedition.org/etudesrurales/11774?lang=en
25. Gadaa Across Domains A Long-Term Study of an African, https://edizionicafoscari.unive.it/media/pdf/books/978-88-6969-885-9/978-88-6969-885-9_DLV8aiz.pdf
26. Pastoralism and Poverty in Borana Oromo | PDF - Scribd, https://www.scribd.com/document/431132613/Boku-Fulltext-Thesis
27. Indigenous Knowledge of Borana Pastoralists in Natural Resource, https://www.researchgate.net/publication/35200253_Indigenous_Knowledge_of_Borana_Pastoralists_in_Natural_Resource_Management_A_Case_Study_From_Southern_Ethiopia
28. An Introduction to the Council Organisation of the Borana Oromo, https://edizionicafoscari.unive.it/media/pdf/books/978-88-6969-885-9/978-88-6969-885-9-ch-03.pdf
29. Gadaa Indigenous Governance System in Light of Modern ... - ELSA, https://etelsa.org/resources/thesis/1b789982-25e8-11ed-9578-0a0027000027/56ad6737-3724-11ed-ada3-0a0027000027.pdf
30. Gadaa Democracy in Ethiopia's Governance | PDF - Scribd, https://www.scribd.com/document/456175730/Oromo-Gadaa-System
31. Pastoralism and Security in West Africa and the Sahel - UNOWAS, https://unowas.unmissions.org/sites/default/files/rapport_pastoralisme_eng-april_2019_-_online.pdf
32. Pastoralism in the Sahel: Contexts, complexities and curatives, https://edepot.wur.nl/707805
33. 1-INDIGENOUS AFFAIRS-2006.indd - IWGIA, https://www.iwgia.org/images/publications/IA_1-2006.pdf
34. Divergent adaptation to climate change in Tahoua, Niger Julie Snorek, https://ddd.uab.cat/pub/tesis/2016/hdl_10803_400717/jusn1de1.pdf
35. Property Rights, Risk, and Livestock Development in Africa - CGSpace, https://cgspace.cgiar.org/bitstreams/672bf90b-05cc-43ce-ab8e-05cf5b02957f/d

ownload
36. Transforming the World: The Science and Theology of Human, https://www.tandfonline.com/doi/full/10.1080/14746700.2025.2526074
37. Malinowski and the Alps – Anthropological and Historical Perspectives, https://iris.unito.it/retrieve/05cddc42-0837-4f0a-8ce6-65f534adf586/Malinowski%20and%20the%20Alps%20BUP%202023.pdf
38. Doing Research in the French Alps. Spaces, Places and Politics, https://pro.unibz.it/library/bupress/publications/fulltext/9788860461988_03.pdf
39. Collective Properties of Trentino: From Traditional Competences to, https://www.mdpi.com/2073-445X/12/1/218
40. Apostles of the Alps: Mountaineering and Nation Building in, https://dokumen.pub/apostles-of-the-alps-mountaineering-and-nation-building-in-germany-and-austria-1860-1939-1nbsped-1469625032-9781469625034.html
41. Social relations in the Kentish Weald : a computer aided historical, https://kar.kent.ac.uk/86119/1/305055.pdf
42. THE MESTA - Diario del Ayuntamiento de Madrid, https://diario.madrid.es/cieacasadecampo/wp-content/uploads/sites/61/2020/10/TheMesta.pdf
43. Mesta - Wikipedia, https://en.wikipedia.org/wiki/Mesta
44. Alfonso X, the Justinian of His Age: Law and Justice in Thirteenth, https://dokumen.pub/alfonso-x-the-justinian-of-his-age-law-and-justice-in-thirteenth-century-castile-9781501735905.html
45. Jews in the Kingdom of Castile from Re-conquest to the Toledo Riots, https://www.researchgate.net/publication/381592446_A_Society_in_Transition_Jews_in_the_Kingdom_of_Castile_from_Re-conquest_to_the_Toledo_Riots
46. Politicized economies monarchy, monopoly, and mercantilism, https://dokumen.pub/politicized-economies-monarchy-monopoly-and-mercantilism-0890967458.html
47. (PDF) Modelling the Impacts of Group Ranch Subdivision on, https://www.researchgate.net/publication/222074339_Modelling_the_Impacts_of_Group_Ranch_Subdivision_on_Households_in_Kajiado_Kenya_Agricultural_Systems_87_331-356
48. Group ranch concept and practice in Kenya with special emphasis, https://www.fao.org/4/X5485E/x5485e0t.htm
49. Wealth-destroying private property rights - Peter Leeson, https://www.peterleeson.com/Wealth-Destroying_Private_Property_Rights.pdf
50. (PDF) Beyond Group Ranch Subdivision: Collective Action for, https://www.researchgate.net/publication/5057201_Beyond_Group_Ranch_Subdivision_Collective_Action_for_Livestock_Mobility_Ecological_Viability_and_Livelihoods
51. Power / Knowledge / Land: Contested Ontologies of Land and Its, https://dokumen.pub/power-knowledge-land-contested-ontologies-of-land-and-its-governance-in-africa-african-perspectives-0472075330-9780472075331-g-1089876.html
52. The Community Land Act and the subdivision of Kenya's,

https://www.frontierspartnerships.org/journals/pastoralism-research-policy-and-practice/articles/10.3389/past.2025.14918/pdf
53. People and Policy in Rangeland Management - IYRP 2026, https://iyrp.info/sites/default/files/2026-05/People-and-Policy-in-Rangeland-Management_EN-document-190526.pdf
54. Land+Treaty+The+Tragedy+of+Individualizing+the+Commons+The, https://www.friendsofmombasa.com/app/download/30564440/Land+Treaty+The+Tragedy+of+Individualizing+the+Commons+The+Outcome+of+Subdividing+the+Maasai+Pastoralist+Group+Ranches+in+Kajado+District%2C+Kenya.pdf
55. Land privatisation and climate change are costing rural Kenyans, https://issafrica.org/iss-today/land-privatisation-and-climate-change-are-costing-rural-kenyans