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NOMADIC

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INTERNATIONAL INSTITUTE FOR THE STUDY OF NOMADIC CIVILIZATIONS
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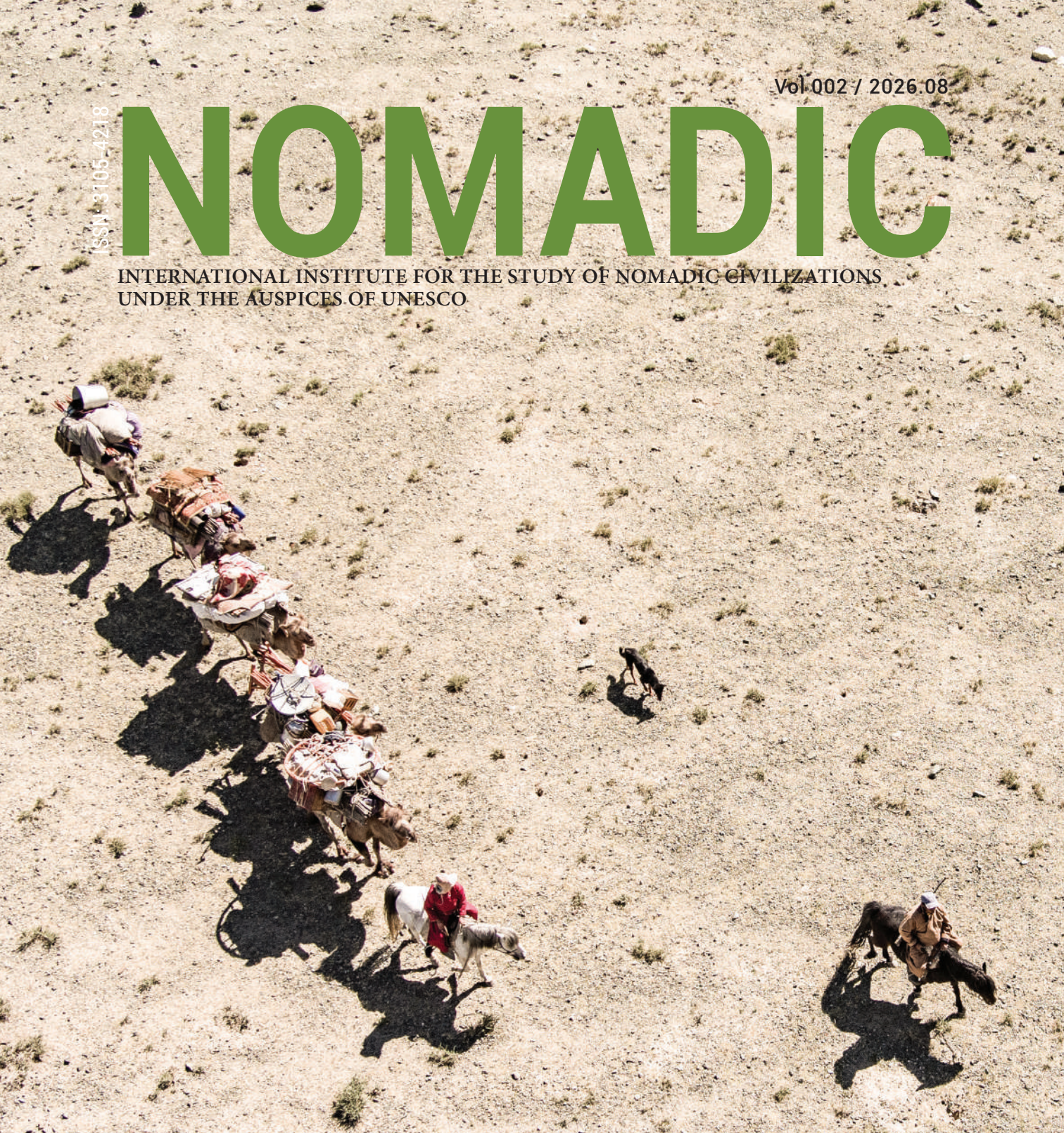

NOMADIC CIVILIZATION:
LESSONS IN HUMAN RESILIENCE IN AN AGE OF CLIMATE CHANGE

NOMADIC

International Institute for the Study of Nomadic Civilizations under the auspices of UNESCO

EDITORIAL

"Nomadic civilization carries traditions, knowledge, livelihoods, and ecological wisdom that reach back through centuries-offering vital answers for our planet's shared future"

As the global community gathers in Ulaanbaatar, Mongolia, from 17 to 28 August 2026 for the 17th Session of the Conference of the Parties (COP17) to the UN Convention to Combat Desertification (UNCCD), this heritage takes on urgent contemporary relevance. Aligned with the UN's International Year of Rangelands and Pastoralists (IYRP 2026)-an initiative spearheaded by Mongolia-this historic gathering focuses on a decisive global mandate: "Restoring Land, Restoring Hope". Rangeland ecosystems cover over half of the world's land area and sustain the livelihoods of more than 500 million pastoralists, yet they remain among the most neglected biomes on Earth. Land degradation and climate extremes directly disrupt food security, water access, and socio-economic stability. Pasture is not merely a natural resource; it is the most critical infrastructure for human survival.

Elevating nomadic wisdom into these high-level global policy debates is precisely why this publication exists. The story of Nomadic magazine itself stretches back to 1998, when the International Institute for the Study of Nomadic Civilizations (IISNC) under the auspices of UNESCO, began publishing it to share nomadic heritage across borders. Our purpose remains unchanged: to explore the living legacy of nomadic culture, present cutting-edge research, and share traditional wisdom with scholars, decision-makers, and global readers alike.

In this 2026 special issue on "Nomads and Rangelands", we bring you into the heart of nomadic territories-from the vast steppes of Mongolia to the pastoral landscapes of Central Asia and Africa. Through real herder field reports, data visualizations, historical lessons, and pioneering technologies from a new generation of nomads, this issue proves how pastoral heritage and modern innovation can reverse desertification and build climate resilience.

We invite researchers, cultural workers, delegates, and readers everywhere to join us in this journey-to honor the endurance of pastoral cultures, safeguard our shared soils, and ensure that the enduring wisdom of nomadic civilization continues to inspire and guide the world.

Editorial team

EXECUTIVE PUBLISHER	Zulbaatar Gangaa
EDITOR-IN-CHIEF	Munkhtamir Damdinsuren
EDITOR	Byambanyam Urtnasan
EDITING/TRANSLATION	IISNC (www.unesco-iisnc.com)
COVER PHOTO	Munkhbaatar Nergui (Videographer)

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ADDRESS International Institute for the Study of Nomadic Civilizations under the auspices of UNESCO

Central Cultural Palace - 7, 8 khoroo, Sukhbaatar district, Ulaanbaatar, 14200 Mongolia

TEL +976-11315102

EMAIL secretariat@unesco-iisnc.com

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Foreword

Munkhtuul Chuluunbaatar Ph.D

Director of the International Institute for the Study of Nomadic Civilizations under the auspices of UNESCO

Today, climate change, desertification, and land degradation stand among the greatest challenges facing humanity. Yet to view these challenges solely as environmental crises is to miss a deeper question: how must we rethink the relationship between human societies and the natural world? From the perspective of socio-cultural anthropology, nomadic civilization is not a way of life built upon conquering or controlling nature. Rather, it is a resilient cultural system shaped over thousands of years through the pursuit of coexistence with the ever-changing rhythms of the natural environment. Nomadic communities did not seek simply to "stop" desertification. Instead, they developed knowledge, practices, and ways of living that enabled them to adapt to environmental variability while maintaining the delicate balance of ecosystems..

The enduring value of nomadic civilisation lies in its mobility, adaptive capacity, and intricate body of knowledge concerning the natural world. Seasonal patterns of pasture use, the careful stewardship of water sources, and the regulation of ecological pressure through the movement of herds have long constituted sophisticated strategies not merely for surviving within the fragile environments of the drylands, but for sustaining life within them. Such practices reflect a particular ecological intelligence-one grounded in movement, observation, restraint, and responsiveness to change. The landscape is not treated as an inert resource to be exhausted, but as a living system whose rhythms must be read, respected, and accommodated. Mobility, in this sense, becomes more than a way of life; it becomes a form of ecological adaptation. At a moment when climate change is accelerating and drought, dzud, water scarcity, and rangeland degradation are intensifying, nomadic knowledge should no longer be regarded simply as an inheritance from the past. It may instead represent an important intellectual and practical resource for the pursuit of sustainable futures. When brought into dialogue with contemporary science, technological innovation, and evidence-based policy, the experience of nomadic civilization can offer humanity another way of imagining its relationship with the natural world-one founded not upon domination, but upon reciprocity, adaptability, and balance.

In 2026, this perspective acquires particular global significance. Mongolia's hosting of the 17th session of the Conference of the Parties to the United Nations Convention to Combat Desertification (UNCCD COP17), alongside the International Year of Rangelands and Pastoralists, offers the international community a timely opportunity to reconsider the deeper value of nomadic civilisation. The nomadic cultural heritage of Mongolia and Central Asia is not simply a history to be preserved as a testament to a vanished past. It is a living reservoir of knowledge-continuously renewed through practice, experience, and intergenerational transmission. In an age of climate uncertainty, this knowledge carries the potential to strengthen humanity's capacity for resilience and adaptation, while opening new pathways toward more sustainable forms of coexistence with the Earth. Under the auspices of UNESCO, the International Institute for the Study of Nomadic Civilisations (IISNC) seeks to study, document, and bring this knowledge into wider global discourse. Its purpose is not merely to safeguard the legacy of nomadic civilization, but to illuminate its continuing relevance: to understand how the wisdom of mobile pastoral societies might contribute to the search for a more resilient, balanced, and sustainable future.

The question, ultimately, is not whether the nomadic past can be preserved unchanged.

It is whether its knowledge can help us imagine what comes next. ■

COVER STORY

NOMADIC PEOPLES AND THE QUEST FOR HUMAN RIGHTS

Dawn Chatty
Professor from Oxford University

© Photo by Dawn Chatty

Nomadic peoples, also understood as mobile pastoral peoples, have sustainably managed the lands they have lived on for centuries. However, throughout the modern era and especially in recent decades, many such peoples have been displaced, dispossessed, and expelled from their traditional territories, forced to settle, and prevented from practising the forms of mobility upon which their livelihoods, their cultural heritage and social systems are based. Their cultural rights and expert knowledge systems of the unsettled and changeable physical environments they have occupied for centuries are ignored by the state and many international agencies. These negative attitudes and restrictions have left many herder societies destitute and have disrupted the cultural foundations of nomadic, mobile peoples' identities. While the explicit aims of settling mobile peoples are no longer stated in the rhetoric of international conservation and development, practical steps toward land restitution and mobility rights have not been forthcoming. Policy has not kept pace with advances in thinking about the relationship between nomadic peoples, the state, and territory. Nor do states and international actors often live up to public declarations of concern for the human rights of mobile peoples. Mobile peoples, even as rights-holders, continue to be marginalised in policy and in practice despite empirical evidence most recently of their resilience in the face of extreme weather / climate change.

This year is the International Year of Rangelands and pastoralists (IYRP) an initiative spearheaded by the government of Mongolia. The juxtaposition of rangelands with pastoralists in this international year, is an important coming together; but it is also divergence which needs to be recognized. Rangelands, and here I include pasture lands, cover over half the world's land area, and sustain the livelihoods and cultures of over five hundred million people. But rangelands are also used by relatively recent ranchers and ranching systems which depend upon private land ownership and fencing of grasslands. In apposition, mobile pastoralists depend upon common land ownership or use rights over pasture that are open and not fenced and the use of which is flexible and negotiated among herders themselves, depending upon weather conditions and changing climates. Recent estimates place some 150 million people as nomadic pastoralists, or mobile herders; this figure is close to the five hundred million mentioned above if herding communities which mix pastoral grazing with some agriculture are included.

Nomads and mobile pastoralists vary greatly in their cultures and social structures, animal husbandry practices, places of habitation, adaptation, and response to climate change. Their association with the traditional, unchanging practices belies, their strengthens and willingness to adapt as required by their total environment. The Maasai of Kenya are a great example of adaptation and change. British colonial assumptions of the unchanging nature of these 'backward and anachronistic' herders such as the Maasai permitted government to allow some to "wander happily and freely" as they had done "since the Flood". But pastoralist culture and society has never been immutable. Pastoralists have always adapted to their environment and adopted tools and techniques that promoted their way of life. Today many Maasai raise the "improved" exotic South African Dorper sheep and use mobile phones to share information about new pastures and to manage buying and selling of livestock over mobile phone apps. In the snows of northern Scandinavia, 10,000 km north, the reindeer-herding Sámi use snowmobiles to corral flocks, a development that the United Nations Human Rights Committee decided had not irreparably damaged traditional reindeer herding. A decade later, the same Human Rights Committee defended the Aymara community's ability to use the Andean wetlands for llama and alpaca herds against the Peruvian government, which had damaged the Andes wetlands (ofedales) by diverting a nearby river

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(Angela Poma Poma v. Peru, 2009).

The frequently negative and traditional definitions of herder societies can be traced back to biblical times and the distinction drawn settled people and those who move in search of pasture for their livestock. Thus Cain, "a tiller of the ground" killed Abel, "a keeper of sheep." In 1377 the North African philosopher Ibn Khaldun differentiated between desert-dwelling pastoral herders, and sedentary city-state dwellers. These categories of hard to control mobile nomads and sedentary agriculturalists persist to this day. The category of rancher and rangelands that is owned, registered, and accessible to state authority, falls into the domain of the settled rather than the mobile. Hence the modern states efforts to force nomads, to settle and change their cultural practices to be more in line with settled ranchers, with private land property fenced and accessible only to the landowners.

Contemporary scholarship has become more careful about the use of these terms. First, the word "nomad" has come to mean a lack of a fixed abode, and a sense of unplanned wandering obscuring its original sense of ancestral land claims to expanses of pasture for herds. Second, it is now clear that many pastoral societies keep permanent homes at least seasonally and move their herds from pasture to pasture while practicing some agriculture . Thus, the nomad-sedentary binary is analytically redundant. Some scholars now prefer a more inclusive definition of pastoralists as "peoples who raise herds of domesticated animals and rely on natural graze." I might add natural graze that is not fenced off. Others opt for greater breadth using terms as "stock owners, hired herders and livestock traders, as well as agro-pastoralists." Or, even more broadly, a definition of pastoralists is sometimes used as a people among whom the majority are involved in the movement of herds.

It is undeniable that mobile pastoral societies are under threat in the modern world. This derives largely from contemporary conservation and extractive industries such as petroleum mining. Conservationists, for example, elaborate a discourse which seeks to protect nature reserves, imagined untamed wildernesses from human intervention. Pastoralists are accused of being agents of destruction, degrading rangelands and regions of graze and browse. By directly labelling pastoralists as destroyers of their environment without any empirical evidence, governments are able to pursue policies of containing mobile populations, pushing them to corners of their original pasturelands, or forcing them to settle, enclose their animals in pens and fencing off areas of graze.

Nomads and mobile pastoralists vary greatly in their cultures and social structures, animal husbandry practices, places of habitation, adaptation, and response to climate change. Their association with the 'traditional, unchanging practices belies, their strengthens and willingness to adapt as required by their total environment.

These conservationist assumptions, among others, are undermined by research which shows that pastoralism and pastoral society have developed alongside rangelands for millennia. Animals were seemingly domesticated after plants: since emerging as a specialised offshoot from the Neolithic farming revolution, pastoralism has evolved as a successful adaptation to rangeland environments worldwide. Without the pastora-
lists and their flocks, rangelands would change. Between 1974-78, for example, Pokot pastoralists were prohibited by the State from entering their traditional grazing areas in the Simbol pastureland in Kenya,. As a result, Acacia species, formerly vigorously consumed by the Pokot's goats, overgrew the landscape and thousands of hec- tares were lost as a grassland resource. Therefore, as pastoralists signatories of the 2022 Dana +20 Manifesto have asserted, mobile pastoralists nurture their ecosystems: "rangelands are important reserves of biodiversity … our ways of life play a vital role in sustaining and managing … [the] ecosystems that we cherish". It can be stated undeniably that nomadic, pastoral societies around the world not only adapt successfully to often extreme environments but are now also proving themselves to be resilience to climate change. We have much to learn from them. ■

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Inside Story

A Story of Resilience That May Yet End in Tragedy

Words by Byambatsetseg Lkhagvasuren

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When we hear the words climate change, we tend to picture the familiar headlines: global temperatures rising, deserts expanding, the Arctic ice melting, rivers drying up. Climate change can seem distant-something unfolding far beyond the routines of our everyday lives.

But it is not distant.

It began yesterday. It is unfolding today. And tomorrow, its consequences may become even harder to ignore.

"Something is happening to this world…"

Those words, spoken by a herder in Sükhbaatar Province after the devastating 2024 zhud still linger in the mind. They were more than a passing observation. They reflected the unease of people who have lived in close relationship with nature for generations-people who notice every subtle shift in the landscape, every change in the rhythm of the seasons.

Researchers increasingly emphasize that the effects of climate change on people's lives and livelihoods cannot be fully understood through meteorological records and statistics alone. To understand what climate change actually means on the ground, scientific data must be considered alongside the observations, experiences and perceptions of local communities.

Over the past two years, we conducted in-depth qualitative interviews with more than ten herders across seven provinces, focusing on their lived experiences of climate change, its socio-ecological consequences, and the adaptive strategies they employ in response to increasing environmental uncertainty.

Rather than introducing the concept of "climate change" directly, we employed an open-ended, phenomenological approach, asking participants to reflect on their personal environmental memory through the following guiding questions:

"What were summer, autumn, winter and spring like when you were young?"

"What has changed in the present day?"

The responses revealed that environmental transformation is not an abstract or distant phenomenon, but is instead deeply embedded in the everyday practices, seasonal rhythms, and livelihood structures of pastoral life.

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The Four Seasons in a Changing Climate

SUMMER: For many herders, summer now arrives later than it once did, indicating a measurable shift in seasonal onset and a shortening of the effective growing period. Phenological observations suggest that plant species which previously emerged reliably during their childhood are either declining in frequency or no longer appearing with the same abundance, pointing to broader changes in vegetation dynamics and pasture ecology.

Consequently, pasture productivity has diminished. Reduced biomass availability has led to insufficient weight gain in livestock, thereby lowering overall productivity and directly affecting household income and livelihood stability within pastoral systems.

Concurrently, herders report an increase in the frequency and intensity of precipitation events. Rather than being gradually absorbed into the soil, rainfall increasingly occurs in short, high-intensity bursts that exceed infiltration capacity, resulting in surface runoff and localized flash flooding. In particular, herders in eastern Mongolia have observed a growing incidence of such flood events following abrupt, short-duration storms, suggesting a shift not only in precipitation volume but also in its temporal distribution and hydrological impact.

AUTUMN: The once-gentle, golden autumn-traditionally a season of stable weather and crucial preparation for the approaching winter-is becoming increasingly erratic and less reliable in its seasonal patterns. Precipitation in the form of rain and early snow is now more frequently disrupting haymaking activities, thereby complicating the timely harvesting, drying, and storage of fodder essential for sustaining livestock through the long winter months.

WINTER: zhud, has always been part of Mongolia's ecological reality. But herders say that its frequency, intensity and geographical reach are changing.

One particularly destructive form is ice zhud, locally known as tömör zhud or shilen zhud. It occurs when temperatures rise suddenly, melting snow, followed by a sharp freeze that creates a thick layer of ice over the ground and snow.

Livestock can no longer reach the grass beneath the ice. Their legs and hooves may also be injured as they struggle to break through the frozen surface. Herders are then forced to rely almost entirely on stored hay and fodder.

As one herder put it: "zhud happened when we were children too. But it never exhausted us like this."

SPRING: In the past, the first green shoots would emerge around the beginning of April, around the time of Khansh Neekh (a time traditionally regarded by Mongolians as auspicious for beginning earthwork and undertaking charitable deeds), giving weakened livestock an important source of nourishment after the harsh winter. Now, that first green growth often arrives later. For herders, this is not merely a change in the landscape. It can determine whether newborn animals survive the difficult spring and whether young livestock are able to gain enough strength.

Interestingly, many of these observations correspond, at least in part, with long-term meteorological records, statistical indicators and climate assessments. According to the national assessment of pasture conditions conducted in 2020, the composition of dominant plant species had changed from baseline conditions across approximately 70 percent of Mongolia's pastureland. Livestock and climate projections also indicate growing pressure on livestock productivity. Based on data from seven meteorological stations, the winter weight loss of sheep, which ranged from 0.31 to 3.25 kilograms in 2020, is projected to increase to losses of approximately 0.34-5.18 kilograms across different regions by 2080. Rainfall patterns are changing as well. Of the days with the highest recorded daily precipitation since 1950, 54 percent occurred after 2000, while future projections suggest that such extreme precipitation events could increase nationally by around 19 percent. The growing frequency of zhud and other natural hazards is reflected in another striking figure: the total number of recorded disasters increased from 29 during 1989-1998, to 53 during 1999-2008, and to 80 during the following decade.

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Four Lands, Four Tales

When the herders' observations are viewed through the lens of the four seasons, a broadly similar picture emerges. Yet when their accounts are examined province by province, a more nuanced reality comes into view: climate change is not experienced in the same way everywhere.

Among herders in Sükhbaatar Province, drought, dust storms and desertification featured prominently in their accounts. More than anything, however, they spoke of the shrinking availability of usable pastureland.

In Mongolia's eastern provinces, where open water sources are relatively scarce, herders often have little choice but to concentrate their livestock around wells and designated water points. This growing concentration places increasing pressure on the surrounding pasture, accelerating degradation and further narrowing the land available for grazing.

Male herder, Sükhbaatar Province:
"The seasons no longer seem to arrive in their proper time. Plants emerge later than they once did, and the rains no longer come when they are expected. The land dries out, the grass comes late, and livestock struggle to gain the fat and strength they once did. As their condition declines, so too does the livelihood of the herder."

82-year-old male herder, Sükhbaatar Province:
"Rain and precipitation no longer come in their appointed season; they arrive late, and from this, drought begins. Then, when the grass has already grown sparse, even a light snowfall can turn the land toward zhud. This is how things have come to be. Perhaps it is connected to global warming, to the changing climate and the weather."

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In Zavkhan Province, the herders' accounts turned more often toward winter and snow. Yet what was particularly striking in their descriptions of summer was the unexpected pairing of two seemingly contradictory words: drought and flood. Their observation that "there is more rain, yet it does not sink into the soil" points to a change more complex than rainfall alone. It suggests that it is not simply the amount of precipitation that is shifting, but also its timing, intensity, frequency and form, alongside possible changes in the structure and moisture-holding capacity of the soil. In this sense, the paradox of drought amid heavy rain captures something fundamental about a changing climate: more water does not necessarily mean more moisture, and a landscape can be flooded by rain while remaining thirsty beneath the surface.

Male herder, Zavkhan Province:
"The cold and warmth of the four seasons no longer seem to belong to their proper times. It can turn cold, then warm again, rain, and snow-all within the span of a single day. In the past, snow would fall softly and steadily, almost as if drifting down. Now it comes suddenly and heavily, piling up all at once."

In Töv Province, the conversations centered on a different kind of change: the shifting natural calendar. Herders spoke of changes in the timing of calving, the emergence of yargui-one of the first flowers of spring-the shearing of goats, and the arrival of migratory birds. These events, once woven into a familiar seasonal rhythm, no longer occur quite when they once did. Such observations seem to reveal more than changes in the natural environment. They point to a deeper disruption in the seasonal order of pastoral life-a rhythm shaped over generations through careful observation, accumulated experience, and an intimate understanding of the land. For herders, the natural calendar has never been merely a measure of time. It has been a guide for knowing when to move, when livestock will give birth, when the first pasture will emerge, and when the land is ready to sustain another season of life. As that calendar shifts, so too does the rhythm of life built around it.

Female herder, Töv Province:
"When summer fails to arrive properly, we are able to milk our cows for barely a month. We can no longer produce the dairy products we once relied on throughout the summer. Then, to carry livestock through the winter when they have failed to gain sufficient weight, we are forced to purchase large amounts of additional hay and fodder."

Herders in Khövsgöl Province spoke more frequently of the seasons losing their distinct boundaries. "Summer has become like autumn or spring," they observed. "Our four seasons are no longer clearly distinguishable." Alongside this blurring of seasonal rhythms, they described a range of changes in the natural environment: wild berries failing to ripen fully, diminished growth of grasses and other vegetation, and declining hay yields. What was once a familiar succession of seasons now appears increasingly uncertain, with the ecological cues that have long guided pastoral life becoming less distinct.

Male herder, Khuvsgul Province:
"Even when the winter becomes severe, there is nowhere left to go for otor (Otor is a traditional pastoral practice in which livestock are temporarily moved to another grazing area to maintain their condition and reduce the risks associated with wintering and spring camps.). If we move toward Ider, the herder families there will object; if we head toward Telmen, the same happens; and if we go north toward Nömrög, the herder families there will object as well."

Male herder, Khovd Province:
"Drought and zhud would come, but at most they would last for a year or two. By the third year, the land would be replenished, the grass would return across the plains, and the herds would recover with ease. It is no longer like that. This land has been gripped by drought for twenty consecutive years."

A "Closed Circle" with No Clear Way Out

As drought and zhud become more frequent and severe, the depletion of natural resources including pasture, hay, rivers, streams and water points-is weakening herders' capacity to withstand environmental shocks and deepening their economic vulnerability. For herder households, this vulnerability is particularly acute because livestock remain overwhelmingly central to household income. Between 90.0 and 96.4 percent of herder's household income is derived from livestock production alone. Consequently, livestock losses are not simply a decline in herd numbers; they can translate directly into the loss of household income, security and livelihood. The scale of these pressures is reflected in a 2018 study by the National Institute for Labour and Social Protection. Among the herders surveyed, 95.8 percent identified drought, 90.3 percent zhud, 90.4 percent pasture degradation, and 80.9 percent the drying of rivers and streams and increasing water scarcity as major challenges to pastoral livelihoods. .

In other words, a "closed circle" with seemingly no way out is taking shape in the lives of herder households. As income declines, so does their ability to purchase hay and fodder. Inadequate preparations for winter then heighten their vulnerability, increasing the likelihood of livestock losses. Those losses, in turn, erode household income in the years that follow, placing further strain on livelihoods and drawing families back into the same cycle. The ability to withstand this cycle varies from household to household, shaped by herd size and composition, accumulated pastoral knowledge and practices, and geographical location. Yet households with fewer livestock and lower incomes are increasingly exposed to its most severe consequences. The effects of this cycle extend far beyond the household itself. Between 1995 and 2013, approximately 414,400 people moved to Ulaanbaatar, and around 29 percent of this migration has been attributed to

BETWEEN 1995 AND 2013, APPROXIMATELY 414,400 PEOPLE MOVED TO ULAANBAATAR, AND AROUND 29 PERCENT OF THIS MIGRATION HAS BEEN ATTRIBUTED TO ZHUD .

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zhud. Researchers have pointed to these figures as evidence of the role that drought and zhud can play in driving rural poverty and migration toward the capital. At the same time, many herders spoke with concern about the declining number of young people entering pastoralism. As younger generations increasingly question whether herding can provide a reliable and sustainable livelihood, fewer are choosing to remain in the countryside and inherit the pastoral way of life.

Climate change, then, is no longer simply an environmental concern. It has become an interconnected ecological, social, economic and cultural risk, reaching from the productivity of pasture and the condition of livestock to household income and livelihoods, migration, and, ultimately, the continuity of nomadic traditions, culture and the long-term sustainability of rural life. Herders are not passive in the face of environmental and climatic change. For centuries, they have learned to live in rhythm with the natural world, accumulating, refining and passing down knowledge of how to anticipate uncertainty, withstand hardship and adapt to changing

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conditions. This knowledge has become deeply embedded in the fabric of everyday pastoral life. To this day, herders continue to draw on traditional forms of adaptation: moving between pastures according to the characteristics of the four seasons; undertaking otor, or temporary movements to distant grazing areas; preparing hay and fodder; and adjusting herd composition and livestock numbers to the carrying capacity and condition of the land.

Yet the nature of the challenge is changing. As climate change increases the frequency, intensity and geographical reach of extreme events, multiple pressures are beginning to converge at once-pasture degradation, water scarcity, and declining supplies of hay and fodder among them. As grazing land and water sources become increasingly limited, many herders are left with little choice but to concentrate their livestock within smaller and smaller areas. The consequences are cyclical. Greater concentrations of livestock place additional pressure on already

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fragile pastures, accelerating degradation and further reducing the land's capacity to sustain herds. In this increasingly complex landscape of interconnected risks, traditional knowledge and adaptation practices remain indispensable- but they can no longer carry the burden alone. The resilience of pastoral communities will increasingly depend on connecting household-level responses with supportive policies, locally grounded planning and effective institutional frameworks.

Looking ahead, local adaptation plans must be shaped through the meaningful participation of herders, communities and other stakeholders. Above all, the voices of those who witness change first and experience its consequences most directly must be placed at the heart of planning. Their knowledge, observations and everyday experiences should not be treated merely as sources of information, but as essential components of the process-helping to identify risks, establish priorities, shape responses and guide implementation. Because those who live closest to the land are often the first to recognize when its rhythms begin to change. For generations, Mongolian herders have written a story of resilience-of adapting, enduring and finding a way forward in the face of uncertainty. But resilience, too, has its limits. And unless we learn to listen, this remarkable story of resilience may yet have a tragic ending. ■

PHOTO ESSAY

THROUGH Shifting Hues

Dawaanyam Delgerjargal

Perhaps it is because I grew up in a ger district. Or perhaps it is because, as a documentary photographer, I have spent years witnessing the realities of people living at the intersection of environmental and social change. Whatever the reason, drought, dzud, desertification, and climate change have always resonate deeply with me. These photographs gathered here span nearly two decades, between 2008 and 2026 during my journeys across Mongolia's rural landscapes. For instance, while traveling through Tsengel soum in Bayan-Ölgii province in 2022, locals shared how the previous year's lack of rain had left the land parched, with dust storms sweeping through and no pasture left for their livestock. Shortly after, we found ourselves engulfed in that very dust storm.

While taking these photos, I have witnessed firsthand how climate change and global warming are impacting Mongolia's landscapes and the lives that depend upon them. The stories of herders, who have inhabited these lands for generations, further validated the devastating effects of desertification. It also struck me just how profoundly human life remains inseparable from the natural world.

Documentary photography is, in many ways, a record of its time. Years later, these events and social conditions will become history, and photographs may be the only medium left through which to see, feel, and remember them. Therefore, through my lens, I aim to preserve the current environmental realities and the lived experiences of the people enduring them. There is also a distance between Mongolia's cities and its countryside. For many urban residents, the realities of rural life-the struggle for water, pasture, fodder, and survival through increasingly unpredictable seasons-remain largely unseen.

As a documentary photographer, I see it as my responsibility to bridge that distance. Through my photographs, I seek to bring what is often overlooked into view, allowing these landscapes and the people who inhabit them to speak for themselves.

Davaanyam Delgerjargal began his photographic journey in 2004 working with black-and-white film. Over the past two decades, he has held six solo exhibitions, published two independent monographs, and contributed to numerous joint exhibitions and collaborative publications.

Currently, he serves as the Director of the "Ts. Batzorig Foundation" for documentary photography and is the founder of "Noise Art Media". Alongside his photographic practice, he works as a photography lecturer at the School of Film, Television, and Media Arts at the Mongolian State University of Arts and Culture.

In 2017, his photobook "Endless Beginning" received the Best Photographer of Asia award at the Photo City Sagamihara competition in Japan.

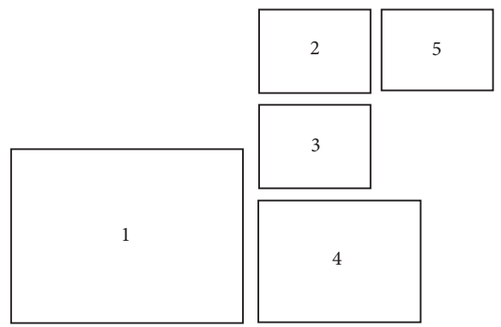
1. Grazing Land Without Grass
Nalaikh District, Ulaanbaatar, 2017.

2. One Last Look at a Lifetime of Labour
Naranbulag Soum, Uvs Province, 2016.

3. Through the Blinding Storm
Tsengel Soum, Bayan-Ölgii Province, 2022.

4. The Flood Leaves Its Mark.
Bayanjargalan Soum, Dundgovi Province, 2014.

5. All That Is Longed for Is Water
Khuld Soum, Dundgovi Province, 2010.



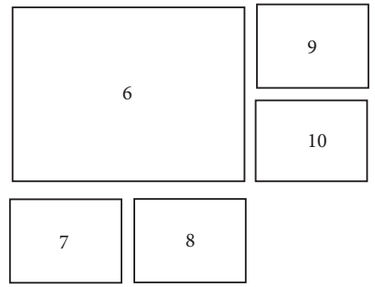
6. Journey into the Far Unknown
Khongor Sand Dunes, Ömnögovi Province, 2023.

7. The Last Traces of Wild Horses
Bayan-Ovoo Soum, Ömnögovi Province, 2014.

8. Wherever the Eye Turns, There Is Sand
Khongor Sand Dunes, Ömnögovi Province, 2023.

9. Engulfed by the Sudden Storm
Mandakh Soum, Dornogovi Province, 2008.

10. They Heard the News
Khovd Province, 2012.



11. The Few Remaining Livestock Bring Solace in Hard Times
Yaruu Soum, Zavkhan Province, 2010.

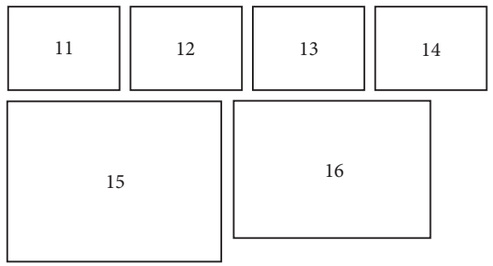
12. Grandma, Let Me Help
Telmen Soum, Zavkhan Province, 2010.

13. A Sudden Rain, a Rising Flood
Sant Soum, Selenge Province, 2025.

14. The Fodder Has Arrived
Uvs Province, 2016.

15. In Harsh Times, Everyone Must Work
Naranbulag Soum, Uvs Province, 2016.

16. A Distant Figure on the Horizon
Gurvantes Soum, Ömnögovi Province, 2014.



Ariell Ahearn
Department lecturer in Human Geography, Oxford University

Mobile Pastoralism in a Changing Climate

Climate change is a global phenomenon caused primarily by the burning of fossil fuels such as coal, oil, and gas. The excess carbon in the atmosphere has driven global warming and atmospheric changes, resulting in impacts such as floods, fires, droughts, melting glaciers, and permafrost and polar ice loss. While industrial agriculture and feedlot farming approaches make use of fossil fuels in their production, which require the manufacture of fertilizers and pesticides and depend on fodder monocrops such as corn or alfalfa produced elsewhere to be processed and transported, mobile pastoralism presents a highly sustainable form of livestock production, which makes minimal use of fossil fuels and contributes to maintaining grassland ecosystem biodiversity. Scholars have highlighted that mobile pastoralists are experts in managing the variable environments that they live in through their sophisticated mobile grazing techniques, breeding and herd selection, and working with the intuition of herd animals themselves who are not constrained by fences and can direct their own mobility in some cases, such as for horse, camel and yak herds. Mobile pastoralist cultures are diverse, but practice belief systems that embody an environmental ethics that respect the agency and spiritual significance of both livestock and natural elements. Indeed, scholars have argued that mobile pastoralism is specifically adapted to the highly variable, non-equilibrium dryland environments of the globe.

Climate change affects pastoralist environments in significant ways. In Mongolia, for example, climate change has caused an increase in average temperatures of over 2 degrees Celsius, melting permafrost and glaciers, and reducing soil moisture. These changes, in turn, have impacted atmospheric processes, including shifts from stratiform to convective rainfall patterns. Increasing temperatures, decreasing soil moisture, melting permafrost, and increased convective rainfall can have significant impacts on vegetation and soil erosion.

A herder from Bayanbulag soum, Bayankhongor province, for example, explained his observations of shifts in climate during an interview in July 2023:

> "Natural changes are abundant, and it's quite evident. This implies that the elements characteristic of one season are lost, and what thrived in spring might not persist into summer. When the sun is mild, it rains, prompting the blossoming of vegetation and berries. However, a sudden drop in temperature, almost threatening livestock, followed by prolonged cold storms, can dry up the moisture. Instead of being cold in winter, it's becoming warm and so on. In autumn, rural herdsmen start preparing food for the winter in November. Animals are slaughtered, and preparations for the winter commence. After this time of the year, the animals lose weight, and the fat diminishes. Subsequently, the milk freezes, and all the necessary arrangements are made. Surprisingly, [now] it's not cold while carrying out these tasks. Even though November is traditionally cold, now the meat doesn't freeze after slaughtering the animals, the milk remains unfrozen, and various other changes are observed… The distinctive features of the four seasons are essentially disappearing. Various phenomena typical of spring occur in summer or during milder winters. There is an abundance of wind, intense rain, and a copious amount of water pouring down. This is not rain that is good for the earth. It's like pouring water right away. Vegetation should grow only when it rains and seeps down to 10 cm. There is no such thing; the water is spilling and flowing straight away. In general, unfavorable events are occuring now. It could be the beginning of the harsh time, but I don't know for sure. There are predictions that things may worsen from this point."

This herder has direct observations of the rising temperature as well as the increase in convective rainfall. He indicates that the familiar signs of seasonal change, such as meat and milk freezing for sustained periods, does not occur as usual, and convective rains bring intense downpours rather than the gentler rains which allow moisture to be absorbed into the soil to support pasture regeneration. Thus, atmospheric changes caused by climate change directly affect pastoralists due to the impacts on pasture and water sources for livestock, as well as increasing challenges posed by weather variability and associated climate hazards and risks. These changes increase the workload, stress, and expenses for herders who may need to move more frequently in order to access alternative grazing lands; and, as mobility is also a social phenomena, increased mobility may require herders to negotiate with local herders and authorities in new locations to ensure continued and flexible access to new areas.

However, it is important to consider climate change impacts within a wider socio-political context. The International Year of Rangelands and Pastoralists working group on Pastoralism and Climate Change policy brief, published in October 2025, makes the point that "Pastoralist livelihoods have long been constrained by policies and investments rooted in outdated assumptions of inefficiency, fragility and ecological harm. From colonial land governance to neoliberal development planning, these narratives have justified interventions that fragment rangelands, restrict mobility and undermine collective institutions-concentrating power and resources elsewhere." Government policies that fragment grasslands through enclosures or land privatization policies, or dispossess herders of their traditional lands, water sources and mobility routes due to large-scale extractive developments on their traditional territories, such as mining, commercial agriculture, or renewable energy compounds climate risks as they are subject to pollution or reduction in the land available practice mobility. Likewise, contemporary climate policies and projects may fail to recognise, respect and protect the customary mobile land use practices and norms that enable long-term sustainability of these important socio-cultural and economic systems. As the IYRP policy brief on pastoralism and climate change states, "states, corporations and multilateral institutions are reimagining rangelands as spaces for their own mitigation and adaptation goals-from renewable energy megaprojects and carbon-offset schemes to mineral extraction and infrastructure corridors. Most of these initiatives overlook pastoral land use, mobility and collective governance systems, driving new waves of dispossession and territorial fragmentation while fuelling land speculation." In this way, without the careful inclusion of pastoralists in policy-making, climate policies may present greater challenges to pastoralists than climate change impacts themselves.■

WHAT IS COP17

WHEN THE LAND SPEAKS

"For thousands of years, nomads have lived in harmony with nature. Join us in exploring what their knowledge can teach us today." Long before treaties and borders, Mongolia's nomadic herders learned to read the land through its rivers, grasslands, seasons, and storms. Today, that knowledge meets a global crisis. Degraded land, drought, and disappearing ecosystems threaten 100 food, water, livelihoods, and cultures worldwide. Born from the Sahel droughts of the 1970s-80s, the global response led to the creation of the UNCCD in 1994.
Now, in August 2026, COP17 brings that mission to Ulaanbaatar under the theme "Restoring Land. Restoring Hope." For Mongolia, it is a chance to place centuries of nomadic knowledge at the heart of the world's conversation on land and resilience.

GLOBAL RESPONSE - WHAT IS COP17?

Land degradation, desertification, and drought are global challenges that threaten food, water, livelihoods, and ecosystems. No country can address them alone.

In response, the international community established the United Nations Convention to Combat Desertification (UNCCD) in 1994-the world's only legally binding international agreement dedicated to desertification, land degradation, and drought.

Every two years, the Conference of the Parties (COP) brings together governments, scientists, Indigenous Peoples, pastoralists, businesses, youth, and civil society to assess progress, strengthen cooperation, mobilise resources, and turn commitments into action.

In 2026, the seventeenth COP comes to Ulaanbaatar, Mongolia, under the theme "Restoring Land. Restoring Hope."

WHY MONGOLIA?

Few countries understand the relationship between people and land as deeply as Mongolia.

Stretching across one of the world's largest continuous grassland ecosystems, the country depends on healthy rangelands for its economy, biodiversity, and cultural identity. Nearly three-quarters of Mongolia is covered by grazing land, where pastoral families have managed livestock through seasonal movement for centuries.

Their way of life reflects an important principle: when one pasture begins to recover, another is used instead. Rather than exhausting the land, mobility allows ecosystems time to regenerate naturally. This balance between people, livestock, and nature has long been one of the foundations of nomadic pastoralism.

Today, however, Mongolia also experiences many of the same pressures affecting drylands around the world. Rising temperatures, more frequent droughts, desertification, and extreme weather events are placing increasing strain on both ecosystems and rural livelihoods. These challenges make Mongolia not only a host nation but also a living example of why land restoration matters.

The timing is equally significant. COP17 takes place during the United Nations International Year of Rangelands and Pastoralists 2026, drawing global attention to the importance of grasslands and the communities that have managed them for generations.

THREE DECADES. SIXTEEN COPS. ONE MISSION.

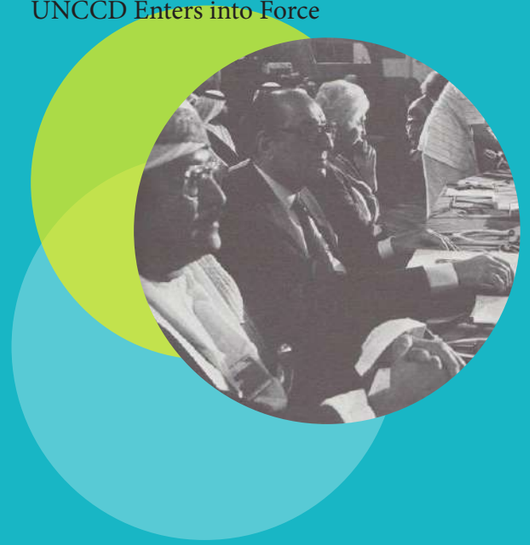
The journey from recognizing desertification as a local environmental issue to treating land restoration as a global priority has taken nearly fifty years. Each milestone has shaped today's efforts to protect ecosystems, strengthen resilience, and secure sustainable livelihoods.

1977
Nairobi, Kenya
(UN Conference on Desertification)

1992
Rio de Janeiro, Brazil (Earth Summit)
In December 1992, the General Assembly agreed and adopted resolution 47/188 on this matter, and the UNCCD was established in 1994.

1994
UNCCD Formally Adopted

1996
UNCCD Enters into Force



Phase I • 1997-2005: Building the Foundation

COP1 (1997 | Rome, Italy): Established institutional architecture and global framework. 197 countries and the European Union are now Parties to the Convention. The Conference of the Parties (COP), which is the Convention's supreme governing body, held its first session in October 1997 in Rome, Italy.

COP2 (1998 | Dakar, Senegal): Strengthened regional partnerships in affected dryland nations.

COP3 (1999 | Recife, Brazil): Advanced National Action Programmes (NAPs).

COP4 (2000 | Bonn, Germany): Expanded scientific and technical cooperation.

COP5 (2001 | Geneva, Switzerland): Linked land degradation directly to poverty alleviation.

COP6 (2003 | Havana, Cuba): Focused on regional implementation mechanisms.
COP7 (2005 | Nairobi, Kenya): Conducted the ten-year review of Convention implementation

Phase II • 2007-2015: From Policy to Measurement

COP8 (2007 | Madrid, Spain): Adopted the 10-Year Strategic Plan and Framework. The 10-year strategic plan and framework to enhance the implementation of the Convention for 2008-2018 outlined a clear vision to forge global partnerships to reverse and prevent desertification and land degradation. The strategic plan provided a worldwide framework to support the development and implementation of national and regional policies that contribute to the reduction of poverty.

COP9 (2009 | Buenos Aires, Argentina): Established standardized performance indicators.

COP10 (2011 | Changwon, South Korea): Launched the Changwon Initiative to mobilize private and public investment.

COP11 (2013 | Windhoek, Namibia): Pioneered the concept of Land Degradation Neutrality (LDN).

COP12 (2015 | Ankara, Türkiye): Aligned UNCCD goals with SDG Target 15.3 (achieving a land degradation-neutral world by 2030).

Phase III • 2017-2026: Restoring Land, Building Resilience

COP13 (2017 | Ordos, China): Placed Land Degradation Neutrality at the center of global environmental finance.
In 2017, at its 13th session, the Conference of the Parties (COP) adopted the UNCCD 2018–2030 Strategic Framework and encouraged Parties to apply it in their national policies, programmes, plans and processes relating to desertification/land degradation and drought. The Strategic Framework has three main components: a vision, strategic objectives and an implementation framework.

COP14 (2019 | New Delhi, India): Focused on global drought preparedness and community land rights.

COP15 (2022 | Abidjan, Côte d'Ivoire): Launched the Abidjan Legacy Programme for ecosystem restoration.

COP16 (2024 | Riyadh, Saudi Arabia): Scaled up international drought finance, technology transfer, and innovation.

COP17 (2026 | Ulaanbaatar, Mongolia): Concentrates on translation into practical action under the theme "Restoring Land. Restoring Hope."

A. Javkhlan:

"COP17 IS A HISTORIC OPPORTUNITY FOR MONGOLIA TO SHOWCASE ITS NOMADIC HERITAGE AND TAKE A LEADING ROLE IN COMBATING DESERTIFICATION

Interview by Byambanyam Urtnasan

For the first time, Mongolia will host the 17th Conference of the Parties to the United Nations Convention to Combat Desertification (UNCCD COP17). Bringing together experts and representatives from across sectors and around the world, the conference will address some of the most pressing challenges of our time, including desertification, land degradation, and the future of rangelands. We spoke with Dr. A. Javkhlan, Director General of Policy, Partnership and Resource Mobilization Department, Office of the COP17 National Committee, about the significance of the conference, Mongolia's role as host, and the country's vision for the future of its steppe landscapes.

Interviewer: Mongolia is preparing to host the 17th Conference of the Parties to the United Nations Convention to Combat Desertification. Could you first tell us what COP17 represents?

A.Javkhlan: Before discussing COP17 itself, I think it is useful to briefly explain the United Nations Convention to Combat Desertification, or UNCCD.

The UNCCD is one of the major multilateral environmental agreements within the international environmental framework. Mongolia is a party to 12 international environmental conventions and agreements. Among them, the three Rio Conventions, adopted at the 1992 Earth Summit in Rio de Janeiro, are particularly significant. They were established around the recognition that environmental challenges need to be addressed in close connection with development planning.

The three conventions are:

- the United Nations Framework Convention on Climate Change;
- the Convention on Biological Diversity; and
- the United Nations Convention to Combat Desertification.

These conventions take an interconnected approach to addressing environmental challenges. Together, they address what is increasingly known as the triple planetary crisis: climate change, biodiversity loss, and land degradation and pollution. Their overarching objective is to determine how the international community can work together to address these interconnected challenges.

Mongolia is a member of all three.

The Convention to Combat Desertification initially focused primarily on desertification in Africa, but its scope has since expanded into a broader global framework for combating land degradation.

The Convention on Climate Change holds its Conference of the Parties every year, while the conventions on biological diversity and desertification convene their Conferences of Parties every two years.

At these conferences, member states review the work they have undertaken, set future objectives and action plans, and approve budgets. Every country seeks to ensure that its ambitions and

priorities are clearly reflected in the outcomes, as decisions adopted under Convention provide an important framework for action by all Parties.

The 17th session of the Conference of the Parties being held in Mongolia is considered particularly significant. This is because, as the first of the three Rio Conventions to hold its COP in this sequence, it has the potential to influence which issues are taken up and what kind of momentum and atmosphere are carried into the subsequent conventions. At the same time, the international community remains broadly divided over issues related to desertification and land degradation, particularly between developed and developing countries.

Developing countries generally argue that developed countries should increase financing for efforts to combat land degradation and desertification. Developed countries, meanwhile, emphasize that the efficient use of financial resources is equally important. They also maintain that because this is a global challenge, developing countries themselves should make a certain level of contribution.

There are also proposals to promote voluntary mechanisms rather than establishing legally binding decisions under the Convention that all Parties would be required to implement. In other words, countries remain broadly divided in their positions on how these issues should be addressed.

This issue has remained unresolved through several previous COPs. However, if it is not addressed now, the situation could become increasingly difficult. There is therefore a growing need to resolve, as far as possible, the issues that remained outstanding from previous COPs. Most importantly, we need to establish what objectives and frameworks we will work within through 2030 and, looking further ahead, toward 2040 and 2050. For these reason, we consider this COP to be of major significance not only for Mongolia, but also for the international community.

Interviewer: What were the main factors and driving forces behind Mongolia being granted the right to host this conference?

A.Javkhlan: Being the host country of a COP comes with enormous responsibility, but for us it is also a tremendous opportunity. It is a major opportunity to bring Mongolia's national policies and leadership to the international stage and to showcase our country to the world. This is why countries compete quite actively to host these conferences.

Mongolia secured the right to host the conference in 2022. Initially, we were scheduled to host COP16. However, because COP16 coincided with an election year in Mongolia, we consulted with Saudi Arabia and agreed to exchange the hosting sequence. As a result, COP16 was held in Saudi Arabia, while COP17 was designated to take place in Mongolia

There were several reasons why Mongolia was selected.

First, Mongolia attracts international attention as a democratic country located in East and Central Asia. Second, our country has experienced significant land degradation, making the issues particularly relevant to us. Third, Mongolia's position between two major neighboring powers also gives the country a distinctive geopolitical importance.

If we look more closely at land degradation, 76.9 percent of Mongolia's total territory is affected by some degree of land degradation. Therefore, while addressing this challenge domestically, we also see COP17 as an opportunity to demonstrate leadership at the international level.

Our nomadic pastoral culture is also highly significant. The United Nations has designated 2026 as the "International Year of Rangelands and Pastoralists." In fact, the idea of declaring an international year dedicated to rangelands and pastoralists had been discussed and advocated for many years. For more than a decade, different countries had proposed the idea, but the decision had not been formally adopted until now.

Mongolia took a leading role in advancing this initiative. Our country itself practices nomadic pastoralism, and approximately 80 percent of our territory consists of rangelands. This was one of the reasons Mongolia proposed the initiative. We put forward the proposal to designate 2026 as an international year and ultimately succeeded in having it adopted. Seen from this perspective, Mongolia has demonstrated leadership in environmental protection by bringing greater attention to its nomadic culture and showcasing itself internationally as a country rooted in nomadic pastoralism.

It is on the basis of all these factors that Mongolia was selected to host the 17th Conference of the Parties to the United Nations Convention to Combat Desertification.

Interviewer: Several years ago, Mongolia hosted the ASEM Summit, and this year it is hosting COP17. What are the advantages of hosting major international conferences? What benefits can Mongolia gain from hosting this conference?

A.Javkhlan: Hosting a major international conference is a tremendous opportunity to showcase a country to the world. In addition, it has a direct positive impact on tourism, the service sector, and the economy.

ASEM was a high-level meeting of Asian and European leaders. COP, however, is somewhat different in character. Hosting ASEM gave Mongolia valuable experience in receiving high-level international guests and delegations, which was certainly an advantage. COP, however, is a conference that brings together stakeholders from across society. It is not limited to heads of state and ministers. Pastoralists, Indigenous peoples, local communities, children and young people, gender groups, the private sector, academic and scientific institutions, and many other stakeholders all participate. Its scope is therefore much broader. This gives Mongolia an opportunity to showcase the country to a much wider international audience.

According to preliminary estimates, 6,000-10,000 people are expected to come to Mongolia during COP. When direct expenditures such as accommodation, food, and transportation are taken into account, the conference is estimated to have a direct economic impact of approximately 130-190 billion MNT, with an average estimate of around 150 billion MNT.

Beyond this, COP17 provides Mongolia with a major opportunity to demonstrate leadership at the international level and bring our national policies and initiatives into global discussions. We are also planning to present several declarations related to the International Year of Rangelands and Pastoralists during COP17. These include the International Pastoralists' Declaration, the Young Pastoralists' Declaration, and the Women Pastoralists' Declaration. If the Parties discuss, support, and adopt these documents, they could become part of the COP decisions and provide direction for implementation by member states.

In addition, we are developing the Steppe Action Agenda. COP does not produce only formal decisions. Countries and international organizations can also voluntarily come together to propose initiatives and action plans for implementation. This is referred to as the Action Agenda.

Within the framework of COP17, Mongolia is working to introduce the Steppe Action Agenda. It is an initiative that countries and organizations can voluntarily join and implement alongside the formal decisions. At present, approximately ten initiatives are planned to be included in the COP17 programme, three of which are initiatives proposed by Mongolia.

The first is the Rangeland Flagship Initiative. The main objective of this initiative is to bring the importance of rangeland ecosystems more clearly to the international agenda. Rangelands cover 54 percent of the world's terrestrial area and are directly connected to the livelihoods of approximately two billion people. Yet almost half of the world's rangeland ecosystems are at risk of degradation. At the same time, financing and investment directed toward this sector remain relatively limited. People often pay greater attention to forest ecosystems such as the Amazon rainforest. Yet rangeland ecosystems have enormous potential while still failing to receive sufficient attention at the international level. Through this initiative, we aim to bring rangeland ecosystems to the center of international attention and increase cooperation and investment among countries and international organizations. We are also looking comprehensively at strengthening public-private partnerships, improving institutional capacity, supporting the livelihoods of pastoralists and rangeland users, and protecting their rights. This initiative is being developed jointly by the Government of Mongolia and the Secretariat of the United Nations Convention to Combat Desertification.

The second is the Water -Land Nexus Initiative. Water is critically important in addressing land degradation. Water scarcity and desertification are closely interconnected. In dry and arid regions in particular, we are making extensive use of groundwater. More than 50 percent of Mongolia's drinking water is supplied by groundwater. Therefore, we are paying particular attention

to how groundwater can be used carefully and responsibly and how it can be protected. At the same time, we are considering how to support the natural replenishment and recharge of groundwater and what technologies could be used to achieve this more effectively.

The third is the Nature-based Solutions for Sustainable Infrastructure. The reason we consider this initiative important is that nature-based solutions refer to the appropriate use of the services provided by natural ecosystems. For example, using renewable energy sources such as solar and wind power, as well as carrying out restoration and reforestation appropriately, are all forms of nature-based solutions.

Integrating nature-based solutions properly into development planning can be highly effective. When we think of infrastructure, we generally think first of hard infrastructure such as roads and buildings. But once infrastructure has been constructed, it can require significant costs for operation and maintenance. If we plan appropriately and in harmony with nature, however, we can reduce these costs. This can result not only in economically efficient solutions but also in environmentally sustainable ones.

This can result not only in economically efficient solutions but also in environmentally sustainable ones. Furthermore, we are looking not only at hard infrastructure but also at soft infrastructure, digital infrastructure, and electronic infrastructure as part of this initiative. We are also paying attention to issues such as artificial intelligence and data centers. Technology is developing extremely rapidly, and in this context it is crucial that decision-making be based on science and evidence. We are therefore exploring how artificial intelligence can be used to make development planning more precise and improve decision-making. In other words, this initiative brings together both hard and soft infrastructure. It also integrates restoration, water management, rangelands, and related issues into a comprehensive framework. All of this is what we refer to as the Steppe Action Agenda. We see this plan as one of the most important policy legacies to emerge from COP17.

At present, we are developing it at the conceptual level. These initiatives will be formally presented and announced during COP17. It is still too early to say exactly how many countries and organizations will join. However, more than 100 countries have informally expressed their support for the Rangelands Initiative. International organizations have also indicated their support. A number of countries and organizations have expressed interest in joining the Integrated Water and Land Management Initiative as well. The Sustainable Infrastructure with Nature-Based Solutions Initiative is progressing at a similar level. The final numbers are not yet available. Once these initiatives are formally announced, we can consider their concepts to have received international recognition. Because these are voluntary initiatives, they do not necessarily require formal decisions.

THIS CAN RESULT NOT ONLY IN ECONOMICALLY EFFICIENT SOLUTIONS BUT ALSO IN ENVIRONMENTALLY SUSTAINABLE ONES. FURTHERMORE, WE ARE LOOKING NOT ONLY AT HARD INFRASTRUCTURE BUT ALSO AT SOFT INFRASTRUCTURE, DIGITAL INFRASTRUCTURE, AND ELECTRONIC INFRASTRUCTURE AS PART OF THIS INITIATIVE.

Interviewer: To what extent can the Steppe Action Agenda be interpreted as an implementation framework for the three initiatives you have just outlined?

A.Javkhlan: Generally speaking, yes. However, it is not limited to these three initiatives alone. It is intended to become a policy legacy and strategic document emerging from COP17. Countries other than Mongolia may also put forward their own initiatives, and international organizations are developing initiatives as well. The Steppe Action Agenda will bring these different initiatives together. For Mongolia, the three initiatives I have described are being advanced at the government level. For example, international organizations such as the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) are also proposing their own initiatives. Within this framework, international-level initiatives are being developed on how to combat dust and sandstorms and reduce their negative impacts. In this way, initiatives proposed by other countries and international organizations will also be incorporated into the Steppe Action Agenda.

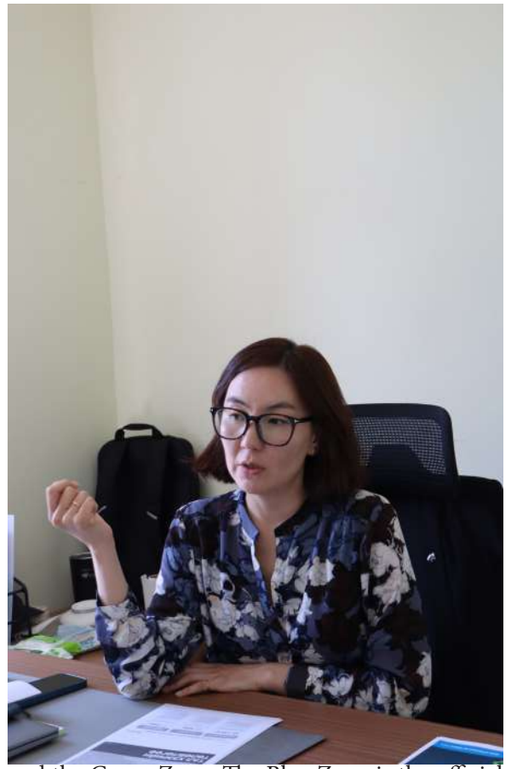
Interviewer: How many days will COP17 last? How many sectoral sessions will be organized?

A. Javkhlan: The programme will be quite extensive. The official programme will open on 17 August. Informal discussions, however, will begin on 15 August. In other words, discussions will begin on the 15th and 16th, while official negotiations and parallel events will fully commence from the 17th. According to the current programme, the conference is scheduled to conclude on 28 August. In addition to the main discussions, a large number of parallel events will also be organized. Approximately 350 parallel events can be accommodated in the Blue Zone. The UNCCD Secretariat accepted applications for parallel events in May. Interestingly, 745 applications were submitted for this COP, which is the highest number in the history of the Conference of the Parties to the United Nations Convention to Combat Desertification. This demonstrates the high level of international interest in Mongolia and the strong desire to participate. It also reflects the large number of countries, international organizations, and other stakeholders seeking to present their activities and initiatives.

We cannot accommodate all 745 applications. Therefore, we informed some organizations that it would not be possible to accept their proposals, while for applications with similar themes, we suggested combining them and organizing joint events. Following the selection process, 305 parallel events were selected to take place in the Blue Zone. In addition, the Convention Secretariat identified 187 events as substantively important but suggested that they be held in the Green Zone because the capacity of the Blue Zone was insufficient. Therefore, these 187 events were also incorporated into the Green Zone programme. In total, approximately 310 parallel events are planned for the Green Zone.

Interviewer: Could you elaborate on the zoning structure in greater detail, including the number of zones and the respective activities planned within each?

A.Javkhlan: There are two zones: the Blue Zone and the Green Zone. The Blue Zone is the official area under the protection of the United Nations. On 12 August, the Government of Mongolia will fully complete the facilities and officially hand them over to the United Nations. Following the handover, a flag-raising ceremony will take place. Once the UN flag is raised, the area will come under the protection of the United Nations. Until the conclusion of COP, the Blue Zone will therefore be an officially protected UN area. This means that it is not an official zone belonging to Mongolia, but an official United Nations area. Only registered and accredited delegates will be allowed to enter. In other words, access will be limited to representatives of countries and organizations accredited by the United Nations. All official negotiations and official events will take place in the Blue Zone. Country pavilions will also be located there. More than 30 national pavilions will operate in the specially designated pavilion area. These will include countries such as Turkiye and Armenia, which are scheduled to host future COPs, as well as previous host countries such as Brazil, Cote d'Ivoire, and Saudi Arabia. France and many other countries will also have



their own pavilions. These countries will organize events exclusively within their own pavilions.

Therefore, the 350 parallel events I mentioned earlier do not include events organized in national pavilions. Each country has full authority over what it organizes in its own pavilion. Mongolia will likewise have its own 80-square-meter national pavilion. There, we will organize a range of events to present our national policies, initiatives, projects, and programmes.

The Green Zone is not a mandatory component of COP but is established at the initiative of the host country to broaden public participation and showcase national policies, projects, innovations, and good practices. Saudi Arabia was the first UNCCD host country to establish a Green Zone, making Mongolia the second. Mongolia's Green Zone will be organized under the concept "Steppe of Hope," reflecting the COP17 message "Restoring Land, Restoring Hope." It will be an open and engaging space where citizens, youth, communities, businesses, and organizations can experience practical solutions, innovation, culture, and land restoration in action. Located adjacent to the Blue Zone, the Green Zone will be open to the public. Registration will be simple and accessible, similar to E-Mongolia and other government digital services. As a result, participation is expected to be significantly higher than in the Blue Zone. Preliminary estimates indicate 6,000–8,000 participants in the Blue Zone, while the Green Zone is expected to receive approximately 30,000–40,000 visits, including repeat visits.

Interviewer: You previously noted that a wide range of specialists from different fields will take part. Which sectors are expected to be represented?

A.Javkhlan: If we look at it sector by sector, this is not simply an environmental issue. Land degradation and climate change are ultimately issues of development. In recent years, there has been increasing discussion about how climate change is contributing to migration. This has become a social issue. At the same time, land degradation is causing changes in food security and food systems. These issues are directly connected to health and the economy. Ultimately, they can also become matters of national security. Therefore, land degradation, climate change, biodiversity loss, and the other elements of the triple planetary crisis are in reality issues that affect every sector. For this reason, we are emphasizing participation from the technology sector, start-up companies, private-sector organizations working in restoration and those wishing to contribute, civil society organizations, and stakeholders from all other areas. To address these issues in a meaningful way, everyone needs to participate and work together.

Interviewer: In Mongolia, pastoralists are among those who experience the effects of desertification most directly in their daily lives. Our country has a distinctive way of life rooted in nomadic pastoralism. How are pastoralists being included in the process?

A.Javkhlan: Before COP17 officially opens, an International Pastoralists' Forum will be organized as part of the International Year of Rangelands and Pastoralists. The forum will take place from 13-15 August. Approximately 400 pastoralists from Mongolia and other countries will participate. During the forum, the declarations I mentioned earlier will be discussed and finalized. Mongolian pastoralists will also participate actively. In addition, some of the pastoralists and representatives of nomadic livestock herding communities who participate in the forum will continue to take part in COP17 activities. There is also another interesting event planned. On 17 August, before the opening ceremony, a ceremonial procession is planned in which representatives of pastoralist communities will participate wearing traditional clothing.

The procession is connected to a major initiative called the "Caravan." The Silk Road Caravan is an international initiative being implemented under the Rangelands Initiative. It is travelling along the Silk Road between COP16 and COP17 with the aim of promoting the culture, way of life, and livelihoods of nomadic pastoralists internationally. The journey was initially planned to begin in Riyadh, the capital of Saudi Arabia. However, due to geopolitical circumstances, it was not possible to begin the journey there. Instead, it started in Türkiye in May. Since then, the Caravan has continued along the Silk Road and has now reached Inner Mongolia. According to the preliminary plan, it is expected to enter Mongolia around 6-7 August. In addition, as part of the International Year of Rangelands and Pastoralists, pastoralists from other countries will meet Mongolian herders to exchange knowledge, experience, and culture. As part of this initiative, they will travel to rural areas along designated routes, visit local communities, learn about their way of life, and participate in knowledge- and experience-sharing activities.

Interviewer: The United Nations has designated 2026 as the International Year of Rangelands and Pastoralists. Could you explain the significance of this decision?

A.Javkhlan: The main objective is to draw greater attention to the issue of rangeland degradation, explore how rangelands can be restored, increase financing, and, most importantly, bring the rights and concerns of pastoralists to the international agenda.

Its significance, however, goes beyond the issue of rangelands alone. It creates an opportunity to discuss at the international level the challenges faced by pastoralists in different parts of the world.The participation of women pastoralists and young pastoralists will also be particularly important. Today, technological development is contributing to the transition toward sedentary lifestyles in many countries. At the same time, the need to preserve the traditional knowledge, culture, and way of life associated with nomadic pastoralism is becoming increasingly important.

Therefore, in the twenty-first century, we need to come together to consider fundamental questions: Who are pastoralists today? How can they live and thrive sustainably? How can their traditions be preserved while also being developed for the future?

The significance of this International Year lies in creating an opportunity to discuss these questions collectively, share good practices internationally, and work together to address the challenges facing pastoralists.

Interviewer: We sincerely thank you for taking the time to speak with us. ■

Traditional Camel Herding and Pastoralism in Syrian Steppe – Case Study

Darem Tabbaa & Ahmad Altabbal

Faculty of Veterinary Medicine of Hama University- Hama – Syria

Pastoralism has historically been a fundamental strategy and a cultural pillar of Syrian society for millennia. This is linked to the nature of Arabia, which stretches from the Taurus Mountains in the north to the Indian Ocean, encompassing the vast arid steppes known as the Badia. From the beginning, pastoralists were separate from agricultural societies, moving their livestock away from cultivated areas like the Euphrates basin to prevent herds from damaging crops. These nomadic pastoral societies significantly influenced the location of ancient Syrian cities, facilitating the supply of livestock products. In the 18th and 19th centuries, large camel-herding tribes, such as the Shummar and Aneza, migrated north to the Badia and Jazira regions of Syria, establishing a system of tribute on settled agricultural villages. In the 1960s, the management of collective grazing lands changed slightly, and the introduction of trucks to deliver water directly to livestock herds removed the natural constraints of seasonal migration.

Camel herding holds a distinguished and elite place in the history of Syrian pastoralism. Traditionally known as the "true Bedouin," camel herders occupied the highest rungs of the desert's social hierarchy. Unlike nomadic sheep herders, who had to remain within a day's journey of water, camel herders could venture deep into the heart of the arid Syrian desert. They were the backbone of regional trade, playing a vital role by renting out thousands of camels to international trading networks or pilgrimage and trade caravans. Today, the economic value of camels in Syria has declined sharply, forcing camel herders to adapt and move away from the transport trade. They began raising camels primarily as a reserve of living capital (selling them to meat markets in some Syrian cities such as Hama, Douma, Damascus, Menin, and neighboring Gulf countries) and to produce milk, which continued to be used medically for many patients from Syria and a number of countries around the world who believe in its superior ability to cure intractable diseases including cancer.

To gain a more accurate understanding of the current status of camel herds in Syria, we studied data collected from three herds grazing in the heart of the Syrian steppe between Raqqa, Deir ez-Zor, and Hasakah, near the plains of the Euphrates River Valley. A comprehensive questionnaire was used to assess the herd's condition, breeding methods, movement patterns, and the challenges faced by camel herders in the difficult circumstances that Syria has experienced. Two of these herds represented the traditional hereditary system of camel breeding, while the third was a small, newly established herd. The questionnaire aimed to examine camel grazing practices and the dynamics of nomadic livelihoods, taking into account the specific context of the Syrian steppe (Badia), nomadic communities, and the current social and environmental challenges in Syria.

fodder and water for their herds, forcing them to travel long distances, ranging from 300 to 500 Km annually. The crisis also led to the cessation of government support for camel herders, compelling them to purchase fodder during periods when sufficient grazing land is unavailable. The absence of associations or networks uniting camel herders in the Syrian desert hinders the exchange of expertise and prevents them from communicating their plight to administrative authorities for assistance in overcoming their challenges. Furthermore, the drought has led to a decline in milk production. The maximum daily yield per camel does not exceed 1.5 liters per day for a period of up to 10 months a year,

Number	Owner age	Male/Female	Tribe	Location	Families and Family members	Number of Camels	Female Camels	Male adult camels	Young Camels	Young Camels
1	45	Male	Alsabaa Alobeidat	Raqqa	(1)8	20	15	3	2	2
2	65	Male	Alsheikh Majol	Hasaka	(5)32	350	280	20	80	80
3	50	Male	Alsheikh Majol	Deir Ez-Zor	**23(4)**	400	250	30	**120**	120

The this table presents the key data for the three herds.

The camel breeds were mostly Shamia, Khawara, Kheniat and Hybrid, the first flock was new established 2018, all other 2 are inherited.

The study reveals the significant impact of

climate change on camel herders in recent years. Drought has severely affected the availability of depending on the availability of water and fodder. There is no established commercial trade for camel milk in Syria, resulting in its consumption either locally without compensation or through barter exchange with alternative products from other livestock breeders (cheese, ghee, yogurt). The study also indicates that most herders rely on selling young male camels for meat to cover their living expenses. Veterinary medical services are few, which indicates the Syrian camels are resilient and adapted to climate changes.

Camel breeding has declined significantly today due to various factors, from 55,000 head before 2011 to nearly 18,000 today. Camel breeders continue to uphold their tradition, hoping for greater attention to this important historic and cultural Syrian heritage through organized governmental and community support to rehabilitate grazing lands and livelihoods for their communities.■

WHO WILL INHERIT MONGOLIA'S RANGELANDS?

Young Herders, Climate Resilience, and the Future of a Living Nomadic Civilization

ANUJIN BAT-ERDENE

Researcher, International Institute for the Study of Nomadic Civilizations (IISNC), under the auspices of UNESCO

Across the world, discussions about rangelands often focus on vegetation cover, biodiversity, grazing pressure, or satellite imagery. In Mongolia, however, understanding rangelands begins with something far less visible but equally essential-the people whose lives remain inseparable from the land.

For centuries, Mongolian pastoralists have sustained one of the world's largest continuous rangeland ecosystems through seasonal mobility, ecological knowledge, and a way of life shaped by adaptation rather than control. Their survival has depended on understanding weather, water, pasture, and livestock as parts of a single living system. Long before climate adaptation entered international policy debates, herders had already developed practical ways of living with environmental uncertainty.

Today, that relationship is under growing pressure. Rising temperatures, more frequent droughts and dzud, declining water sources, shrinking pasture productivity, volatile livestock markets, and rural outmigration are reshaping pastoral life across Mongolia. Climate change now intersects with economic and social pressures, making it increasingly difficult for young people to imagine a secure future in herding.

This raises an important question.

© Photo by IISNC

Who will inherit Mongolia's rangelands?

The question is particularly timely as the international community marks the International Year of Rangelands and Pastoralists (2026). While global discussions often focus on ecosystem restoration, biodiversity conservation, and sustainable grazing, one equally important reality is sometimes overlooked: rangelands cannot be protected without the people who continue to care for them.

The future of Mongolia's grasslands therefore depends not only on ecological restoration, but also on whether the next generation of herders is able - and willing - to remain on the land.

To explore this question, the International Institute for the Study of Nomadic Civilizations (IISNC), under the auspices of UNESCO, conducted a nationwide baseline study involving 240 herders, including 103 young herders aged 15-34, across Arkhangai, Dundgovi, and Uvs provinces. Combining surveys with in-depth interviews, the study examined how environmental change, livelihoods, family life, public services, and cultural identity together shape the future of Mongolia's younger generation of herders.

Between Heritage and an Uncertain Future

One of the clearest findings is that young herders have not rejected herding. What many increasingly question is whether it can still provide a secure and dignified future.

© Photo by Davaanyam Delgerjargal

Throughout the interviews, herding was described as far more than an occupation. It represented family history, cultural identity, responsibility, and a deep connection with the land. Participants spoke proudly about raising livestock, respecting pasture, and preserving knowledge passed down through generations. At the same time, many acknowledged that these values now exist alongside growing uncertainty about climate, income, education, and family life.

The survey reflected the same tension. Most young respondents continued to value pastoral culture and believed traditional knowledge should be passed on to future generations. Yet far fewer believed herding alone could provide a stable livelihood for young families under today's conditions.

Older herders often measured success not by the size of a herd, but by the way people cared for their animals, respected the land, and fulfilled their responsibilities to the community.

"A good herder is someone who treats livestock with care, uses their products responsibly, protects nature, and earns the respect of the community. That is what being a herder truly means."

- Nyamtseren, herder, Delgertsogt soum, Dundgovi Province

Yet many of these same families hesitate when asked whether they hope their own children will follow the same path.

One woman from Arkhangai answered without hesitation.

"No, I wouldn't encourage my children to become herders. The climate has become too difficult."

-Javzandolgor, herder, Ikhtamir soum, Arkhangai Province

Her response was not a rejection of pastoral life itself. Rather, it reflected a concern shared by many parents who have spent decades adapting to increasingly unpredictable weather and now question whether their children should face even greater uncertainty.

The findings reveal an important distinction: young people are not abandoning herding because they no longer value it. They are questioning whether the conditions needed to sustain this way of life still exist.

Living with a Changing Landscape

For Mongolia's herders, climate change is not an abstract concept discussed in policy papers. It is experienced every day-in drying springs, poorer pasture, harsher winters, and the constant uncertainty of whether a family can continue making a living from livestock.

Across Arkhangai, Dundgovi, and Uvs provinces, participants consistently identified longer droughts, more frequent dzud, shrinking water sources, and declining pasture productivity as the greatest threats to pastoral life. These changes affect far more than livestock. They shape household incomes, influence family decisions, and increasingly determine whether young people choose to remain in rural Mongolia.

One herder from Arkhangai described how these changes have become visible on the land itself.

"We now see weeds spreading where nutritious grasses once grew. Every year the pasture changes. The land can no longer recover the way it used to."

- Erdenebat, herder, Ikhtamir soum, Arkhangai Province

For pastoralists, environmental change is measured not only by scientific data, but by daily experience-0drying springs, disappearing forage plants, and grazing land that no longer recovers as it once did.

For young herders, however, the challenge extends beyond the condition of pasture. Increasingly, they are asking whether they can build a future around herding at all.

Munkhdelger, a 25-year-old herder from Uvs Province, once dreamed of becoming a nationally recognised herder.

"I used1 to dream of becoming a State Champion Herder. But after years of drought and harsh winters, I've started to lose hope. If another difficult winter comes, we may sell our livestock and move to town."

His words reflect the uncertainty shared by many of his generation. These experiences also challenge a common perception of Mongolia's rangelands. Herders are often portrayed as contributors to pasture degradation. Yet the people interviewed described reducing herd sizes, adjusting seasonal movements, protecting key grazing areas, and preparing more carefully for increasingly unpredictable winters.

Rather than standing outside the environmental crisis, they are among the first to experience its consequences-and among the first to adapt. Their knowledge, built through generations of living with the land, remains one of Mongolia's greatest resources for understanding environmental change.

Beyond Climate

Climate is only part of the story.

Young herders spoke just as often about unstable markets, shrinking pasture access, limited public services, and the challenge of building a family in rural Mongolia. For many, these pressures are inseparable.

Even those committed to herding often struggle to secure grazing land or establish an independent livelihood.

"Young herders cannot simply return and start herding if there is no pasture available. Everywhere is already occupied, and newcomers are pushed away."

- Nyamtseren, herder, Delgertsogt soum, Dundgovi Province

Economic insecurity emerged just as strongly. Many participants felt that while herders shoulder most of the risks, they receive the smallest share of the value created by livestock production.

When asked whether he hoped his own children would become herders, Odonkhuu, a herder from Uvs Province, answered without hesitation.

"No, I don't want my children to become herders. The work is simply too hard. I want them to study, see the world, and choose their own future. If they later decide to return to herding, that should be their choice."

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His response reflects a broader shift taking place across rural Mongolia. Many experienced herders remain proud of their way of life, yet hesitate to encourage the next generation to follow it.

The challenge, therefore, is not simply preserving tradition. It is creating the conditions that allow young people to remain on the land because they choose to - not because they have no alternative.

The Future of Mongolia's Rangelands

Who, then, will inherit Mongolia's rangelands?

The answer depends on more than the condition of the land itself.

What has changed is not their commitment.

What has changed is their confidence that herding can still provide a secure and dignified future.

Climate change is part of that uncertainty, but it is not the whole story. Participants also described shrinking pasture access, unstable markets, limited public services, and the growing difficulty of building a family and a future in rural Mongolia.

As the world marks the International Year of Rangelands and Pastoralists (2026), Mongolia has an opportunity to demonstrate that protecting rangelands means more than restoring ecosystems. It also means supporting the people whose knowledge, mobility, and stewardship have sustained these landscapes for generations.

The question, then, is not simply who will inherit Mongolia's rangelands.

It is whether the next generation will still see a future in caring for them.

If the next generation leaves, Mongolia risks losing far more than livestock producers. It risks losing generations of ecological knowledge, cultural continuity, and one of the world's last living nomadic civilizations.

If they remain, Mongolia's rangelands will continue to have not only users, but guardians. ■

Pastoralism in Qazaqstan: Past, present and future perspectives

Peter Finke, Aliya Kashaganova and Gulnaz Tulenova
University of Zurich

As other parts of Central and Inner Asia, Qazaqstan has for millennia been a country of pastoral nomadic movements. This has proven to be a highly adaptive livelihood, which allowed household to make efficient usage of the natural resources surrounding them. Depending on local ecology, such seasonal mobility took place over long distance between different types of steppes and semi-deserts, or along altitudes with alpine meadows serving as summer pastures while protected valleys were occupied in winter.

This all changed dramatically during early socialist times when collectivisation and sedentarisation were implemented with ultimate force and violence. An estimated 90 per cent of all livestock perished during the late 1920s, causing widespread famines throughout the steppes. The human loss was equally devastating and approximately 1.5 million Qazaqs, close to half of the population at that time, lost their lives. In later decades, the Soviet government had to recognise that some form of mobile pastoralism was inevitable to make adequate usage of the steppes, mountains and deserts. Livestock rearing was, however, not nomadic anymore but firmly integrated into the socialist planned economy.

When the Soviet regime collapsed in the early 1990s, pastoralism suffered again drastically. The decay of infrastructural support and functioning marketing channels forced people to sell off their animals to meet basic household demands. Exorbitantly high transaction costs and legal insecurity made pastoralism – as well as agriculture – a largely unprofitable business and prompted people to start migrating towards urban settlements.

For a while, seasonal movements with livestock stopped altogether in most parts of the country. It was only with the economic booms that set in since the mid-2000s that maintain herds of sheep and goats, horses and cattle, as well as – in smaller numbers – camels became a lucrative activity again. With the rising revenues from oil extraction, a growing middle class, and subsequent consumption patterns people in many rural areas of Qazaqstan started investing again in livestock to build up an existence as households or petty entrepreneurs. At the same time, the first large scale ranchers also appeared on the scene.

In the south-eastern parts of the country, where we have conducted research for a number of years, this took the familiar shape of vertical mobility across different altitudes. Winters are spent in the semi-deserts all the way towards Lake Balkash, although only a minority undertakes such long-distance movements. Many families take care of their herds during the cold season by feeding them in shelters next to their houses. Spring and autumn may be spent on pastures near the villages along the edge of the mountains, while for summer people utilise the alpine meadows of the Jungarian- or Jetisuw-Alataw with its lush pastures and sufficient provision with water sources. People may stay here for three to five months, depending on local and annual ecological conditions.

These movements are shaped not only by ecological conditions but also by rising costs and changing access to pasture, since grazing areas near villages are often insufficient and unevenly distributed among villages. At the same time, the cost of hiring herders has increased, while finding one has become another major issue. Alongside this extensive form of livestock mobility, a more intensive model is expanding among local farmers. Some have recently begun fattening

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groups ranging from more than 50 to nearly 200 Alatau, Angus and crossbred bulls at their homes. These animals, however, depend more heavily on purchased fodder, investment and reliable buyers than on seasonal movement. Their expansion is also encouraged by growing number of cross-border demand for livestock and meat in neighbouring Central Asian countries, which local farmers and traders associate with rising cattle and meat prices. Contemporary livestock production in the region therefore combines distant pastoral mobility with increasingly intensive forms of cattle fattening at the household level.

Interestingly, the majority of people involved in nomadic (or semi-nomadic) pastoralism these days have not been born in the region but are Qazaqs who had migrated here from China or Mongolia during the last thirty years. As many of them lack the necessary skills and experience for the formal labour market – including knowledge of the Russian language, still of outmost importance – herding animals was for many an ideal start into a new future. Selling livestock

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products from their own herds as well as receiving salaries for maintaining those of other families, proved a valuable source of income that allowed building up the means for a sustainable household economy. What was also important that qandas, as Qazaqs originating from China or Mongolia are called, are more often than not willing to make the seasonal journey with their families, which allows the production and processing of dairy products as well as other activities. Local shepherds, if they can be found at all, usually go on their own and can thus only manage herding the flocks throughout the day.

Most notably is probably the rising interest in horse raising. This has become a highly profitable business for both its meat and milk production. Sausage made out of horse meat, the famous qazi, as well as fermented horse milk, qimiz in Qazaq, are omnipresent not only during ceremonial events but also in everyday life. Apart from that, sheep and cattle are most important for a great variety of produce, which enable families a steady source of income. Goats are less important in Qazaqstan. This is also true for camels, although some larger farms milk them for shubat, the other popular fermented beverage apart from qimiz. All of these are traded not only locally but also find their way to the urban centres of Almaty and Astana.

Seasonal movements also have consequences for the rural economy because when milk producing cattle are sent to distant pastures, less raw milk remains available in and around the villages. Our fieldwork indicates that local processors compete for a more limited number of regular suppliers. Interestingly, however, this shortage does not necessarily lead to a corresponding increase in the price paid to livestock-owning households. The price for raw milk remains relatively stable, which suggests that its value is determined not only by local availability but also by the bargaining relations between producers, milk collectors, processors and traders. Therefore, milk may become more difficult to obtain without becoming more profitable for the families who produce it.

The future of pastoralism in Qazaqstan faces several challenges. A major one, as everywhere in Central and Inner Asia, is climate change and its yet unforeseeable long-term impact on grasslands and water supply.

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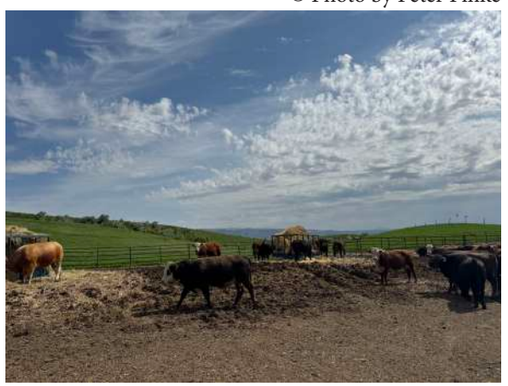


But raising livestock in Qazaqstan is much more than just an economic activity. As in other parts of Central and Inner Asia, pastoralism is part of its cultural heritage and identity. The millennia-long history of nomadic livelihoods and adaptation has left deep traces in arts, sciences, and individual personality. The need to understand and adapt to a very specific and at times capricious natural environment has also created a large body of traditional knowledge about landscapes, climate, and animal needs. While the transmission of such knowledge from generation to generation has been interrupted to a certain degree during socialist times, when central planners and scientists took over management decisions, it is still engrained in everyday practices.

The future of pastoralism in Qazaqstan faces several challenges. A major one, as everywhere in Central and Inner Asia, is climate change and its yet unforeseeable long-term impact on grasslands and water supply. Degradation seems as yet less of an issue than in other regions due to the temporary decline in livestock numbers. As a consequence, many parts of the country have in recent decades been rather under- than overused, so there may be some buffer existing, but to leave pastures idle for a longer time poses problems of its own. But unpredictable weather conditions may endanger pastoral mobility also for other reasons. Thus, in 2025, herders reported they would leave the alpine summer pastures one month earlier due to lack of forage. The same conditions also prompted bears to move downhill in search of fodder, which brought them in vicinity to humans and livestock.

Another challenge is the organisation of land allocation patterns, which has been largely neglected since the end of socialist planning, also due to the decrease in livestock numbers. For the future, this might become a source of conflict and insecurity. To prevent such a new law on pastures has been crafted, which allows local adaptive management patterns. And, finally, again as in many parts of the region, the preference of young people to move to town and find steady employment there, may create a problem of labour supply in pastoralism as well as of the continuation of traditional knowledge transmission. ■

G.BILGUDEI: BRIDGING THE STEPPE: HOW THE HUNU SYSTEM IS TRANSFORMING MONGOLIAN NOMADIC HERDING

Word by Byambanyam Urtnasan

Q&A

The founder and initiator of HUNU, a technology system designed for Mongolian pastoralists, was born into a herding family. He grew up familiar with the harsh realities of the steppe and the vulnerability that comes with depending on nature for a living. His father was one of nine siblings, all raised in herding families. Yet today, only one of them continues the family's pastoral tradition. That experience prompted Bilgudei to ask a simple but consequential question: Could technology make life easier for herders without changing what makes nomadic pastoralism unique?. His answer is HUNU - a system combining satellite GPS, livestock monitoring, pasture information, weather data and livestock counting technologies. We met Bilgudei to talk about technology, nomadic knowledge and his vision for a new generation of Mongolian pastoralists.

Q- Let us begin with HUNU. What exactly is the system, and how does it work?

A- There are three main products. The first is the application. The second is satellite GPS, and the third is a livestock-counting model. Through the application, herders can use satellite GPS to see the location of their livestock. If they use smart ear tags, they can also monitor an animal's temperature and movement. There is even a function that can guide them toward their livestock. The GPS component also allows us to access information derived from satellite imagery - things such as pasture growth and snow depth. Herders can receive a ten-day weather forecast, and family members can share their GPS locations with one another. They can also mark particular locations on a map. For example, if a family marks the location of its ger as "home," that point can later help them find their way back, even without an internet connection or in the darkness of night. The third product is our livestock-counting model. It uses drones and surveillance cameras to count animals.

So, ultimately, HUNU is not simply a system for finding livestock. It is becoming a broader system for monitoring pasture and registering livestock.

Q- So the purpose extends beyond livestock tracking - toward pasture management as well?

A- Exactly. If we look at the larger picture, it is a pasture-monitoring and livestock-registration system. Mongolian nomadic pastoralism has traditionally been relatively harmonious with nature. Herders rotate their pastures, and this movement gives the land an opportunity to recover. But today, herders are moving less and less. Perhaps the places available for migration are becoming more limited as well.

I believe that herders who continue to rotate their pastures should be able to derive economic value from that practice. Because we can record the historical locations of livestock, we can see where a herd has moved across the four seasons

and where it has grazed. With that information, it becomes possible to certify that a product genuinely comes from nomadic pastoralism - and that its producer is, in fact, a nomadic herder.

That could become particularly meaningful for cashmere. Mongolia supplies around half of the world's cashmere. When I spoke with people in the European cashmere industry, I found that there is interest in purchasing cashmere produced through nomadic pastoralism. Internationally, products certified as organic or produced under environmentally sustainable and ethically responsible supply chains tend to command a price premium in global markets. Mongolia possesses a comparative advantage in such production systems; however, there remains a structural gap in effectively linking these products with international consumer segments that actively demand and are willing to pay for verified sustainable goods.. That is why we are interested not only in cashmere, but eventually in certifying meat and other pastoral products as well.

Q-What kind of practical difference can HUNU make in a herder's everyday life?

A- It can return to herders the most precious resource of all - time itself. AA horse can disappear, and a herder may spend a week or even a month searching for it. That means fuel costs, time and labour. Beyond the direct expense, there is also the opportunity cost - one of the household's strongest labour resources is occupied searching for a missing animal. There is also the problem of livestock theft.

Another serious issue is livestock drifting away from its normal grazing area. There are cases where herders follow animals that have wandered away and lose their lives in the process. Satellite-based weather information can help protect herders from natural hazards as well. We have connected the system with AI. By looking at the livestock's normal grazing history over the previous 14 or 30 days, the system can detect when an animal begins moving beyond its usual range or in an unusual direction. That can point to two possibilities: the livestock may be drifting away, or it may have been stolen. The system can identify that change and alert the herder. We can also provide advance warnings based on wind speed and other conditions that may increase the likelihood of livestock drifting away. There are many functions, but the underlying purpose is simple: to reduce uncertainty in a life that has always had to live with uncertainty.

Q- You are bringing contemporary technology into a deeply traditional form of pastoralism. What has been the greatest challenge in connecting these two worlds?

A- For a young person, this has been one of the most complex systems I have ever worked on. Even something as seemingly simple as an application involves hundreds of micro-decisions - where a button should be placed, how information should be structured, what hierarchy of data makes sense for users in a pastoral context. GPS, however, has been the most challenging layer. Mongolia's environmental conditions are extreme, and livestock here are not enclosed or regulated in the way they are in many other countries. That alone makes the operational context fundamentally different. Because of that, imported solutions cannot be applied directly. They have to be re-engineered for local realities. On the technical side, the system depends on satellite connectivity. Since Mongolia does not operate its own satellite infrastructure, we rely on a limited number of global providers, and even securing access and permissions becomes a separate administrative and technical process.

Then there is the hardware layer. Take the battery as an example. If it cannot operate at -40°C, it is effectively non-functional in the Mongolian steppe. It also has to withstand dust, moisture, and continuous outdoor exposure. And because this is a satellite-based GPS, it must maintain a stable orientation for signal transmission. In the case of horses, that means it has to be mounted around the neck. We initially tried attaching it to the traditional nogt, but it created friction against the horse's face and eventually detached. We then experimented with adding weight for stability, but that made it impractically heavy.

So, we replaced the battery with an AA battery. Since it uses replaceable batteries, we had to use an American-made Energizer battery that can operate at temperatures as low as -40°C. Those batteries are quite expensive. If the GPS sends updates too frequently, the battery drains much faster. At the moment, we have to replace one battery every month, at a cost of around 40,000 Mongolian tögrög.

After experimenting in this way, we eventually developed a GPS device with a solar panel. Mongolia gets a relatively high amount of sunlight, so the device can recharge itself using solar energy. But when we first put it on horses, we ran into another problem-the device got damaged. The stallions would fight among themselves and break the GPS units. So we realized that we needed to develop a protective casing around the device as well. That is essentially how we have continued developing the technology: by testing it in real conditions, identifying problems, and improving it step by step.

From a practical standpoint, financing has been one of our biggest challenges. If we had secured funding earlier, we could have developed the product much faster. There were periods of three or four months when we could not do anything simply because we had no funding. Mongolia's investment ecosystem for startups is still relatively underdeveloped. There was a

period when startups received more support, but those opportunities have gradually declined. At the moment, we are essentially moving forward through our own determination and resources.

Interestingly, we rarely receive criticism from herders themselves. The criticism tends to come from young people of our generation. They ask, "Why are you trying to change nomadic pastoralism?" But that is not what we are trying to do at all. What many people do not realize is that herders in Mongolia have already been using GPS technology for around ten years. There are nearly 100,000 GPS devices in use across Mongolia. We may not always be aware of it, but herders themselves are already searching for and adopting solutions that respond to their needs.

Sometimes I feel that we have become too divided between the city and the countryside. People in the city are on one side, and people in rural areas are perceived to be on the other. You hear questions like, "Can rural people really use technology?" or "Do they use Facebook?" or "Do they know how to use smartphones?" But in reality, almost everyone has a smartphone, and people in rural areas use Facebook just like everyone else. There is even a group for GPS users with more than 18,000 members. Another group called "Lost Livestock" has more than 50,000 members, with people posting photographs of missing animals every day. So, whether we notice it or not, change is already taking place naturally with the passage of time.

At the same time, we should not become like Inner Mongolia. There, livestock are kept within enclosed areas. But nomadic pastoralism is fundamentally about movement and mobility. Migration should never come to a complete stop. What we are trying to do is support that mobility as much as possible-not eliminate it. Technology should work with nomadic pastoralism, not against its very nature.

Q- Where is HUNU today? Is the entire system already ready for the market?
A- At this point, all the core components of the system are ready. The GPS devices are ready, the app is ready, and all of the main functions are working. We recently conducted a pilot test with 10-15 herder households across eight provinces. Our GPS devices are now actively being used in those eight provinces, and we have already started receiving our first orders.

The main challenge at the moment is that the GPS devices are taking longer than expected to arrive. Other than that, demand has been very strong. People who have already purchased the devices are coming back to place additional orders. This is a product that costs 510,000 Mongolian tögrög, which is not a small amount, yet demand remains very high. That tells us there is a genuine need for this kind of solution.

Q- What does it cost to use the HUNU system? Is there a monthly fee in addition to purchasing the device?
A- Yes, there is. That is another major consideration. At the moment, there are only two satellite-based GPS systems available on the Mongolian market. One of them has essentially become a monopoly. It has been operating for around ten years and is a relatively expensive system. For example, if you fail to pay your GPS service fee for five days, you can be charged a 100,000 Mongolian tögrög penalty. With our system, there is no activation penalty. Compared with other services, our monthly service fee is approximately 30 percent lower.

Another advantage is that there are no ongoing battery costs. You do not need to replace the battery. The HUNU GPS device costs 510,000 Mongolian tögrög, and that price includes the collar and all the necessary equipment. The satellite service itself is paid for on a quarterly basis. We do not collect that payment ourselves; it is paid directly to the satellite company because all the location data is transmitted via satellite.

The price depends on how many location updates you choose to receive per day. Transmitting data through a satellite is itself relatively expensive. For example, if you choose to receive four updates a day, you will receive four location points per day. We currently offer three options: 4, 6, or 12 updates per day. Four updates per day costs 99,000 Mongolian tögrög per quarter. Six updates cost 126,000 tögrög, while 12 updates cost 186,000 tögrög per quarter. So, with four location updates per day, the monthly cost comes to approximately 33,000 Mongolian tögrög. The mobile application itself is free.

Q- How large is the team behind HUNU?
A- At its core, HUNU is currently a three-person full-time team. But the people behind the project extend far beyond those three. One of our greatest strengths is our ability to work across borders-to bring together international organizations, specialists, and expertise whenever the project calls for it. We are also part of Google's accelerator program, which has given us access to valuable support, knowledge, and a wider network. When we include the people who contribute to HUNU on a part-time basis, our extended team numbers around 17 people across six countries. In that sense, HUNU is not simply a small team working from one place; it is a growing network of people connected by a shared ambition to rethink how technology can serve Mongolia's nomadic way of life.

Q- How do you plan to develop the system going forward?
A- For now, we are continuing to build and improve the system. The bigger picture for us is to improve herders' lives-to make their work easier, more convenient, and less demanding, and most importantly, to increase their income. Ultimately, we hope this will also encourage more young people to engage in livestock herding.

Livestock herding represents a huge opportunity and a significant resource. If we can bring these resources to international markets in an environmentally responsible and balanced way, there is enormous potential.

At the moment, we have the GPS devices, the application, and people are already using them. We also have a livestock counting model. Our next goal is to develop a larger platform that can verify the origin and quality of meat, cashmere, and other livestock products.

As mentioned earlier, the system could also be used for pasture monitoring. It has significant potential as a research tool as well. For example, in Mongolia today, there is an ongoing question of whether pasture degradation is primarily driven by climate change or by the impact of livestock. By linking livestock movement data with pasture conditions, we could study this issue in much greater detail and with far greater accuracy.

Q- Why did you choose the name HUNU?
A- We wanted the name to convey the idea of a strong and resilient nomad. We considered many different options when we were trying to find the right name. But when we thought about the company's vision, the idea of creating strong, empowered nomads through technology felt like the right one.

The name also felt closely connected to the word "Hunnu," both in terms of its sound and its meaning, so HUNU seemed like a natural choice.

Q- You mentioned increasing herders' income earlier. How exactly can this system generate income for them? At the moment, herders themselves are the ones purchasing the system, aren't they?
A- Herders sell products such as cashmere and meat. Our goal is to create opportunities for them to sell those products at a higher price. To do that, we need to verify the origin of the products-to use technology to prove that a particular product genuinely comes from nomadic livestock production.

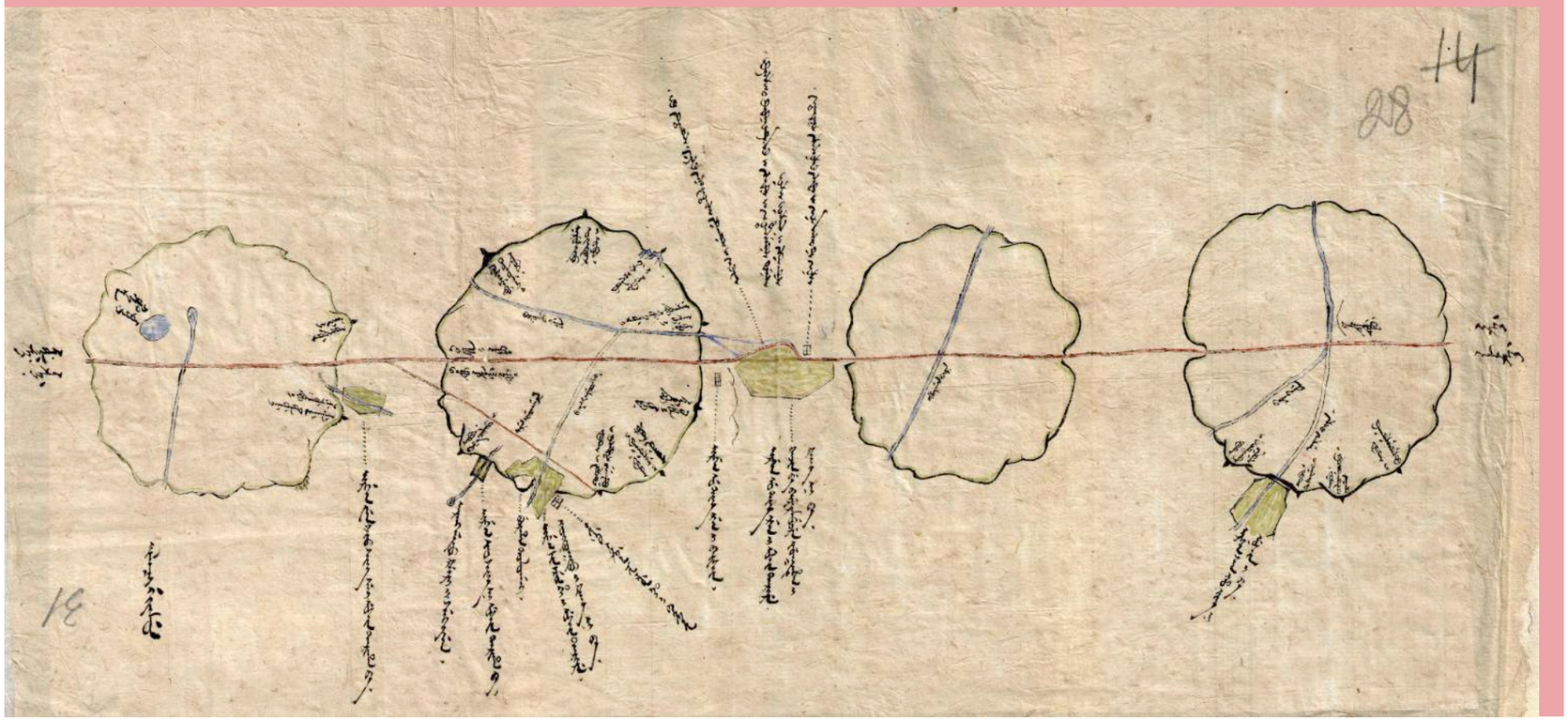
At the moment, foreign companies purchase products from herders through intermediaries. Our goal is to become part of the technology layer within that supply chain. In other words, the buyers who ultimately pay are the larger companies purchasing cashmere, meat, and other livestock products.

These companies are increasingly interested in paying a premium for products that are produced in environmentally responsible and sustainable ways. They need reliable ways to verify that their requirements are actually being met. If we can step into that gap and provide technological verification, the value of those products could increase.

In turn, this could allow herders to earn more from the cashmere and meat they produce. That is our long-term vision. ■

Pasturelands of Relay Stations in Mongolia from the 18th to the Early 20th Century

Munkhbaatar Shijirbaatar
Ph.D, Mongolian National University of Education



▲ The territories of four örtöös (relay stations) located within the Baatar Zasag Khoshuu (banner) of Khalkha's Tusheet Khan Aimag (province).

A relay station (Örtöö) was an official communication and transport post operating under specific laws along fixed routes. It had designated personnel, an appointed chief (zangi), its own territory, and established rules for messengers and officials to rest, swap mounts, and access food and drink.

In the 18th to 20th centuries, relay stations established across Mongolia had to fulfill the critical, long-term role of a special postal system connecting urban settlements and infrastructure. Consequently, the state granted allocated territories to station administrations, producing official maps and territorial registers. Station territory referred to the designated zone where station workers lived, grazed their livestock, and where official travelers could pass through without impediment. To ensure the swift execution of relay services, the Manchu Qing Dynasty granted land carved out of local banner (khoshuu) territories to these stations, establishing what was known as station lands.

The establishment of these station lands created a unique form of land tenure in Mongolia. Because these station territories intersected banner lands horizontally, they directly impacted the grazing capacity of the banners. This inevitably led to land and pasture disputes between banners and stations. To resolve these conflicts, boundary cairns (ovoo) were erected. People of the Kharchin relay station even guarded these boundary cairns to prevent banner livestock from encroaching on their land.

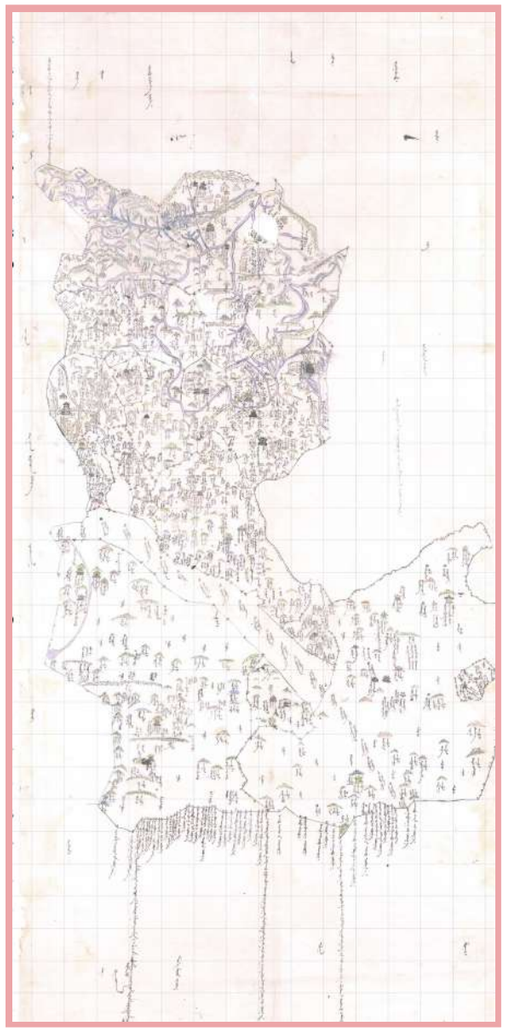
Depending on the geographical and environmental conditions of Mongolia, horses and camels were used for transport and riding across the relay network. Provisions and meat rations meat juice for station personnel and travelers were calculated and supplied in sheep. Therefore, to maintain smooth operations, it was essential to provide adequate pasture for the station's livestock. As a result, provinces and banners along the route were required to grant temporary land rights to the relay stations.

Relay settlements were established at intervals of 25 to 75 gazar (roughly 14 to 40 kilometers by modern measurements), depending on the availability of pasture, wells, springs, and rivers, as well as general terrain conditions. Water resources, such as wells, natural springs, and rivers, and pasture capacity were considered the most vital elements of station territory, serving as key factors when selecting sites for new stations.

Relay stations in Mongolia were named after the local landscape names where they were situated. The fact that a single station might be recorded under several different names in historical sources is linked to the nomadic movement of the stations themselves. Depending on water availability, pasture capacity, and seasonal conditions, stations would shift their physical encampments within their allocated territory. This seasonal movement was a unique feature of the Mongolian relay system. In other words, every station maintained designated lands for summer, winter, autumn, and spring.

Station lands were used under the ownership by appointed chieft, guards, couriers, soldiers, and ordinary citizens. The livestock kept at the stations can be categorized into two groups: official service livestock and the personal livestock of the station workers. Both types of livestock were bred and raised within the station territory. Access to station pastures was strictly forbidden to all non-station livestock, extending even to the herds owned by banner ruling princes and lamas. Conversely, station livestock were not permitted to enter banner lands. During severe droughts or harsh winters (zhud), stations could only conduct otor on banner lands after obtaining formal permission from the banner authorities.

The Code of the Ministry for the Administration of Outer Mongolia legally codified the exact number of official livestock each station was required to maintain. Across all relay stations in Mongolia, a fixed total of 110,637 head of livestock had to be maintained annually. When the personal herds of the station workers were added to this



▲ The territory of the Kharchin örtöö (relay station) marked across the khoshuu (banner) lands of Khalkha's Tusheet Khan Aimag (province).

figure, the actual number of livestock swelled tens of times higher. Thus, pastureland was the single most critical issue for relay station management.

During this period, the primary route ran from Chuulalt khaalga to Sair Us, extending further to Uliastai and Khovd; this was known as the Altai Military Relay Route. Running straight north from Sair Us toward Khuree and Khiagta was an express courier route. Additional stations were positioned from Uliastai to the Jinjleg guardpost and Barkhol city, as well as from Khovd to Khöshöö Mod and Barkhol. Every station possessed its own territory, though sizes varied significantly depending on the route, the number of stationed personnel and livestock, and the carrying capacity of the land.

Due to natural disasters like droughts and dzud, or pasture shortages caused by rapidly growing herds, disputes frequently arose over land rights with local banner subjects. Consequently, station territories repeatedly expanded or contracted as control shifted. These boundary disputes between stations and banners frequently led to the creation of detailed local maps. Maps specifically outlining relay station territories began to be produced in 1780.

When six Kharchin relay stations were established within the territory of the Tusheet Khan Banner in Khalkha's Tusheet Khan Province, constant land disputes erupted in the region. Similarly, the establishment of the Altai Military Relay Route through the southwestern portion of the Daichin Wang Banner (also in Tusheet Khan Province) and an express courier route right through its center absorbed a significant portion of the banner's lands. Banner subjects lost the freedom to migrate within their own territory and faced diminished grazing lands, prompting repeated legal appeals and protests. These tensions escalated significantly during droughts and severe winters. Although the express relay stations occasionally offered concessions, they yielded little result. Within less than a decade, the width of these station territories was reduced multiple times - from 70 gazar down to 60, 50, 40, and eventually 30 gazar. Even when new land maps were drawn, disputes persisted. Disputes escalated from driving away station livestock and beating couriers to severe measures, such as depositing the remains of plague and illness victims on station lands. Although banner subjects made concessions in some cases, the relay service was a vital state duty that could not be interrupted or deprived of pasture, meaning station authorities often enforced their claims by force.

Traders and travelers without official permits were forbidden from traversing station lands. To prevent merchant traffic from overgrazing and damaging station pastures, separate routes were designated for commercial trade. These trade routes often branched into multiple paths depending on the season and pasture availability.

Known as trade routes, local Mongolians named them based on sacred mountains, historical events, or specific directions. Later researchers dubbed these routes the "Tea Road" after the primary commodity traded along them. While trade routes and relay routes were distinct, both were strategically planned to pass through areas rich in water and pasture.

▲ An ovoo (stone cairn) demarcating the territorial boundary between an ürtüü (relay station) and a khoshuu (banner)

The territories granted to relay stations can be categorized by size into large, medium, and small. The Kharchin relay stations in Khalkha territory held the largest domain. According to station maps and banner land registers, the length of the Kharchin station lands extended uninterrupted until reaching the border of the adjacent station, leaving no buffer zone. In some cases, additional land was granted laterally. Stations such as Mukhar Gashuun, Khonch, Khatsavch, and Bilgekh spanned widths of around 80 kilometers, an area roughly equivalent to a small modern Mongolian soum. The Kharchin station lands were situated in a dry Gobi zone with low fertility and few water sources; furthermore, because they accommodated primary station personnel, corvée auxiliaries, and guards, their overall territorial extent was vast. Compared to other routes, the stations along the line from Chuulalt Khaalga to Uliastai experienced heavy traffic and higher population density, necessitating larger land grants. As the Kharchin stations extended into the steppe and Khangai mountain zones, their land allocations noticeably decreased, demonstrating that territorial grants were adjusted according to pasture carrying capacity.

Stations with medium-sized territories included the express stations along the north and south routes of Khuree, the Khalkha 20 Stations, the stations connecting Khovd to Uliastai, Uliastai to Jinjleg, and Khovd to the Sogog guardpost. Although their territories were initially vast, they shrank over time due to banner land disputes and encroachments by local farming efforts.

In the Khangai region, stations were located closer together and held smaller land grants due to higher pasture capacity and rugged natural terrain. The average width of an express station's land in this region was around 30 to 40 kilometers. Rather than connecting directly with neighboring stations, these station territories often bordered banner lands along their length. In these border zones, itinerant nomads (keremel arad) and relatives of active station workers frequently settled.

The smallest land units belonged to the soum relay stations. These were local stations established directly by provinces and banners for their own administrative needs. Because they maintained few personnel and small herds, their allocated land was minimal. For instance, the soum stations along Ürgüü's eastern route had lands measuring 10 to 17 kilometers in length and width, while those along Örgöö's western route toward Uliastai spanned only 5 to 6 kilometers.

Regardless of administrative classification (express vs. soum), relay stations located in the Gobi and steppe regions consistently held larger territories than those in the fertile Khangai mountain region. This difference was fundamentally tied to pasture carrying capacity and water availability.

The pastureland was both the most crucial and the most vulnerable component of the vast relay system connecting Mongolia's steppes, Gobi, and mountains. Consequently, the government strictly defined territorial boundaries, produced official maps and registers, and dispatched high officials (amban) in person every year to inspect and audit the station lands. ■

THE WORLD OF MONGOLIAN AND ITALIAN PASTORALISM: Surviving Climate Change and Modernity

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2026 оны 8 дугаар сарын 21-31

World Nomadic Cultural Festival: 21-23 August 2026
National Museum of Mongolia: 25-31 August 2026

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