

Resilient Rangelands

Multiple benefits for
Kazakhstan's people, nature
and national development

Prepared by Global Conservation Solutions
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The Royal Society for the Protection of Birds (RSPB) is a UK-based charity that works to conserve nature. The organisation protects and restores habitats, owns and manages over 200 nature reserves in the UK, and advocates for nature protection laws. Internationally, the RSPB works with partners to protect birds and habitats through projects in strategic locations. The RSPB was founded in 1889 and is the BirdLife Partner in the UK. We are also a partner of the Altyn Dala Conservation Initiative.

The Association for the Conservation of Biodiversity of Kazakhstan (ACBK) is the largest national conservation organisation in Kazakhstan, dedicated to protecting the country's biodiversity through research, policy advocacy, conservation education, ecosystem restoration, and protected areas. Founded in 2004, ACBK is Kazakhstan's official representative for BirdLife International, and the lead implementing partner of the Altyn Dala Conservation Initiative.

The Altyn Dala Conservation Initiative is a multi-national and long-term partnership working to restore steppe, desert, and wetland ecosystems across the 75-million-hectare historic range of the saiga antelope in Kazakhstan. Alongside ACBK, core partners include Kazakhstan's Committee of Forestry and Wildlife of the Ministry of Ecology and Natural Resources, Fauna & Flora, Frankfurt Zoological Society, and the RSPB.





About this document

This document sets out the evidence for why resilient rangelands matter to Kazakhstan's people, its nature and its national development. It draws on evidence from the SNAPP Resilient Rangelands project (<https://snapppartnership.net/team/resilient-rangelands/>) and the wider scientific literature. The project brings together RSPB, ACBK and researchers from the Science for Nature and People Partnership (SNAPP) Resilient Rangelands Working Group to build the evidence base for managing Kazakhstan's rangelands for people, livestock and nature together. It is an advocacy document. It is not a scientific paper or a formal policy brief. Its purpose is to inform and open debate across ministries, not to set out specific actions. It is written first for a reader in the Ministry of Agriculture. The argument is built on shared goals rather than environmental concerns alone. Resilient rangelands are the foundation of Kazakhstan's livestock sector. Protecting that foundation is the same task as growing the sector.

It is organised in two parts. The executive summary sets out six key messages. Each message is a short argument with its central evidence. The chapters that follow give the full supporting detail. They cover what a resilient rangeland is, what it provides, what keeps it resilient, what erodes it, a West Kazakhstan case study, what policy can do, and examples of good practice. Sources are numbered in the text. The References list them in full, with links. Internal SNAPP Resilient Rangelands and other project sources are flagged as such throughout.

A resilient rangeland is one that keeps providing forage, water and livelihoods through drought and disturbance, and recovers when the pressure eases. Resilience is about function held over time, both productive and ecological, not the condition of the land at a single moment. It is a more precise idea than a "healthy" or a "protected" rangeland. It is also not the same as leaving land unused. Most of Kazakhstan's rangeland is working land, and moderate, mobile grazing is itself a source of resilience. Section 02 develops this definition in full.

The executive summary sets out six key messages. Each message is a short argument with its central evidence. The chapters that follow give the full supporting detail.

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Executive summary

Message 1. Kazakhstan's rangelands are a national asset. Food security, rural livelihoods and national development all depend on them.

Between about 180 and 186 million hectares of Kazakhstan is pasture, depending on the source and baseline used. On either figure, that is close to two-thirds of the country³. These rangelands feed the national livestock herd. They sustain rural livelihoods. They are central to the cultural identity of the Kazakh people. They are not just farmland. They are nature, and they are national wealth.

Every target in the Ministry of Agriculture's own plan depends on the rangeland. The Comprehensive Livestock Development Plan for 2026 to 2030 sets firm targets. It aims for cattle numbers of 12 million head, sheep and goats of 28 million, meat output of 1.8 million tonnes, and doubled meat exports⁴. Every one of those figures depends on the grazing capacity of the rangeland. Healthy rangeland delivers the conditions production depends on. It helps prevent soil erosion, recharges groundwater, and reduces the impact of drought^{5, 6}. Moving livestock through the seasons, following the best periods of vegetation quality and quantity, keeps animals well fed and prevents overgrazing. This mobile use has kept the rangeland productive for generations, alongside its wildlife^{7, 8}.

The make-up of that herd is changing. One part is growing far faster than the rest. The national horse population now stands at about 4.6 million head. It has grown by roughly 10% a year since 2020, returning to approximately its pre-collectivisation level^{9, 10}. Horses graze differently from cattle and sheep. As wide-ranging, largely unherded animals, they cover great distances. This spreads grazing pressure, but it can also concentrate pressure locally¹¹. The Livestock Development Plan is built around cattle, sheep and goats. It does not yet treat horses as a distinct, fast-moving variable. How large the horse herd should become, and how far future demand should be met by imported high-productivity breeds, is an open question the Ministry will need to answer.

The resource is under pressure, but not evenly, and not in only one direction. In its reporting to the UN Convention to Combat Desertification, Kazakhstan has recorded between about 26.6 and 27.1 million hectares of pasture as degraded, depending on the reporting source. It has pledged to halt the loss by reaching Land Degradation Neutrality by 2030^{12, 13, 53}. That figure is Kazakhstan's own reported number. Degradation is concentrated in particular regions rather than spread evenly, and by regional standards much of the country's rangeland remains in relatively good condition. Degradation is also not only a story of overgrazing: pasture can degrade just as surely from too little grazing, where the loss of mobile herds lets litter and fire build up¹². The problem is as much about how grazing is distributed across the landscape as about total numbers. Reversing it is mainly a matter of grazing and rest, not ploughing and reseeded. There is no strong case for reseeded natural pasture. Rest and rainfall let the steppe recover on its own¹⁴.

Healthy rangeland delivers the conditions production depends on. It helps prevent soil erosion, recharges groundwater, and reduces the impact of drought.

Message 2. Resilient rangelands are the most climate-adaptive agriculture Kazakhstan has.

Pasture-based livestock is among the more weather-stable parts of Kazakhstan's farm economy. But when policy rewards output alone, stocking rates climb, and pasture is grazed faster than it can regrow. The short-term gain comes at the cost of the land's future productivity¹⁶. Beyond a point, more animals do not mean more food. Fewer livestock kept in good condition can deliver a more stable and, over time, more profitable enterprise than heavier stocking on exhausted pasture^{43,44}.

A resilient rangeland does the opposite. It reduces the impact of drought and keeps producing meat and milk when intensive systems fail in dry years. Water, cost and salinity risk confine irrigation to a small fraction of the country. The great majority of livestock production must rest on rangeland that cannot be irrigated¹⁷. The choice is not output versus conservation. It is output this season versus output every season. Climate change makes this more pressing, but its effects are strongly regional. Mean annual temperature rose by about 0.9°C between the 1961 to 1990 baseline and 1991 to 2020, with further warming projected toward mid-century. The largest increases in extreme-heat days are in the south, south-west and west¹². In those exposed regions, drought is already more frequent. Across much of central, eastern and northern Kazakhstan, by contrast, precipitation has been rising, improving pasture growth¹⁵. The message is not that the whole country is drying out. It is that a resilient rangeland lets each region hold its productive base, and that policy should concentrate where climate stress and degradation converge, above all in West Kazakhstan.

The consequences reach well beyond the individual farm. Rangelands hold around a third of the world's land-based carbon. Much of that carbon is stored below ground, where degradation releases it^{19,20}. Land degradation already costs Central Asia billions of dollars a year, most of it from rangelands. Restoration, by contrast, returns an estimated four to thirty-five dollars for every dollar invested^{21, 22}. Prevention is also far cheaper than repair. Across Central Asia the cost of acting against land degradation is estimated at roughly a fifth of the cost of inaction over thirty years, so avoiding degradation protects the budget as well as the land²¹. Keeping rangelands resilient is therefore not a separate environmental request. It is climate adaptation. It also delivers commitments the country has already made: the latest NDC highlights the restoration of degraded pastures, and the land sector is central to carbon neutrality by 2060²³.

Across Central Asia the cost of acting against land degradation is estimated at roughly a fifth of the cost of inaction over thirty years.



Fragile soils in dry regions are prone to degradation if overgrazed © Michele Bowe/RSPB

Message 3. Biodiversity is not a rival claim on rangelands. It is what keeps them productive.

There is a real short-term trade-off, and it is worth stating plainly. Wildlife can reduce the grazing available to livestock, and hay meadows are a genuine competing use of land²⁴. But vegetation diversity, soil life and grazing wildlife do not compete with production. They are part of the system that delivers it. What keeps a rangeland both diverse and productive is not a single ideal stocking rate. It is variety: a patchwork of grazing intensities, some areas grazed hard and some rested, with a role even for fire^{25,2}, and a mix of grazers, including cattle, sheep, horses and wild ungulates, that each use the vegetation in different ways¹¹. Most of this is invisible from the surface. In natural grassland the greater part of the living biomass sits below ground, in roots and soil life, and that is where most of the long-term carbon is held too. That diversity pays twice. It holds forage production steady, and it is also the route by which these soils store carbon: across 2,296 grassland sites, grassland with more plant species and stronger mycorrhizal association held more soil carbon, both near the surface and deep down⁹⁹. This variety, or heterogeneity, is how Kazakhstan can deliver several of its Kunming-Montreal Global Biodiversity Framework targets at once. A patchwork of grazing intensities on well-planned working land can also count toward Target 3, the 30-by-2030 area target, where it qualifies as an Other Effective Area-based Conservation Measure. Both are delivered through the same integrated spatial planning process that Target 1 requires²⁶.

Some of the most useful examples are those closest to farm production. Wild pollinators, mostly insects native to the steppe rather than managed honeybees, support a large share of crop and fodder production, since most of the world's leading food crops depend to some degree on animal pollination^{72,73}. The burrowing mammals of the steppe, often treated as pests, aerate and turn over the soil, cycle nutrients and maintain the fertility that pasture and cropland both draw on^{32,33}. A healthy, diverse wildlife community also supports the wider rangeland system that livestock depend on, from nutrient cycling to the habitat structure that keeps forage productive. These are benefits the sector already relies on, even where they are easy to overlook.

The saiga is the most visible example, and also the most debated. Its recovery, from fewer than 40,000 animals in 2005 to over 4.6 million saiga by 2026, is a national success and globally recognised as one of the fastest recoveries of any large herbivore^{27, 28}. At these numbers, the tension with livestock over pasture and water is real and lasting. Most of it falls on West Kazakhstan, where more than half the animals are found^{29,30}. That tension should be addressed directly, not ignored. But the recovery is an overall gain for the rangeland. The saiga carries value that livestock cannot replace, as a national symbol and part of Kazakh cultural identity³¹. As the only wild grazer left across much of the steppe, it is likely to contribute to nutrient cycling, seed dispersal and habitat diversity. These are the same functions that grazing wild ungulates perform in comparable grassland systems worldwide²⁵.

The wider evidence supports this, though it comes from separate studies of wild and of domestic grazers rather than systems where the two were directly compared. Grazing by wild ungulates in comparable grassland systems tends to raise plant diversity, ecosystem function and productivity rather than reduce it²⁵. Separate research on domestically grazed semi-arid rangeland finds a similar pattern: moderate livestock grazing maintains or raises plant diversity, while both total exclusion and heavy overgrazing reduce it². The same is true of Kazakhstan's own burrowing mammals. Ground squirrels and marmots, often treated as pests, act as ecosystem engineers: they turn over and aerate the soil, cycle nutrients and create habitat^{32,33}. The saiga's specific role is less fully quantified in Kazakhstan than in some other grassland systems. Field research to test it directly, including grazing exclosures, is now being set up. The international evidence is consistent and strong enough to act on, even while the Kazakhstan-specific evidence is still being built. A healthy rangeland is where the Ministry of Agriculture's productivity work and the Ministry of Ecology and Natural Resources' biodiversity work deliver together, not in competition.

A patchwork of grazing intensities and mixture of wild and domestic grazers is how Kazakhstan can deliver several of its Kunming-Montreal Global Biodiversity Framework targets at once. This patchwork on well-planned working land can also count toward Target 3, the 30-by-2030 area target, where it qualifies as an Other Effective Area-based Conservation Measure.

Message 4. Policy choices, not climate alone, will decide the future of Kazakhstan's rangelands.

Climate sets the pressures. It does not set the outcome. Working with stakeholders in West Kazakhstan, the project built four pictures of the landscape in 2050. They share one climate, yet they yield sharply different outcomes for pasture, wildlife and livelihoods. This is preliminary work, built on the structured judgement of local stakeholders rather than field measurement, but it points clearly in one direction: degradation can be slowed, and in places reversed²⁴. Two policy choices separate a degrading future from a resilient one: the direction of livestock investment, and the approach to saiga management.

Most of the tools that decide this sit at district level. They include seasonal pasture planning, the placement of water points, and the reallocation of leased but unused distant pasture⁸⁸. The reverse risk also matters: national policy set in Astana can default to a single, one-size-fits-all formula applied uniformly across very different regional conditions, when what pasture in the south-east needs can be the opposite of what pasture in the north needs. District-level tools only work if national policy leaves room for them to differ by region. The Law on Pastures already provides most of the legal framework. What is missing is delivery: the capacity, budget and coordination at district level to turn the pasture management plans it requires into practice³⁴. How land is allocated matters as much as how it is grazed. For example, leasing land for hay production in key saiga calving grounds worsens the conflict rather than easing it, since it removes forage saiga depend on at the most sensitive point in their life cycle and encourages fencing that blocks their movement²⁴.

Underlying all of this is the question of movement. Whether pastoralists move depends on tenure, markets, labour and infrastructure, including a shrinking pool of people willing to work as pastoralists⁸. Much of the national herd belongs to smallholders who graze their animals collectively and rely on common public pasture. The leasehold system tends to fragment this common pasture. What is needed is not a blanket expansion of common pasture, but a clear, regionally differentiated strategy for how it is allocated. In parts of the south-east, more common pasture may be right. Across much of central and northern Kazakhstan, by contrast, the colonisation of previously abandoned pasture has been slower¹⁶. Lightly grazed pasture of this kind often retains higher plant diversity than the heavily grazed ground near settlements, consistent with the general grazing-intensity evidence set out in Section 04, though this specific comparison has not yet been tested directly across Kazakhstan's regions. The practical guidance also exists. A World Bank and Ministry of Agriculture manual already sets out seasonal rotation, stocking rates and watering distances for household and family beef farms, which hold most of the country's cattle, and the Ministry runs an online pasture management platform to go with it¹⁰⁰. What is most often missing is delivery: the capacity to plan, the autonomy to fit local conditions, and real participation by pasture users. This should include the knowledge of mobile grazing that existed before the Soviet period and continued through it in adapted form, and which still survives as oral history in the villages.

Kazakhstan's Law on Pastures already provides most of the legal framework. What is missing is delivery: the capacity, budget and coordination at district level to turn the pasture management plans it requires into practice.



Livestock movement at sunset © Sorrel Jones

Message 5. Kazakhstan has committed to the right direction. The task now is to align its national strategy, incentives and delivery with those commitments.

Through the three Rio Conventions, Kazakhstan has already committed to this goal. It has pledged Land Degradation Neutrality by 2030 under the Convention to Combat Desertification¹³, the Kunming-Montreal Global Biodiversity Framework under the Convention on Biological Diversity²⁶, and carbon neutrality by 2060 in its latest climate pledge²³. Resilient rangelands serve all three at once. A single management decision, such as restoring a stretch of degraded pasture, can advance livestock productivity, biodiversity, land-degradation neutrality and the climate targets together²⁴.

The commitments are in place. What has not yet followed is the national strategy and the incentives that shape decisions on the ground. The plans that drive the sector are built around production. Biodiversity and the condition of the rangeland itself sit in separate environmental strategies that carry less weight. The subsidies that most shape land use reward output rather than the state of the pasture¹⁶. This is not a breach of Kazakhstan's commitments, which leave each country free to choose how it meets them. It is a gap between what the commitments intend and what the national system currently rewards. Part of the gap is that the same words mean different things to different people. 'Combating degradation and desertification' is often understood as bringing land back into farming and planting trees, rather than as keeping the steppe ecosystem itself healthy³⁵.

Delivery is the other half of the task. It is worth being clear about what restoration of open rangeland means, because it is easy to get wrong. It is not tree-planting, which can damage open steppe. It is not the reseedling of natural pasture either. It is the management of grazing itself: taking livestock off overgrazed land, and financing the mobility and patchwork of grazing intensities that let the steppe restore itself¹⁴. Carbon finance is an emerging option, based on soil carbon and avoided degradation rather than tree-planting, and it is now being tested at scale. A project targeting 500,000 hectares in northern and central Kazakhstan has begun rebuilding rangeland soil carbon through better grazing. It is at an early stage, but it uses digital soil-mapping that is overcoming the measurement costs that once made this unviable^{61,62}. What holds rangeland carbon back is not the price of carbon. It is laboratory capacity, an agreed national methodology, and political attention. Afforestation has a national tree-planting programme behind it. Rangelands have no domestic programme of comparable scale or profile, although sustainable pasture management has featured in donor-supported livestock work^{63,64,100}. The land-use laws largely exist. The first step is therefore not new legislation but delivery: pasture management plans that are consistently enforced and properly resourced, drawn up with local pasture users from the start⁸⁸.

Kazakhstan has pledged Land Degradation Neutrality by 2030 under the Convention to Combat Desertification, the Kunming-Montreal Global Biodiversity Framework under the Convention on Biological Diversity, and carbon neutrality by 2060 in its latest climate pledge. Resilient rangelands serve all three at once.



Surveying soil carbon in West Kazakhstan
© Michaela Butorova-McGurk

Message 6. Kazakhstan can lead the region on resilient rangelands, and 2026 is the moment to show it.

Kazakhstan does not have to follow on resilient rangelands. It can lead. The country holds the largest tract of intact temperate rangeland remaining anywhere on the planet. Its progress against Land Degradation Neutrality is measurable. The saiga recovery has already shown the region what Kazakhstan's leadership can deliver^{37,27}. By regional standards its rangelands remain in relatively good condition, and are improving rather than degrading across much of the country. This is a strong base to build on. The same challenges run from Mongolia to Turkmenistan, so there is a real chance to show what works. But Kazakhstan's land-tenure system is distinctive, so solutions will need adapting from one country to the next rather than copied directly³⁵.

Kazakhstan has also designated very large new protected areas. At around 10.1% of its land area, the protected area network is still well short of the 30% it has committed to under the biodiversity framework, but the direction is right^{26,96}. Beyond their conservation value, the strictest category of these protected areas, the zapovedniks, has real scientific worth. Human use, including grazing, is legally excluded there. They serve as reference systems: a record of how the steppe behaves under wild grazers alone, against which working pasture can be judged. Kazakhstan's wider network of national parks and nature reserves is not grazing-free in the same sense. Some permit regulated livestock use, and all carry the legacy of the grazing regimes that shaped them before designation. They are better read as a gradient of grazing intensity than as a single ungrazed baseline. Together, they give the country a range of grazing conditions that is close to unique among the world's temperate grasslands, and a shared achievement across the ecology and agriculture work of government.

Leading means a whole-of-government effort, not the Ministry of Agriculture alone. Pasture sits with agriculture, while nature and climate sit with ecology. Bringing biodiversity into local planning needs the two to work together, and it also needs the Ministry of National Economy, which oversees regional and rural development and through which much of the delivery on the ground actually runs. The regional appetite for this is clear. In 2021 the UN General Assembly declared Uzbekistan's Aral Sea region a zone of ecological innovations and technologies: a neighbour turning a degraded landscape into a focus for investment and reform³⁸. The timing helps. 2026 is the International Year of Rangelands and Pastoralists, and UNCCD COP17 offers a regional audience^{39,35}. But the case does not depend on international recognition. Kazakhstan's strength here is domestic: a country managing its own land well and securing its own food. The international stage is where that gets recognised. It is not the reason to act.

Pasture sits with agriculture, while nature and climate sit with ecology. Bringing biodiversity into local planning needs the two to work together, and it also needs the Ministry of National Economy, which oversees regional and rural development and through which much of the delivery on the ground actually runs.



Diverse species are important for rangeland resilience
© Michele Bowe/RSPB

01: Introduction and global context

Kazakhstan's rangelands in a world that is watching

Kazakhstan is a country rich in rangeland habitat. Between about 180 and 186 million hectares is pasture, close to two-thirds of the country's entire land area on either figure³. From the Ural River valley in the west to the Altai foothills in the east, rangelands define the landscape, shape the climate, and have structured Kazakh life for thousands of years. This is not background scenery. It is the productive base on which the country's agriculture, rural livelihoods and cultural identity all rest. And it is at a turning point.

**180-
186M**

hectares of pasture,
close to two-thirds of
the country³

**26.6-
27.1M**

hectares already
degraded and
growing¹²

39%

of gross agricultural
output from
livestock⁴

Kazakhstan's rangelands have been through turning points before. The Virgin Lands campaign of the 1950s and 1960s ploughed tens of millions of hectares of rangeland into cropland, transforming the northern landscape within a generation³⁷. The break-up of the Soviet Union then restructured land tenure, herd sizes and settlement patterns almost overnight. That institutional collapse pulled the landscape in two directions at once. Near settlements, land use intensified and degraded. Further out, abandoned cropland and understocked distant pasture began reverting toward native vegetation⁸⁴. It was a mixed legacy, not a one-directional decline, and the two patterns are still visible side by side today^{7,14}. A third turning point is now underway. It combines livestock expansion targets, climate-driven drought concentrated in the west, and growing recognition that the rangelands cannot keep absorbing pressure without consequence.

The choices Kazakhstan makes in the next decade will determine whether the rangelands enter 2050 as a productive, resilient national asset, or as a degrading resource that undermines the very agricultural growth targets it is meant to support. Those choices are not made in conservation ministries. They are made in agriculture policy, pasture tenure law, investment strategy and regional land management. This document is written for those conversations.

Kazakhstan's rangelands in global context

Rangelands, the grasslands, savannas and shrublands managed for livestock or wildlife, cover more than half the world's land surface³⁵. They support the livelihoods of over one billion people. They hold approximately one-third of the world's land-based carbon. They are home to a disproportionate share of terrestrial biodiversity³⁵. They are also the most degraded and, relative to their extent, least protected terrestrial ecosystem on Earth. An estimated half of the world's rangelands are in some state of decline³⁵.

Kazakhstan holds the largest tract of intact temperate rangeland remaining anywhere on the planet³. The Eurasian rangeland belt, often called the steppe, stretches from the Carpathians to Manchuria and once covered roughly ten million square kilometres³⁵. Today, Kazakhstan's share is by far the largest unbroken remnant. This is not simply a local conservation asset. It is a globally significant landscape, and what happens to it matters beyond Kazakhstan's borders.

Kazakhstan's share of the Eurasian rangeland belt is by far the largest unbroken remnant. This is not simply a local conservation asset. It is a globally significant landscape, and what happens to it matters beyond Kazakhstan's borders.

Key Message 1

Kazakhstan's rangelands are a national asset. Food security, rural livelihoods and national development all depend on them.

EVIDENCE IN FOCUS

Policy has already reshaped the rangelands twice

Kazakhstan's rangelands are sometimes discussed as though their condition is fixed by climate and geography. In this view, policy operates only at the margins. The twentieth-century record does not support that view. From 1954 the Soviet government's Virgin Lands campaign converted approximately 25.5 million hectares of rangeland into cropland in northern Kazakhstan by 1961^{37,102}. The campaign briefly made Kazakhstan a major grain producer. But it replaced a perennial grass system adapted to drought with an annual monoculture. That monoculture had none of the root structure needed to hold soil or protect against dry years. Wind erosion followed through the 1960s and 1970s, made worse at first by regular deep ploughing that left the soil loose and bare, much as in the American Dust Bowl. Cultivation techniques were later changed to disturb the soil less, which reduced the erosion but did not restore the grassland.

The second transformation ran in the opposite direction. The 1991 break-up of the Soviet Union dismantled the collective farm system almost overnight. That system had organised seasonal grazing routes, herd movements and settlement patterns⁷. Approximately 19 million hectares, 54% of Kazakhstan's cropland, were abandoned between 1991 and 2000. This happened as the economics of cultivation collapsed along with Soviet-era input subsidies³⁷. In Kostanay oblast alone, livestock numbers fell from around 3.0 million to 0.7 million head between 1990 and 1999³⁷. Peer-reviewed survey research in south-eastern Kazakhstan found that, at the time of the study, almost 30% of farms remained entirely sedentary on village pasture, and households, similarly constrained, held around 60% of the district cattle population studied. Over half of surveyed households and around a third of farms considered the village pasture they depend on to already be degraded¹⁶. That household share was specific to the districts studied and to that point in time; more recent expert assessment suggests the household share of Kazakhstan's national herd has since fallen further, to closer to 40% (Kazakhstan Statistical Agency. 2024. *Agriculture, Forests and Fishing in the Republic of Kazakhstan 2019-2023 [Sel'skoe, Lesnoe i Rybnoe Khozyaistvo v Respubliki Kazakhstan]*. Astana. In Russian.).

Today's pattern in Kazakhstan's rangelands is degraded ground near settlements and underused pasture further away. This is largely the unresolved legacy of an institutional collapse more than three decades old. It is not an accident of climate. Both twentieth-century transformations were driven by policy and institutional change. The Comprehensive Livestock Development Plan for 2026 to 2030 and the implementation of the existing Law on Pastures are the next large-scale policy intervention in the history of Kazakhstan's rangelands. This history does not raise the question of whether policy will reshape the rangelands again, because it already is doing so. The real question is whether it repeats one of the two previous failures, a fragile monoculture or an unreplaced institution, or avoids both.

At the same time, the country faces conditions that are increasingly common across dryland Asia. These include rising temperatures, more variable rainfall in some regions, growing demand for livestock products, and the legacy of land management decisions made under a very different political system⁷. It is worth being precise about where these pressures fall. The southern and western parts of Kazakhstan are already the most vulnerable to drought nationally. Climate projections, by contrast, point to precipitation increasing across roughly half the country, particularly the northern and central regions, over the coming decades¹⁵. Kazakhstan's rangeland challenge is therefore regional as much as national. The lessons it learns are directly relevant to its neighbours in Mongolia, Uzbekistan, Kyrgyzstan and beyond.

02: What we mean by a resilient rangeland

A definition that works in Kazakhstan

The word “resilience” is used often in environmental science. In the context of Kazakhstan it carries a specific and important meaning. A resilient rangeland is not simply a healthy one or a protected one. It is one that can absorb pressure, such as drought, heavy grazing or harsh winters, and recover its productive capacity afterwards. Resilience is about function over time, not the condition of the land at a single moment.

Here is a practical definition. A resilient rangeland keeps providing forage, water and livelihoods through drought and disturbance, and recovers when pressure eases⁶. It does not collapse under stress. It absorbs the pressure and recovers. That capacity is what distinguishes a rangeland that supports the same herd sizes through a dry decade from one that degrades in the second bad year and does not come back.

Resilience has four dimensions

In the Kazakhstan context, rangeland resilience operates across four connected dimensions. Each matters on its own. Together, they determine whether rangelands can sustain production across decades and climate variability.

Ecological resilience: the capacity of the plant and soil community to maintain cover and diversity under grazing pressure and drought, and to recover when pressure is reduced. A pasture with twenty plant species is more resilient than a monoculture of a single grass²⁵; diverse root systems hold soil through dry years, and mycorrhizal fungi in intact soil sustain the below-ground nutrient cycling that pasture productivity depends on⁷⁵.

Livelihood resilience: the capacity of pastoral households and rural communities to sustain incomes and food security across variable seasons. This depends on having enough land to move between pastures, access to water points across the landscape, and the flexibility to reduce herd sizes temporarily without losing the productive base entirely¹⁶.

Governance resilience: the capacity of the institutional and legal framework to manage use of rangelands adaptively, to respond when degradation is detected, to enforce pasture management plans, and to allocate land in ways that enable seasonal movement rather than locking pastoralists to a single location.

Landscape resilience: the capacity of rangelands at scale to maintain ecological function, carbon storage, water regulation, wildlife habitat and connectivity across migration routes, even as individual patches experience pressure and recovery cycles.

These four dimensions reinforce each other. Ecologically healthy pasture gives pastoralists the flexibility to manage livelihoods adaptively. Institutions that enable seasonal movement protect ecological recovery. A connected landscape sustains wildlife that contributes to ecological function. And a functioning ecosystem provides the services, clean water, stable soil and carbon storage, that underpin all four dimensions at once.

A resilient rangeland keeps providing forage, water and livelihoods through drought and disturbance, and recovers when pressure eases. It does not collapse under stress. It absorbs the pressure and recovers.

What resilience is not

Resilience is sometimes confused with protection. A resilient rangeland is not one that is fenced off from use. Most of Kazakhstan's rangelands are working land, grazed and leased, and that is appropriate. The question is not whether they are used, but how. Moderate, mobile grazing across a diverse landscape is itself a driver of resilience: it is the form of pastoralism that sustained this landscape for millennia. It is intensive, concentrated, immobile grazing that damages rangelands.

Resilience is also not simply about stocking rates. A pastoral system can be understocked in some areas and catastrophically overstocked in others at the same time. That is exactly the pattern that has emerged in Kazakhstan since the Soviet Union's break-up, with livestock concentrated near settlements while distant pastures sit unused^{7,8}. Managing resilience means managing distribution, across the landscape and across time, not just total numbers. Seasonal movement, both livestock and saiga ranging further north or south, east or west as weather and density shift, is itself part of how the system copes with variability. Resilience works in both directions. A single national narrative of overgrazing does not fit every region, or every season, equally.

Most of Kazakhstan's rangelands are working land, grazed and leased, and that is appropriate. Moderate, mobile grazing across a diverse landscape is itself a driver of resilience: it is the form of pastoralism that sustained this landscape for millennia.

03: What resilient rangelands provide

Benefits that belong to the agricultural balance sheet

The temptation when describing rangeland benefits is to list ecosystem services: a long inventory of goods the habitat provides, from carbon to pollinators to cultural heritage. This is accurate but incomplete. It frames Kazakhstan's rangelands as an environmental amenity rather than a productive asset.

The framing in this chapter is different. Each benefit below is something the agriculture sector depends on directly. Without it, the Livestock Development Plan targets, 12 million cattle, 28 million sheep and goats, 1.8 million tonnes of meat, and doubled exports, become harder or impossible to reach⁴. Biodiversity and carbon are parts of the same productive system. They are not additions to it.

Forage and livestock production

The most direct benefit is the most obvious: the rangelands feed the animals. Kazakhstan's national livestock herd already contributes 39% of gross agricultural output, and its productivity rests heavily on the grazing capacity of the pasture. This is not the whole picture: many herds also depend on winter fodder from cultivated hay, grain and crop residues, and some systems today keep livestock with little or no access to natural pasture at all. But for the great majority of the national herd, rangeland forage remains the primary and lowest-cost feed base. The Comprehensive Livestock Development Plan for 2026 to 2030 sets ambitious growth targets for cattle, sheep and goats, meat output and exports⁴. Every one of those targets depends on the rangelands' ability to produce forage reliably: this year, next year, and through the droughts that will come with increasing frequency in the drought-prone south and west of the country^{40,15}.

A degraded pasture produces less forage per hectare. It supports fewer animals per unit area, and recovers more slowly after drought⁵. Over time, the area needed to sustain a given herd size grows. This pushes grazing pressure outward and accelerates the degradation frontier where it is occurring. The relationship between rangeland condition and livestock productivity is not a straight line. Pastures can degrade slowly for years before collapsing rapidly, and recovery, if it comes, takes far longer than degradation.

39%of gross agricultural output from livestock⁴**12M**cattle targeted by the 2030 Livestock Plan⁴**1.8Mt**meat output target, all dependent on rangeland capacity⁴

Soil health

Ground cover is the most important protection rangelands have against soil degradation. Plant roots hold soil particles together. Root exudates feed the microbial communities that build soil organic matter. Canopy cover intercepts rain and reduces the force of drops that would otherwise dislodge surface particles⁵. When ground cover is lost, through overgrazing, drought or ploughing, erosion accelerates rapidly and soil structure deteriorates⁵.

In Kazakhstan's context, salinisation is an additional concern. Irrigation-fed cropland surrounding rangeland areas, and the legacy of Soviet-era drainage disruption, have left large areas vulnerable to salt accumulation⁴². Healthy rangeland vegetation has deep root systems that draw water from depth. This helps regulate the water table and reduce salinisation risk⁴². This is a direct agricultural benefit: saline soils are unproductive soils.

Water regulation

Healthy rangeland absorbs rainfall and releases it slowly. Good ground cover and intact soil structure let rain soak into the ground rather than run off. This recharges groundwater and feeds streams and rivers gradually over time. Degraded, bare soils shed water rapidly instead. This generates flash runoff that carries topsoil with it and reduces the water available to livestock and settlements downstream⁵.

In the drought-affected south and west, where water scarcity already constrains production¹⁵, this regulation function is an agricultural asset of growing importance. Managing rangelands for resilience is also managing for water security.

Carbon storage

Rangelands hold approximately one-third of the world's land-based carbon¹⁹. In grasslands specifically, much of that carbon sits below ground, in roots and soil organic matter. Modelling of California's drought- and fire-prone rangelands found that this belowground carbon is largely protected from the wildfire losses that increasingly affect forests, and that grassland ecosystems stayed a more reliable net carbon sink than forests under 21st-century drought and warming scenarios²⁰. This below-ground carbon store is both more resilient and more threatened than is commonly recognised. When the vegetation that supports it is removed and the soil is disturbed, the carbon is released as CO₂ and methane¹⁹.

This below-ground system is not only a carbon store. Root biomass and soil microbial communities, including mycorrhizal fungi, are also central to forage production itself: they structure the soil, hold water through dry spells, and cycle the nutrients that plant growth and soil fertility depend on⁷⁵. Globally, vegetation that partners with mycorrhizal fungi, arbuscular, ecto- and ericoid types combined, holds around twelve times more aboveground carbon than non-mycorrhizal vegetation, and soil carbon stocks are themselves linked to the balance of mycorrhizal types present in an ecosystem⁷⁵. A 2026 global assessment puts the scale of this system in perspective: the living fungal networks in the world's topsoils weigh in the order of 300 million tonnes and move roughly a billion tonnes of carbon into soils each year, with grassland and savanna biomes among those holding the greatest densities⁹⁷. A survey of 2,296 grassland sites has since shown how this translates into stored carbon: mycorrhizal association raises soil organic carbon in both topsoil and subsoil, and it does so largely by increasing plant diversity and pushing more of the plant's growth below ground. Notably, the same study found no overall relationship with aboveground productivity, so this is a soil carbon effect rather than a yield effect⁹⁹. That same global analysis found that converting natural land to cropland measurably reduces this mycorrhizal vegetation, in part because ploughing and fertilisation damage the fungal networks that mycorrhizal plants depend on⁷⁵. Ploughing native or long-abandoned rangeland for cropland disrupts these root systems and fungal networks and releases the carbon they hold. Recovery of both is slow. A study

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tracking Kazakhstan's own abandoned cropland found that vegetation converged toward native rangeland composition only where the land was grazed afterwards, and even *then* over a period of decades rather than seasons¹⁴. This is directly relevant to Kazakhstan today. Some of the land abandoned since the 1990s has regained meaningful ecological and carbon value over the intervening decades, and there is renewed interest in returning parts of it to cultivation. Recultivating it would risk losing that accumulated value for a return that takes generations to rebuild. This is why avoiding the conversion of native and long-recovering rangeland is generally a more effective strategy than restoring it after the fact^{7,14}.

The implication is significant, though it needs a precise reading. Rangelands that are in good condition, and have been stable for some time, tend toward carbon equilibrium: they neither emit nor sequester much net carbon. It is chiefly rangeland that is recovering, moving from a degraded to a healthier state, that acts as a temporary carbon sink, while degradation itself is what turns the system into a source. Because most of Kazakhstan's rangeland has been disturbed in one way or another, much of it does carry that sink potential, but building soil back to the condition found at undisturbed sites is the work of centuries rather than decades. That is also why the undisturbed sites Kazakhstan still holds, which many countries no longer have, are worth protecting in their own right. The scale of the sequestration potential this implies is genuinely uncertain, hard to measure or predict, and may be overstated in some international estimates; what is much better established is that avoiding new degradation, and the carbon release that comes with it, is a clear and valuable outcome regardless. The country's NDC 3.0 already recognises the mitigation value of restoration. It names pasture restoration as a climate mitigation measure and places the land sector at the centre of the pathway to carbon neutrality by 2060²³. Preliminary carbon measurements now under way across Kazakhstan's rangelands will help establish how large this effect actually is; the full dataset is not yet published. Investing in resilient rangelands is not a separate environmental agenda. It delivers against climate commitments Kazakhstan has already made.

Climate buffering

Resilient rangelands are Kazakhstan's most effective climate adaptation tool, particularly in the drought-exposed west. Diverse plant communities combine deep-rooted perennials, drought-tolerant species and seasonal variation in productivity. This spreads the risk of total forage failure across a wider range of conditions. When a monoculture fails in a dry year, everything fails. When diverse grassland is stressed, drought-tolerant species take over and maintain some level of productivity until conditions improve²⁵.

This buffering function is most valuable precisely where climate variability is rising fastest: the south and west, again, rather than the entire country. Investment should target where climate stress is genuinely concentrated. It should not assume climate stress is uniform across the country.

Every hectare of degraded pasture that is restored to productive condition is a hectare that moves from harming Kazakhstan's carbon account to helping it.

Key Message 2

Resilient rangelands are the most climate-adaptive agriculture Kazakhstan has.

EVIDENCE IN FOCUS

The economic case: managing conservatively for resilience pays

Kazakhstan does not need a single anecdote to make this case. It has its own regional economics. Land degradation already costs Central Asia billions of dollars a year, and most of this comes from rangelands. Restoration is estimated to return between four and thirty-five dollars for every dollar invested^{21,22}. Preventing degradation is cheaper still. Across Central Asia the cost of acting against land degradation is estimated at roughly a fifth of the cost of inaction over thirty years²¹. That is a mainstream economic return, not a small environmental one. It means that, based on the numbers, there is no real choice between production and resilience.

The same logic holds for an individual stocking decision. The international evidence on this point is now direct rather than anecdotal. A 2024 peer-reviewed bio-economic modelling study looked at semi-arid rangeland cattle enterprises in Western Australia. That region was chosen because it faces frequent, unpredictable drought, much like West Kazakhstan. The study found that a conservative stocking rate, set at around two-thirds of the locally recommended maximum, left enough reserve forage in the ground to sustain the herd through drought years. This produced a more stable enterprise, and over time a more profitable one, than heavier stocking⁴³. This matches the wider stocking-rate literature. Heavier stocking increases output and profit in favourable years. But it does so by drawing down the reserve of standing forage a herd needs to survive when the rain does not come. This same risk imbalance makes heavy stocking a risky strategy in a drought-prone system⁴⁴. In Kazakhstan's rangelands, drought is a recurring feature rather than an occasional shock. They are exactly the kind of system in which this logic applies most strongly.

This kind of focus on resilience is also increasingly a commercial asset rather than a cost. The Livestock Development Plan commits to doubling meat exports to roughly 165,000 tonnes⁴. Separately, the industry is pursuing premium Halal-certified positioning in Gulf markets⁴⁶. Both depend on consistent, reliable supply. A resilient rangeland delivers exactly this, and an exhausted one cannot.

04: What keeps a rangeland resilient

The foundations of functioning rangelands

Rangeland resilience is not an accident. It is the product of specific ecological, management and governance conditions. When these are present together, they enable rangelands to absorb pressure and recover. Understanding what maintains resilience is essential to knowing where to invest, what to protect, and what policy changes will do the most to sustain production over the long term.

Plant and habitat diversity

A diverse plant community is the most fundamental driver of a rangeland's resilience. Different species respond differently to drought, cold, grazing pressure and soil conditions. A diverse plant community functions across a wider range of conditions than a species-poor one does. When one part of the community is stressed, others compensate. This is an insurance effect: the ecological equivalent of a diversified business portfolio, where a loss in one holding is offset by gains in another. It is what allows a healthy rangeland to maintain productivity through conditions that would destroy a monoculture²⁵.

Experimental evidence from grassland ecosystems confirms that moderate, well-managed grazing by large ungulates can increase plant species richness rather than reduce it. A ten-site study across Yellowstone National Park found that grazing by native migrating ungulates tended to raise local plant richness, with the effect strongest in the more productive grasslands. Grazing reorganised plant diversity rather than simply removing it²⁵. A separate eight-year grazing gradient experiment, from 2014 to 2021, in semi-arid *Stipa* grassland in Inner Mongolia, an ecosystem closely comparable to Kazakhstan's, found that moderate grazing did not reduce richness. Instead it maintained richness indirectly, by favouring the dominant *Stipa* grass that shelters other species, and by drawing down the excess biomass that would otherwise crowd them out in wetter years². Neither study supports grazing without limit. Both total exclusion and heavy overgrazing reduce diversity in both systems. The message for a Kazakhstani rangeland of the same broad type is that moderate, well-distributed grazing sustains plant diversity, and that removing grazing altogether can harm diversity as much as overgrazing does. The same logic argues against a different kind of simplification: replacing diverse natural pasture with a reseeded, 'improved' monoculture, whether an introduced high-yield grass or a limited-diversity forage mix. Such pasture can lift short-term forage volume. But they trade away the insurance effect that diversity provides, leaving the pasture more exposed to drought, pests and disease. They are also markedly harder to reverse than a grazing regime, once established. In West Kazakhstan today, farmers are increasingly reseeding natural pasture to raise hay yield, a high-investment change that then leads some to fence off the reseeded land to protect it from saiga. The result compounds the two problems this section describes: less diverse pasture, and a fragmented landscape that blocks the movement of saiga and other species. Chemical control of unwanted plants on natural pasture carries a related risk in a different form. Large-scale herbicide use to simplify grazing vegetation is a practice used in some ranching systems elsewhere. So is the large-scale poisoning of burrowing rodents such as souslik, to suppress them as a perceived pest. Both remove the diversity that keeps a rangeland productive and resilient. Both should be treated as a last resort, not a routine tool^{53,25,2, 71}.

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Landscape connectivity

Rangelands are not a uniform surface. They are a mosaic of soil types, moisture gradients, topographic positions and plant communities. Each part of the mosaic supports different species and responds differently to seasonal conditions⁶. Maintaining connectivity across that mosaic, so that mammals, birds, insects and seeds can move between patches, is essential to the resilience of the system.

Connectivity has been reduced in Kazakhstan in three ways: by fencing that follows leasehold and cadastral boundaries rather than ecological gradients, by infrastructure that interrupts seasonal migration routes, and by the breakdown of the social institutions that managed access to distant pastures¹⁶. Restoring connectivity does not require removing all infrastructure. It requires managing infrastructure with ecological function in mind. Kazakhstan's expanding network of large protected areas is a genuine asset here. Its strictest zapovednik core areas are legally free of grazing. They provide an unusually large, unfenced baseline for rangeland processes with only natural grazers present, a reference condition that is rare in temperate grassland systems worldwide, and worth recognising as a national achievement in its own right.

Connectivity also depends on avoiding the opposite failure. Land grazed too lightly, or not at all, loses diversity just as surely as land grazed too hard. Litter and standing dead vegetation accumulate where grazing is absent. This crowds out the low-growing species that depend on open ground, and builds up the fuel load that makes wildfire more severe when it does occur. Periodic fire, alongside grazing, was historically part of what kept the Eurasian steppe's vegetation in balance. The loss of both grazing and fire together, not grazing alone, is part of what has changed since the Soviet Union's break-up¹. Wild grazers such as saiga can substitute for some of this missing pressure on land that livestock do not reach. But connectivity for wildlife has to be paired with a livestock grazing regime that does not leave that land undergrazed instead.

Mobile and rotational grazing

The single most important management factor in Kazakhstan's rangeland condition is the ability of pastoralists to move livestock seasonally across the landscape. Hay meadows and other cropland, sited to serve both livestock and nature, matter too. Hay fields are often placed on riparian land, and they are as much a part of a working rangeland system as open pasture. They deserve explicit treatment alongside grazing, not to be left out of the picture. Research on Kazakhstan's rangelands, from Soviet-era studies through to more recent, Kazakhstan-based assessments, consistently shows that the current pattern, livestock concentrated near settlements year-round with distant pastures left idle, is a primary driver of degradation where degradation occurs^{7,81,83}. Overgrazing near villages, combined with undergrazing at distance, produces degraded zones expanding outward from settlements, and unused pasture that loses diversity through lack of disturbance.

Rotational grazing rests sections of pasture while others are grazed, then rotates. This allows recovery between grazing events. Seasonal movement to distant summer pastures has the same effect at landscape scale: it distributes grazing pressure and gives each area time to recover⁵. Heterogeneity matters as much as the total amount of grazing. A patchwork of intensively grazed, moderately grazed and rested land supports more biodiversity than uniform grazing at any single intensity. This is precisely the mosaic already emerging across Kazakhstan, as documented above¹. A rotational system needs to preserve that patchwork of intensities, rather than smooth grazing pressure evenly across the landscape. Averaging out grazing intensity risks losing the same heterogeneity that supports biodiversity, a pattern also documented in the historical loss of low-intensity grazing commons in Europe^{69,70}. Neither tool requires large capital investment. Both require institutional and tenure conditions that do not currently exist everywhere.

How land is allocated matters as much as how it is grazed. Leasing land for hay production in key saiga calving grounds worsens the conflict rather than easing it, because it removes forage the animals depend on at the most sensitive point in their life cycle and encourages fencing that blocks their movement²⁴. This variety argument has a sharper edge close to villages. The high-intensity, heavily grazed zones that form immediately around settlements and livestock camps, similar to the historic concentration zones around auls, are not simply degraded land. They sit at the upper end of the grazing-intensity gradient. They support species that need short, heavily grazed, dung-rich grassland, found nowhere else in the landscape. The clearest Kazakhstan example is the Sociable Lapwing (*Vanellus gregarius*), a Critically Endangered wader that breeds almost exclusively in Kazakhstan. It nests overwhelmingly in these settlement-edge grazing zones, not in taller, less grazed steppe^{65,66}. Research on its nesting sites found a strong, direct link between grazing intensity and nest density around villages, with nest density rising sharply above a threshold level of grazing⁶⁵. As Soviet-era pastoral use around villages broke down in the 1990s, this high-intensity

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niche shrank sharply, and Sociable Lapwing habitat suitability fell with it. The recent national recovery in livestock numbers has since partly restored suitable habitat in places⁶⁷. But the species remains Critically Endangered, and its status still depends on retaining these settlement-edge grazing zones, rather than smoothing them away through uniform rotational grazing. This is not an argument for promoting overgrazing as policy. The point is narrower: a small share of heavily grazed, settlement-edge pasture is ecologically valuable in its own right. A mixed grazing landscape should deliberately keep some of it, rather than treating it only as a problem to fix.

Horses: a distinct and highly mobile grazer

One part of Kazakhstan's livestock system is growing faster than any other part. Official figures show the national horse herd rising from around 2.9 million in 2020 to approximately 4.6 million by the end of 2025. This is a growth rate of roughly 10% a year. The herd is climbing back to approximately its estimated pre-collectivisation level of about 4.64 million^{10,41,9}. As horses become a larger share of the grazing herd, how they use the rangeland matters more for its resilience.

Horses behave differently from cattle and sheep. Horses are hindgut fermenters rather than ruminants. This means they process high volumes of coarser, lower-quality forage, and they are less selective about what they eat. This is a well-established difference. It lets horses coexist with ruminant livestock on the same rangeland, rather than compete with them¹¹. Horses are also highly mobile. Under year-round extensive management they range far more widely and independently than herded cattle or sheep, and their daily grazing range varies markedly with season and weather. Horses and ruminants are usually kept in separate herds, and horses range largely independently, so where both use the same landscape the grazing pressure between them is spread more widely. It also adds to the variation in grazing intensity that keeps a rangeland diverse and productive. At high local densities, though, horses can still cause localised overgrazing, even while national figures look sustainable.

Native grazers: the saiga and the rangeland system

The saiga antelope (*Saiga tatarica*) is the most visible sign of what a functioning rangeland looks like. It is also the case most often cited internationally as evidence of what is possible. As of 2026, it is also the clearest test of whether Kazakhstan can manage agriculture and biodiversity together, rather than treating them as competing claims on the same land.

By 2003, poaching following the break-up of the Soviet Union had reduced the Ural saiga population to just over 6,000 animals⁴⁷. Nationally the population fell to around 21,000 animals in 2003 and was still below 40,000 in the mid-2000s⁴⁸. The Altyn Dala Conservation Initiative was formed in 2005 as a partnership between ACBK, the Government of Kazakhstan and international conservation organisations. It combined anti-poaching enforcement, a network of new protected areas, sustained population monitoring, environmental education and awareness raising in rural communities, and support for action against the illegal wildlife trade. The recovery that followed is internationally recognised as one of the most substantial wildlife recoveries recorded for any large mammal. In December 2023 the IUCN changed the saiga's global Red List status from Critically Endangered to Near Threatened. It cited the species' recovery from fewer than 40,000 animals nationally in the mid-2000s to over 1.9 million by late 2023⁴⁹. The April 2024 aerial census put the national total at approximately 2.8 million, of which the Ural population accounted for about 1.62 million²⁷. By April 2025 the national total had reached approximately 4.1 million, with the Ural population at around 2.3 million³¹. The saiga also carries meaning that livestock cannot replace. It is a national symbol and part of Kazakh cultural identity, and that is part of why its recovery matters to the country and not only to conservationists³¹. By the 2026 spring census, the national total across all three populations had passed 4.6 million. The Ural population, which overlaps most directly with livestock country, was at around 2.7 million²⁸.

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~6,000Ural population low point, 2003⁴⁷**2.3M**Ural population, 2025³¹**4.6M+**national total, spring 2026 census²⁸

This recovery has also produced a real and escalating conflict with livestock farmers, concentrated in West Kazakhstan. Farmers report that saiga herds trample crops and hay meadows and compete with livestock for pasture and water⁴⁸. These costs are not anecdotal. In July 2025 the Ministry of Ecology and Natural Resources began a population control programme in West Kazakhstan. This followed sustained complaints from regional farmers and a scientific assessment. The assessment found that the saiga population could not continue growing at its current rate without harming both pasture and the saiga population itself³⁰. The rapid growth of the saiga population may itself be linked to land-use changes, such as cropland and hay-meadow expansion on the steppe, and to burning that produces a flush of new grass growth, though the precise causes of the increase are not fully established. Between July and November 2025, official figures reported by the Prime Minister's press service record approximately 196,000 saiga culled and processed through licensed facilities⁵⁰. This is roughly 5% of the national population of about 4.1 million, and below the 20% initially proposed by regional authorities³⁰. The balance between farmers seeking faster relief and conservationists urging caution remains unresolved.

Saiga are functionally different from sedentary livestock. Saiga historically had a nomadic and migratory lifestyle. This is still evident in some populations, though the Ural population's migration, while substantially restored over recent years, still covers less ground than the historical record describes. This lifestyle distributes nutrient cycling and seed dispersal more widely than domestic herds reach. Because they keep moving through the year, that nutrient cycling is spread across the whole migration range rather than concentrated in one place⁴⁸. On the available evidence, they are likely to support plant diversity, nutrient cycling and habitat variety in ways that complement rather than duplicate livestock grazing. They reach areas that domestic animals do not, and they select different plant species. Kazakhstan-specific field evidence using modern quantitative methods for these functions is still being built. Soviet-era literature describes a role for saiga in pastureland regeneration, but it predates the methods now used to test such claims rigorously⁶⁸. Researchers are now working to establish grazing exclosure experiments. This method is used extensively in North American rangeland science but has never previously been applied at scale in Kazakhstan. It will separate the effects of saiga grazing from livestock grazing and from ungrazed control plots. Until that Kazakhstan-specific evidence is published, the wider international literature on wild grazers supports the claim. But it should not be overstated as settled Kazakhstan-specific fact.

The tension between saiga herds and livestock farmers is real. Competition for pasture, water and hay meadows creates genuine short-term costs for pastoral households. Acknowledging this tension honestly is the starting point for managing it.

An emerging response has been piloted by ACBK in partnership with pastoral communities in the Ural population's range. It trains pastoralists to record saiga presence, movement and livestock interactions directly²⁹. This builds better ecological data, and it addresses a specific complaint: that saiga management decisions have in the past been made using data that neither involved the people living with the consequences nor reflected their experience. It also gives pastoralists a channel through which their costs can be recognised before they escalate into a national cull debate. At root, this conflict is not only an ecological problem. The trust deficit driving it runs mainly between pastoral communities and government, which sets and enforces saiga policy. ACBK is the main national conservation organisation active on the ground, and it plays a supporting technical role within that relationship rather than standing in for government. Building trust with ACBK should not be read as resolving pastoralists' relationship with government itself.

Soil ecology and ecosystem engineers

Below the visible surface of the rangelands, a complex community of organisms sustains the functions that underpin everything above. A large-scale study of the Yellow Ground Squirrel (*Spermophilus fulvus*) across central Kazakhstan's dry rangeland looked at its abundance as an ecosystem engineer. This species aerates and turns over soil, cycles nutrients and creates habitat for other species. The study found that this depends on an intermediate level of grazing. Density rose with the open, short-vegetation conditions that moderate grazing creates. It fell sharply where grazing had ceased and vegetation grew too dense for the animals to detect predators or to forage. A similar decline was also recorded for related species in Kalmykia and north-eastern Ukraine³³. The same moderate, mobile grazing that keeps pasture productive for livestock also sustains the soil engineers that maintain soil function. Both overgrazing and abandonment reduce them. This has a wider implication that is easy to miss. The heavily grazed ground around settlements is not simply damage. It is a distinct habitat that some steppe insects and birds depend on, and it is the modern equivalent of the grazing concentrations that formed around auls a century ago. As semi-subsistence herding declines, that habitat is disappearing along with it. The aim is therefore a range of grazing intensities across the landscape, not a uniform middle level everywhere³³. Ground squirrels and marmots can cause real local problems, chief among them damaged grazing infrastructure and forage loss. But broadcast poisoning is not a workable answer. It removes the ecosystem-engineering function described above along with the target species, and its effects are not selective. Freshwater organisms, birds including raptors, reptiles and insects such as locusts also depend on the same moderately grazed rangeland mosaic. This document focuses on the species with the clearest Kazakhstan-specific evidence rather than attempting a full inventory. But the same principle, that moderate, mobile grazing sustains rather than threatens biodiversity, extends across this wider range of species. Wild insect pollinators belong to this same mosaic. Most of the world's leading food crops depend to some degree on animal pollination, much of it delivered by wild insects rather than managed hives, so the diversity of the steppe supports part of the country's crop and fodder production as well as its pasture^{72,73}. A diverse, functioning wildlife community also supports the wider rangeland system that livestock depend on, through nutrient cycling, seed dispersal and the habitat structure that keeps forage productive. Keeping wildlife populations healthy is therefore part of protecting the rangeland as a whole, not a competing aim.

The Bobak Marmot (*Marmota bobak*), Kazakhstan's largest burrowing rodent, plays a comparable role at a different scale. A study of marmot colonies in Naurzum State Nature Reserve in northern Kazakhstan found that their burrow mounds create habitat patches with a plant community distinct from the surrounding rangeland. These patches have lower total cover but higher numbers of annual and salt-tolerant specialist species. Several of these species were found only on burrow ground³². Marmot colonies mix soil layers and create this patchwork of microhabitats across the landscape. This increases the fine-scale diversity of the whole rangeland. It is the same insurance-style benefit that plant diversity provides at a larger scale. Like the ground squirrels, marmots depend on grazed, open grassland to thrive. The same literature that documents their engineering role also finds their colonies declining where cattle grazing has ceased and vegetation has grown too tall and dense for them.

At the top of Kazakhstan's rangeland food chain, wolves were once far more abundant and their numbers have roughly halved since the 1970s. Kazakhstan nonetheless holds one of the largest wolf populations in the world. Numbers were estimated at around 30,000 to 32,000

Most of the world's leading food crops depend to some degree on animal pollination, much of it delivered by wild insects rather than managed hives, so the diversity of the steppe supports part of the country's crop and fodder production as well as its pasture.

animals in the 1970s, falling sharply to around 13,000 by 2018. This decline is linked to the earlier collapse in saiga numbers and to rising hunting pressure⁵¹. Official counts put the population at 13,819 in 2022 and 15,181 in 2023, with an annual hunting quota set at roughly 23% of the estimated population^{52,51}. Wolves influence ungulate behaviour, movement and habitat use, and their reduced numbers remove one driver of the landscape-scale movement patterns that historically distributed grazing pressure. Whether a healthy wolf population also constrains saiga numbers or distribution within limits the pasture can bear is a plausible hypothesis rather than a demonstrated finding for the Kazakh steppe. The global evidence for top-down population regulation of ungulates by wolves is highly context-dependent, and it has not been established here⁵¹. What is better supported is the behavioural effect: where wolves are scarce, one of the natural pressures shaping how freely a locally abundant grazer moves and disperses is removed, which may in turn increase reliance on direct human intervention, including culling, to manage that grazer's impact. So wolf conservation and saiga management remain connected policy questions, even though the strength of that connection is not yet settled.

The project's own restoration planning puts it in these terms: as the only remaining apex predator of Kazakhstan's steppe and desert ecosystems, the wolf affects, and in some contexts may regulate, populations of wild ungulates and of smaller predators⁹³. There is also a practical management point that stands separately from the ecological one. Perceived livestock losses to wolves are consistently higher than verified losses, and there is no standardised national system for recording attacks, so control decisions are taken without reliable damage data^{93,94}. Fewer than 40% of livestock owners currently use any systematic protection measures, and local accounts in West Kazakhstan hold that wolves take less livestock where wild prey is plentiful^{93,94}. Practical coexistence measures, drawing on the substantial international experience of livestock guarding, husbandry change and verified compensation, are therefore likely to reduce losses more dependably than culling alone. Ecosystem resilience is not just about the plants that are visible. It is about the connected system of species and processes that sustains them. Kazakhstan's experience here sits within a wider international pattern. A 2026 synthesis of high nature value pastoral systems across Europe, the Americas and Asia found that large-carnivore recovery is consistently both a genuine conservation success and a real, additional pressure on the pastoral systems that deliver the most biodiversity. Trust between pastoralists and wildlife managers is the factor that most consistently separates conflict that stays contained from conflict that escalates⁴⁵.

To measure public attitudes towards wolves directly, a 2025 peer-reviewed survey covered 1,068 people across Kazakhstan's rangeland, desert and mountain regions, including rural and urban residents, hunters and livestock owners. It found that attitudes nationally were neutral to mildly positive. But attitudes were notably more negative when people were asked about wolves in their own home region, and livestock owners held the most negative views of any group⁵¹. In other words, conflict with wildlife is felt locally even where national attitudes look benign. This is the same pattern that surrounds the saiga in the west. The study's own authors recommend investigating the causes of human-wolf conflict, evaluating the effectiveness of livestock guarding methods such as traditional dogs and corrals, and improving population and distribution data so that hunting quotas can be set against evidence rather than assumption⁵¹. There is a substantial international literature on pastoralist-carnivore coexistence, developed initially around large-carnivore recovery in Europe. It offers directly transferable tools. These include livestock guarding methods, monitoring schemes and mechanisms for building trust between pastoralists and the bodies that manage wildlife⁴⁵. None of this requires reversing Kazakhstan's livestock policy. It requires the same kind of targeted, locally grounded management that this document recommends for saiga.

Local knowledge and adaptive management

Kazakh pastoral knowledge has accumulated over millennia. It encodes sophisticated understanding of seasonal patterns, plant indicators of pasture condition, water availability, and the signs of approaching drought. This knowledge is held in practice, language and social memory. It is one of the most valuable and most threatened resources in Kazakhstan's rangelands. It is being lost as the generation that practised seasonal movement grows older. Since independence, young adults have left villages for education and work in towns. This rural demographic shift has left an older age structure and a documented shortage of family labour for pastoral work. Large-herd owners have in turn become less willing to accept other

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people's livestock or to hire shepherds, as wider economic opportunities have made the work less attractive⁸. Recruiting and retaining the next generation of shepherds, and improving the pay and conditions that make the work attractive, is itself now a constraint on effective pasture management.

Adaptive management means adjusting stocking rates, routes and timing in response to observed conditions. It is the practical application of this knowledge. Formal rangeland monitoring systems, including the remote sensing capacity now being developed with Kazakhstan's national space research bodies, can support adaptive management. But they need to be paired with scientists and local knowledge holders working on the ground to measure vegetation composition, productivity and biomass directly. Kazakhstan is currently in a period of renewed national and cultural confidence. This creates a specific opportunity to formally reactivate the grazing knowledge that predates, and was carried through, the Soviet collective-farm period, which many rural households still hold as oral history, passed down from grandparents and great-grandparents who practised it, before that knowledge is lost entirely.

From the diversity of the plants to the saiga, the ground squirrels and the pastoralist's own knowledge, these are not competing claims on the rangeland. They are the system that keeps it productive.

Key Message 3

Biodiversity is not a rival claim on rangelands. It is what keeps them productive.

EVIDENCE IN FOCUS

The evidence that biodiversity keeps rangelands productive

The pattern found in Kazakhstan's saiga and burrowing-mammal populations is not a local curiosity. It is the same result recurring across grassland systems worldwide. Different methods have tested it in different ecosystems. A ten-site study across Yellowstone National Park found that grazing by native migrating ungulates raised local plant species richness rather than reducing it. The effect was strongest in the more productive grasslands²⁵. A separate eight-year grazing-gradient experiment studied semi-arid *Stipa* grassland in Inner Mongolia, an ecosystem closely comparable to Kazakhstan's. It found that moderate grazing maintained plant diversity rather than reducing it. Both total exclusion and heavy overgrazing reduced diversity in both systems².

Kazakhstan's own burrowing mammals provide a domestic test of the same principle, at a different scale. The Bobak Marmot's burrow mounds create habitat patches with a plant community distinct from the surrounding rangeland. These patches have lower total cover but a higher number of annual and salt-tolerant specialist species. Several of these species are found nowhere else on the landscape. Marmot colonies decline where cattle grazing has stopped and the grass has grown too dense for them³². The Yellow Ground Squirrel shows an equivalent pattern across central Kazakhstan's dry rangeland, and in comparable populations in Kalmykia and north-eastern Ukraine. It is an ecosystem engineer that aerates soil, cycles nutrients and creates habitat for other species. Its abundance rises with moderate grazing and falls sharply once grazing stops³³.

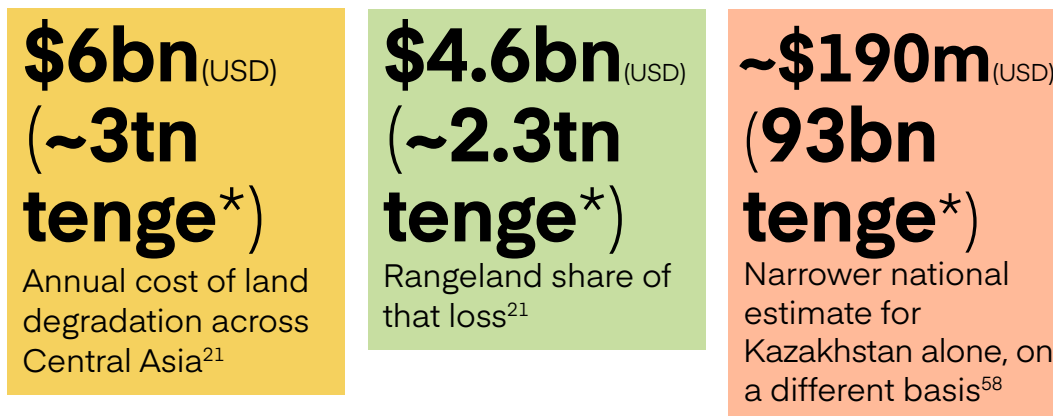
Four independent studies, on two continents, using different methods and different taxa, reach the same conclusion. Grazing and diversity are not opposed. A rangeland that loses its grazers, wild or domestic, loses productive capacity along with them. This is not a single favourable result. It is a consistent finding across the literature. That is why biodiversity has a legitimate claim on the Ministry of Agriculture's own productivity agenda, not only the Ministry of Ecology and Natural Resources'.

05: What erodes rangeland resilience

The causes and costs of degradation, where degradation is occurring

Rangeland degradation in Kazakhstan is not evenly distributed. Where it occurs is not a mystery. Its causes are known, its spatial patterns are mapped in the areas affected, and its costs are quantified. What is lacking is not diagnosis but treatment. This means the policy decisions and institutional changes that would reverse the trends currently running against the rangelands in the areas under most pressure.

The underlying driver is a mismatch between the time horizons of policy and the time horizons of the rangelands. Policies that reward short-term output, such as high stocking rates and intensive use of accessible pasture with no allowance for recovery periods, all combine to produce short-term gains. These gains are taken from the land's future capacity. The environment can absorb this for some years. But each degraded hectare is harder to recover than the last. Where the degraded area is already spreading outward, that outward expansion continues rather than levelling off on its own. This is why the international standard for land-degradation neutrality prioritises avoiding degradation first, then reducing it where it is under way, and only then restoring land already lost. Each step in that sequence costs more and works less reliably than the one before⁷⁴.



*Tenge/USD figures in this box are indicative only, rounded at approximately 500 tenge to the US dollar; they are not precise currency conversions.

Concentrated grazing and the breakdown of mobility

The most important single driver of degradation where it occurs in Kazakhstan is the concentration of livestock near settlements, combined with the abandonment of distant and seasonal pastures. This pattern was first documented in the Soviet and early post-Soviet period and has since been confirmed by more recent, Kazakhstan-based assessments^{7,81,83}. Since the break-up of the Soviet Union, the infrastructure of seasonal mobility has largely broken down¹⁶. This includes water points along seasonal routes, the shared arrangements for organising seasonal pasture use, from summer pasture to winter pasture, and the institutional arrangements governing access to distant pasture. Pastoralists are administratively tied to their home settlements. The legal machinery for accessing distant pasture is cumbersome or unavailable. And the capital required to move animals seasonally, such as vehicles, temporary infrastructure and hired labour, is beyond many smallholder households⁸. The constraint is not only capital but liveability. Distant pastures frequently lack accommodation, water and communications, so taking a herd out means a long spell away from the village with few facilities. Providing those basics at distant pastures is part of the infrastructure of mobility, not a separate welfare question⁸. Mobility is not only a defensive strategy against degradation, either: pastoralists move to actively seek out the best available forage, and that search has a direct, measurable effect on livestock weights and productivity^{86,87}.

The result is a spatial pattern visible in satellite data. Degraded rings extend outward from villages, surrounded by increasingly unused distant pasture that loses diversity through lack of disturbance⁵³. Recent cadastral research in southern Kazakhstan finds a related mechanism: formal privatisation of pasture near settlements can create negative spillovers on productivity in neighbouring, still-common parcels, compounding pressure at the settlement edge⁸². Hay meadows and cropland sit within this same pattern rather than outside it. Where they are sited on riparian and other productive land close to settlements, well-managed hay meadows can supply winter fodder without requiring long-distance movement. This eases pressure on distant summer pasture. Poorly sited or abandoned cropland, however, can itself become part of the degraded ring described above. Approximately two-thirds of Kazakhstan's pasture is in remote areas used by only around one-third of the livestock population³. The problem is not too many animals overall. It is too many animals in the wrong places, and, increasingly, too few animals on the distant, remote pasture that is losing the grazing pressure it needs to stay diverse. This remote pasture is not the same as the common village pasture discussed elsewhere in this document: it is typically held under lease rather than in common, and it is this undergrazed, leased land, not the heavily grazed village commons, that is losing diversity here. This does not mean settlement-edge grazing is itself the problem. As Section 04 describes, a moderate zone of high-intensity grazing close to villages is a valuable habitat in its own right. The problem is scale. Where mobility has broken down entirely, that zone keeps expanding outward into a widening ring of bare, compacted ground, well past the point where it still supports the species that depend on it.

Policy incentives for intensification

Kazakhstan's agricultural policy over the past decade has prioritised livestock production growth. Subsidies, loan programmes and development targets all point toward expanding herd sizes⁴. The Livestock Development Plan for 2026 to 2030 continues this trajectory. There is nothing inherently wrong with ambitious production targets. But when subsidies reward stocking rates without requiring pasture management plans, they create incentives that drive degradation where land is already under pressure.

The Plan's focus also leaves out the fastest-growing part of the herd. Its targets are framed around cattle, sheep and goats. Yet the horse population is expanding faster than any of them, driven by rising demand for horse meat and fermented mare's milk (kumis). The horse population is not treated as a distinct variable in the Plan^{10, 41}. A resilient rangelands strategy needs to plan for horses in their own right, not as an addition to the cattle and sheep totals. Two questions follow for the Ministry of Agriculture. First, what is the intended future scale of the horse herd? Second, how much of future demand will be met by imported, higher-productivity breeds rather than by further growth in the traditional, highly mobile native stock? The answer will shape rangeland grazing patterns as much as any single decision about cattle or sheep.

Grazing norms are the administrative allocations of forage per livestock unit. They typically assign all available forage to domestic animals with no allowance for wildlife⁶. The pattern runs through the practical guidance as well as the norms themselves: the World Bank and Ministry of Agriculture manual on sustainable pasture management for household and family beef farms sets out stocking rates, seasonal rotation and watering distances across eighty pages without mentioning saiga or wild grazers once¹⁰⁰. This effectively treats native grazers as losses from the system rather than as components of it. It creates pressure to exclude or reduce wildlife populations from productive areas. The US experience with rangeland policy shows the same effect. When forage allocation leaves no room for native species, the pressure to manage wildlife out of the system is difficult to resist⁶.

Infrastructure that fragments movement

Fencing around agricultural plots, linear infrastructure and resource extraction sites, roads that cross seasonal migration routes, and irrigation infrastructure that blocks traditional water access points all contribute to the fragmentation of the landscape. For livestock, the main reason seasonal movement has stopped is that the households owning the animals no longer move, rather than fragmentation itself. Fences around infrastructure and settlements do restrict daily and weekly movement, however, which concentrates animals and causes overgrazing locally. For saiga, it disrupts the migrations that are essential to their grazing function and that spread the population's impact across the landscape²⁹. Linear infrastructure, such as pipelines, railways, roads and fences, can have disproportionate impacts on ecological connectivity relative to their physical footprint.

Approximately two-thirds of Kazakhstan's pasture is in remote areas used by only around one-third of the livestock population. The problem is not too many animals overall. It is too many animals in the wrong places, and, increasingly, too few animals on the distant, remote pasture that is losing the grazing pressure it needs to stay diverse.

Salinisation

Soviet-era irrigation infrastructure created a legacy of rising water tables and salt accumulation. This continues to affect large areas of formerly productive land⁴². Where irrigation water evaporates without adequate drainage, salts accumulate at the surface. This reduces productivity, diversity and the soil biological communities that drive ecological resilience⁵. Reversing salinisation is costly and slow. Preventing its expansion is far more effective⁴².

Climate stress as an accelerant, concentrated in the west

Climate change is not the primary national cause of Kazakhstan's rangeland degradation, and its effects are markedly regional rather than uniform. The scale of change is nonetheless real and already measured. National monitoring data show that mean annual air temperature across Kazakhstan rose by 0.9°C during 1991 to 2020, compared with the 1961 to 1990 climate baseline. The increase in extreme-heat days has been most pronounced in the south, west and south-west of the country¹². Drought years that push pastoralists to use pastures that would normally be rested are already more frequent in West Kazakhstan, particularly around Uralsk, Aktobe and Atyrau. These are the regions identified as most drought-vulnerable nationally. Meanwhile, precipitation is projected to increase across much of central and northern Kazakhstan over coming decades, improving rather than reducing stocking capacity in those areas¹⁵. Stakeholder consultations across West Kazakhstan consistently identify drought and rainfall variability as the primary drivers of degradation, as farmers there experience it²⁴. That regional experience should not be generalised to the whole country. Wetlands and springs are a disproportionately important part of this picture, for wildlife, for livestock, and for the reeds and hay that both draw on. This is because they hold water and support forage through exactly the dry periods when the surrounding rangeland cannot. Kazakhstan currently has little dedicated policy or practice for conserving small wetlands and springs on working rangeland. Simple, low-cost protection measures are used for this purpose in pastoral systems elsewhere in Central Asia and would be worth piloting on Kazakhstan's rangelands. In Mongolia, for example, WWF-Mongolia has supported school eco-clubs working with local pastoralists and soum administrations to fence the headwaters of natural springs on saiga rangeland, four in 2018 and five more in 2020, with pastoralists then taking on responsibility for protecting the spring under a signed agreement. Camera-trap monitoring at the fenced springs recorded increased water flow and use by both livestock and wild animals⁷⁶. Fencing that keeps livestock off the immediate margins of a spring while still allowing access for watering is the same low-cost principle applied there. The interaction between a degraded, resilience-depleted rangeland and a more variable climate is the most serious long-term threat to the livestock sector in the areas where both are occurring together. A resilient rangeland, wetlands included, is the sector's best protection against that threat.

Stakeholder consultations across West Kazakhstan consistently identify drought and rainfall variability as the primary drivers of degradation, as farmers there experience it.

**~26.6-
27.1
M ha**

degraded pasture,
concentrated
regionally; area
expanding¹²

~78%

of remaining pasture
assessed as
vulnerable to
degradation⁵⁹

**USD
1:4-35**

return on every
dollar invested in
restoration^{21,22}

06: West Kazakhstan case study

Four futures to 2050: what policy decides

Climate change will stress Kazakhstan's rangelands, and that stress will fall hardest on the drought-exposed west. What is not determined by climate is the outcome. A note on terminology: In this document "West Kazakhstan" means the oblast of that name, whose capital is Uralsk. It is not a general term for the west of the country. The project worked in four of its districts: Bokeyorda, Kaztalovka, Zhanybek and Zhangala. Where this document refers to the wider arid west of Kazakhstan, it says so. The SNAPP Resilient Rangelands project worked with stakeholders across West Kazakhstan to build a set of four scenarios for the landscape in 2050. Each scenario shares the same climate trajectory, but each produces sharply different outcomes for pasture condition, degradation, biodiversity and rural livelihoods²⁴. The variable between the scenarios is not the climate. It is policy.

How the scenarios were built

The scenarios were developed through participatory workshops in Uralsk in 2025. These drew on the perspectives of pastoralists, local government administrators, conservationists, academics and agricultural scientists, and representatives of regional and national institutions. Participants were asked to identify the factors they believed would most strongly determine the landscape's future, and the factors they were most uncertain about²⁴.

Two factors emerged as most important and most uncertain. The first is the direction of livestock investment. This means whether policy continues to prioritise volume growth, or shifts toward quality, value-adding and sustainable intensification. The second is the approach to saiga management. This means whether the recovery of the saiga population is treated as a problem to be controlled or a resource to be managed. These two factors generated four distinct 2050 scenarios. Each is internally consistent and grounded in the same climate baseline²⁴.

The qualitative scenarios were then translated into spatial land cover projections. These mapped the probable extent of degradation, recovery, cropland change and habitat condition under each pathway. The results are striking.

What the scenarios show

The most important finding is also the easiest one to overlook: climate is not what separates the four scenarios. Climate change will still make every pathway harder than it would otherwise be. Drought will be more frequent and recovery slower. This finding should not be read as saying climate change does not matter. Climate change is expected to bring more frequent drought, greater rainfall variability and rising heat stress across Kazakhstan's rangelands, with the most severe impacts concentrated in the already-vulnerable south and west^{12,15}. Every scenario in this chapter has to absorb that pressure; none of them avoid it. Investing in a resilient rangeland is one of the few tools available for meeting that pressure. It is not a substitute for tackling climate change through mitigation elsewhere, but it is itself partly a response to that pressure, including through the carbon revenue it can generate. What the scenarios do show is that the divergence between a rangeland system that is recovering and one that is degrading in 2050 does not come from any difference in climate between them. Climate was deliberately not used as a scenario axis, because its direction is not genuinely in doubt. It was treated instead as a pressure common to all four futures. It is a function of the direction of livestock investment and the approach to saiga management. Both are policy variables. Both are set by choices that Kazakhstan's government and regional authorities will make in the next five to ten years.

The management levers that separate a good outcome from a poor one are not exotic or expensive. They are seasonal pasture management plans that schedule rotation and rest periods, water points placed across the landscape so that livestock can move off overgrazed land near settlements, reallocation of unused leased distant pasture to support common grazing, and cooperatives that let smallholders pool grazing rights and share the costs of

The SNAPP Resilient Rangelands project worked with stakeholders across 4 districts in West Kazakhstan to build a set of four scenarios for the landscape in 2050. Each scenario shares the same climate trajectory, but each produces sharply different outcomes for pasture condition, degradation, biodiversity and rural livelihoods.

The four scenarios

A

Rangelands Under Pressure

Livestock expansion continues as the primary policy goal. Saiga management is reactive and driven by conflict. Degradation expands from settlement cores. Distant pasture remains unused. By 2050, degraded area has grown substantially and rural inequality has widened.

B

Managed Intensification

Livestock investment prioritises value-adding and sustainable intensification over volume. Saiga are managed proactively. Seasonal movement infrastructure is partially restored. Degradation is stabilised near settlements. There is some recovery on distant pastures. Livelihoods improve.

C

Wildlife Economy

A wildlife economy and nature tourism emerge alongside livestock. Saiga recovery is welcomed as an economic asset. Landscape connectivity improves. Carbon and biodiversity gains are largest under this scenario. Transition costs are real, but investment follows.

D

Policy Paralysis

Policy uncertainty delays reform. Investment stalls. Saiga conflict worsens. The landscape drifts. Degradation continues but slowly. Some areas recover by default. Opportunity cost is highest here. It is the gap between what is and what could be.

seasonal movement^{24,16}. Financing restoration means enabling this kind of mobility and heterogeneity, not any engineering intervention. A field study compared former cropland abandoned since the early 1990s with never-ploughed reference rangeland across Kazakhstan. It found that spontaneous recovery toward native vegetation depended on grazing being present, not absent. Moderately grazed abandoned cropland converged toward native rangeland composition, while land left entirely ungrazed followed a markedly different and less complete path¹⁴. There is no strong case for active reseeding or planting on Kazakhstan's rangelands beyond short-term returns. In the long term, well-managed grazing at the right density, with free movement, remains the most effective and lowest-cost restoration tool available.

The Law on Pastures already provides most of the legal machinery needed to implement these measures. The gap is not legislation. It is implementation failure at district level, driven by constraints on capacity, capability and coordination rather than by any missing legal tool.

"Nothing can be done, it is climate change" is a common excuse for inaction on Kazakhstan's rangelands. The scenario analysis is grounded in structured expert and stakeholder judgement rather than field measurement. It provides a considered basis for rejecting that view. Climate sets the pressure. Policy and management decide how much damage that pressure does.

The role of tenure

Underneath all four scenarios is the question of whether pastoralists can move. Research consistently shows that seasonal stock movement is essential to avoiding degradation where degradation is a risk⁷. Whether pastoralists can move depends on how pasture is leased and held, but also on markets, household labour, herd composition and the availability of water points and basic infrastructure at distant sites^{78,85}. Current tenure arrangements tie households to administrative settlements, create barriers to accessing distant pasture, and provide no legal mechanism for coordinating seasonal movement across multiple leaseholders¹⁶. Getting tenure right is the prerequisite for everything else. The right balance of public and leased pasture is not uniform across the country, though. It needs to reflect real

regional differences in grazing pressure and livestock structure, documented in the south-east, centre and north of Kazakhstan alike, rather than a single national formula^{8, 1}. A comprehensive academic review of Kazakhstan's pastoral tenure reform since independence reaches the same conclusion. It finds that the 2017 Law on Pastures and its 2024 amendments supply much of the legal machinery for landscape-level management. Implementation is what falls short. Three things constrain it: the high proportion of pasture already under long-term lease, limited capacity at district level, and the fact that many pastoralists are unable or unwilling to move to distant pasture even where it is made available to them. A separate regional case study reaches similar conclusions for Pavlodar oblast^{88, 89}.

Tenure reform does not mean privatisation. It does not mean returning to Soviet-era collective management either. It means creating a legal framework in which seasonal mobility is not just permitted but supported. This includes clearly defined access rights to seasonal pastures, coordinated allocation of distant leases, and institutional arrangements that let neighbouring households cooperate in managing shared grazing commons. Any change to how land is held is also politically sensitive. In 2016, proposed amendments allowing longer land leases to foreign investors set off the largest protests in Kazakhstan's recent history and were quickly reversed. Tenure reform therefore has to be pursued transparently and with the confidence of local pasture users⁶⁰.

Key Message 4

Policy choices, not climate alone, will decide the future of Kazakhstan's rangelands.

EVIDENCE IN FOCUS

This finding is not new to Kazakhstan

The finding that policy choices, not climate alone, shape rangeland outcomes is not a new claim about the future. It is a demonstrated fact about the past. From 1954 the Virgin Lands campaign converted approximately 25.5 million hectares of rangeland into cropland by 1961¹⁰². This was the result of a policy choice, not of the weather in any of those years. It matters here to distinguish climate from weather. Climate is the longer-run pattern of temperature and rainfall. Weather is the day-to-day conditions in a given season. This document's broader argument is not that climate change is unimportant. Its argument is that policy choices, not climate alone, determine whether Kazakhstan's rangelands cope with the added stress that climate change will bring³⁷. The 1991 break-up of the Soviet Union then reversed course entirely. Around 19 million hectares of cropland, 54% of the total, were abandoned within a decade as the economics of cultivation collapsed along with Soviet-era subsidies. In Kostanay oblast alone, livestock numbers fell from around 3.0 million to 0.7 million head between 1990 and 1999^{7, 37}. These were two transformations, in opposite directions, under a broadly similar regional climate throughout. Both were driven by policy and institutional change, not by weather.

The West Kazakhstan scenarios show the same pattern holds looking forward. This is based on the project's own preliminary modelling, which is not yet independently published. That modelling projects land cover to 2050 from observed change between 1996 and 2020, using soil type, proximity to livestock stations, water points, roads and rivers, and an index of pasture load. Climate was not included as a variable in it, and the four pathways differ only in the storylines applied to those projections, which were set by the Uralsk workshops^{24, 92}. Climate was deliberately not treated as a scenario axis because its direction is not genuinely uncertain. It is a pressure common to all four futures. The scenarios therefore cannot show that policy outweighs climate, and they are not offered here as evidence that it does. What they show is that, under a shared climate, the direction of livestock investment and the approach to saiga management produce sharply different outcomes for degradation, biodiversity and rural livelihoods. Both are choices within Kazakhstan's own control²⁴. Layering climate projections on top of these scenarios would change the spatial detail of each, and that work has not yet been done. Both the historical record and the forward-looking scenarios point to the same conclusion.

07: What policy can do

Delivering commitments through a resilient rangeland

Kazakhstan does not need to invent a new policy agenda to address rangeland degradation. It has already committed to the destination. Through the three Rio Conventions, the UNCCD, the CBD and the UNFCCC, Kazakhstan has pledged to restore its degraded land, protect its biodiversity, and reduce its emissions¹³. A resilient, healthy rangeland delivers progress against all three at once. The challenge is not commitment. It is implementation. Those three commitments are held by three different conventions, and Kazakhstan answers each of them with a separate national plan. Agriculture and food are where all three meet on the ground, which makes the agricultural sector the practical place to integrate them rather than a fourth competing interest.

UNCCD: Land Degradation Neutrality by 2030

In 2017, Kazakhstan made a voluntary commitment under the UN Convention to Combat Desertification to reach Land Degradation Neutrality by 2030¹³. This means that by the end of this decade, the area of degraded land in Kazakhstan will be no greater than it was at the baseline. Between approximately 26.6 and 27.1 million hectares of pasture are already degraded, according to Kazakhstan's own national reporting and corroborating FAO analysis^{12, 53}, and the degraded area is growing in the affected regions. This is an ambitious target. It is also precisely the right one. Every year of delay makes it harder and more expensive to meet.

The Law on Pastures and the system of Pasture Management and Use Plans provide the legal machinery through which LDN commitments on rangelands can be delivered¹⁶. These instruments already exist. The gap is in their implementation. Mandatory pasture management plans, consistently enforced and properly resourced, would be among the most impactful steps Kazakhstan could take toward its LDN commitment. So would a clear national strategy for how public and leased pasture is allocated across regions with genuinely different grazing conditions.

Kunming-Montreal Global Biodiversity Framework: 30-by-30

Target 1 of the Kunming-Montreal Global Biodiversity Framework calls on all Parties to bring their land under integrated, participatory spatial planning by 2030; this is a global target rather than a pledge unique to Kazakhstan. Kazakhstan has responded to it nationally through its Concept of Conservation and Sustainable Use of Biodiversity for 2026 to 2035, which similarly calls for the rational use of pasture. It is the same planning process through which Kazakhstan would deliver its Land Degradation Neutrality commitments and its pasture restoration agenda. Most of Kazakhstan's rangelands are working land, grazed, leased and managed for production rather than formally protected. Because of this, Target 1 is the target that reaches almost all of the rangeland estate. In principle, one landscape-scale planning process could serve the UNCCD, the CBD and the UNFCCC together, rather than three separate ones. Achieving that in practice is not straightforward. Kazakhstan's land-use planning system is not yet set up to run a single integrated process across ministries, and building one would itself be a significant undertaking. But even a partial step toward integration, such as a shared spatial evidence base or a joint reporting mechanism across the three conventions, would make implementation more coherent, and over time more affordable, than running three unconnected processes.

Delivering Target 1 well also supports the targets that follow from it. It underpins the 30-by-2030 area target, Target 3, since a patchwork of grazing intensities on well-planned working land can qualify as an Other Effective Area-based Conservation Measure alongside Kazakhstan's formally protected areas²⁶. It also supports Target 5, on the sustainable use and trade of wild species. This is directly relevant to how saiga population management is designed. And it supports Target 9, on managing wild species sustainably so that they benefit, rather than only burden, the people who live alongside them. This is the frame this document uses throughout for saiga and wolves alike. It also connects to Target 2, which calls for 30% of degraded terrestrial ecosystems to be under effective restoration by 2030:

Target 1 of the Kunming-Montreal Global Biodiversity Framework calls on all Parties to bring their land under integrated, participatory spatial planning by 2030. Kazakhstan has responded to it nationally through its Concept of Conservation and Sustainable Use of Biodiversity for 2026 to 2035, which similarly calls for the rational use of pasture.

restoring degraded pasture, the practical recommendation running through this document, is exactly what that target asks for. Read this way, Target 1 is the entry point. Targets 2, 3, 5 and 9 are what it delivers. The 30% area target should not stand alone as the headline, with everything else following as an afterthought. For the Ministry of Agriculture and the Ministry of Ecology and Natural Resources together, what this requires is narrower than a new planning system. It means treating Target 1's spatial planning process, rather than any single sector plan, as the shared evidence base. Both the Comprehensive Livestock Development Plan and Kazakhstan's biodiversity and land-degradation commitments would then draw on it, so the three conventions are served by one process rather than duplicated across three. Food production is where this integration is easiest to make concrete: the same spatial plan that protects a patchwork of grazing intensities for biodiversity is the plan that keeps the rangeland productive enough to meet the Livestock Development Plan's own targets, so the two ministries are, in practice, planning for the same food-security outcome from different starting points.

UNFCCC: NDC 3.0 and carbon neutrality by 2060

Kazakhstan's most recent Nationally Determined Contribution, submitted to the UNFCCC in 2025, explicitly names restoration of degraded pastures as a climate mitigation measure²³. The land sector is central to the pathway to carbon neutrality by 2060. The NDC itself is explicit about the stakes: without continued support to reduce land degradation, the Land Use, Land Use Change and Forestry (LULUCF) sector will remain a net source of emissions through the plan period rather than the sink it is meant to become^{18,23}. This creates a direct policy connection between the agriculture ministry's rangeland agenda and Kazakhstan's climate commitments. It also creates an opportunity for climate finance to support land restoration that would otherwise have to be funded entirely from the agricultural budget.

Carbon finance for rangelands

Carbon finance on Kazakhstan's rangelands is an emerging area. Recent amendments to Kazakhstan's Ecological Code have introduced provisions for recognising pasture carbon and tying carbon rights to land leases³⁶. The opportunity lies in soil carbon sequestration and avoided degradation, not in planting trees on open rangeland, which could damage it rather than restore it. This is not an argument against trees. Planted in the right place, in shelterbelts and field margins where they shelter livestock and hold soil, trees are compatible with a working rangeland, and farmers value them. What harms the steppe is the wholesale afforestation of open pasture. Wholesale afforestation risks more than a less efficient use of carbon finance. A 2024 review of the evidence concludes that planting trees on rangeland is not a natural climate solution at all: it offers minimal additional carbon storage, because most rangeland carbon is already held below ground where it is less vulnerable to loss, while it reduces the rangeland services that local people depend on⁹⁸. Steppe biodiversity depends on open, largely treeless habitat, so converting it to forest can displace the species this document sets out to protect, not only cost the restoration programme money³⁵. Large-scale tree planting in naturally dry, open landscapes has also been shown elsewhere to alter local hydrology, for example by lowering water tables as trees draw on more groundwater than the native grass and shrub cover they replace. Modelling from China indicates that large-scale land cover change of this kind can shift regional water availability well beyond the planted area itself⁹⁵. Any afforestation proposed for Kazakhstan's open steppe should be screened for this risk before it is approved, not after. Soil carbon also offers the larger opportunity. Pasture restoration is estimated to offer the greatest carbon volume of any land-use option in Kazakhstan, in the order of 20 to 40 million tonnes of CO₂ equivalent a year nationally. This is far beyond what tree planting could deliver, even though soil carbon credits currently sell for a lower price per tonne than credits from afforestation⁶³. The main

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barrier has been measurement. Sampling soil carbon physically across large areas has been prohibitively expensive. That is now changing. A 500,000-hectare project in northern and central Kazakhstan, led by the firm rTek with the technology provider Perennial and backed by the FAO and the Global Environment Facility, is rebuilding rangeland soil carbon through rotational grazing and rest. It uses Verra's new digital soil-mapping tool to reduce the physical sampling required many times over^{61, 62}. The project is still at an early stage, but it shows that carbon can become a genuine additional funding stream for restoration.

Two obstacles remain, and neither is the carbon price. The first is the cost and capacity of measurement. Kazakhstan's accredited soil laboratories can carry out the analysis, but not at the throughput a national programme would demand. A soil-carbon methodology calibrated to Kazakhstan is still being assembled. The most promising route is a proposed national platform that would combine field measurement, remote sensing and modelling under government oversight⁶³. Rangeland soil gains carbon slowly. Because of this, the cost of establishing a baseline and monitoring it has to be carried against a low return per hectare. This is what has made these projects hard to finance without the digital methods now emerging. The second obstacle is political attention. Afforestation has a national programme behind it, including a presidential commitment to plant two billion trees, since extended to 2027 and justified explicitly as a response to desertification⁶⁴. Rangelands have no equivalent. The effect is that the easier option receives the attention, while the greater opportunity, the carbon already held in rangeland soils, is missed.

The policy framework around this moved again in the summer of 2026. In June and July, Kazakhstan's Parliament adopted, and President Tokayev signed, an omnibus law amending the Ecological and Forest Codes and several other legislative acts on ecology and the improvement of certain sectors of the economy. Its substantive core sits in the Ecological Code, which for the first time codifies Paris Agreement Article 6 market mechanisms in statute, under a new Article 288-1, alongside a buffer account, a carbon market stabilisation reserve, and statutory definitions of the voluntary carbon market, additionality and double counting under Article 298^{90, 91}. The law also formalises, for the first time in statute, an investor-forest-holder contract mechanism for offset projects on state forest fund land, and sets a specific state-retained share of the results of any Article 6 project: not less than 30% of emission reductions and not less than 10% of removals, credited toward Kazakhstan's own national contribution⁹¹. This is a concrete new input for financial modelling of any future rangeland carbon project that looks beyond the domestic voluntary market. The full text of the law was published on 9 July 2026, with individual provisions taking effect in stages between August and September 2026⁹¹. This is a national framework rather than a rangeland-specific one, but it is directly relevant here: a soil carbon project of the kind described above could, in principle, now reach international as well as domestic buyers, and any such project will need to plan for the mandatory state retention share alongside its own buffer and reversal provisions. The detailed rules that will govern how this applies to soil carbon projects on leased pastureland specifically have not yet been adopted. The responsible ministry was, as of July 2026, still procuring the technical support needed to draft them, with formal adoption more realistically expected in 2027 than in the coming months⁹¹.

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Key Message 5

Kazakhstan has committed to the right direction. The task now is to align its national strategy, incentives and delivery with those commitments.

EVIDENCE IN FOCUS

Rangeland carbon finance is moving from theory to practice

The clearest sign that rangeland carbon finance is becoming real is a project already under way at scale. The Kazakhstan Grasslands Restoration project is led by the local firm rTek with the United States technology provider Perennial. It is backed by the FAO and the Global Environment Facility. It targets 500,000 hectares of degraded rangeland in northern and central Kazakhstan. It is one of the largest soil-carbon projects in Central Asia. It relies on the practices this document recommends: rotational grazing, resting overgrazed pasture and adjusting livestock density. These practices let deep-rooted steppe grasses rebuild carbon in the soil⁶¹.

It also tackles the measurement barrier described earlier in this chapter. Sampling soil physically across such large areas has long made rangeland carbon projects too costly to run. The project is the first in the region to use Verra's digital soil-mapping tool. This tool combines satellite data and machine learning to estimate soil carbon. It reduces the physical sampling needed many times over⁶². The 2025 Ecological Code amendments tie carbon rights to the land lease. This gives landholders the legal basis to earn from it.

It is still early. Baseline modelling began in 2025 and no credits have yet been issued. The economics are demanding. Rangeland soil gains carbon slowly, so the return per hectare is low. A project only works at scale. This is why bringing many landholders into one scheme matters so much⁶³. The project's own developers name the hardest problems as the ones this document returns to throughout: securing the cooperation of many mobile pastoralists, and managing carbon rights on communal grazing land⁶⁴. Both are institutional rather than technical. Both point to the same answer as the rest of this document. Pasture users have to be organised and supported to act together.

The delivery gap

The commitments Kazakhstan has made are not the problem. The gap is between signing them and delivering them. Turning a pledge into a hectare of recovered pasture requires detail that is currently thin. This includes how grazing is planned and rotated in practice, how leases are allocated and enforced, how degradation is monitored at the scale needed, and how restoration is financed across a landscape where the pressures are genuinely regional rather than uniform.

The honest question for Kazakhstan's government is no longer whether to commit to resilient rangelands. That question was answered by the LDN pledge, the KMGBF and the NDC. The question now is operational. What institutional arrangement, what budget line, what monitoring system, and what incentive structure will turn existing legal and policy commitments into measurable change on the ground?

LDN commitment: by 2030, no net increase in degraded land

Kazakhstan's 2017 voluntary pledge to UNCCD

KMGBF Target 1: integrated spatial planning across all land

CBD Kunming-Montreal Global Biodiversity Framework, 2022

NDC 3.0: pasture restoration named as mitigation measure

Kazakhstan NDC 3.0, submitted to UNFCCC, 2025

Land sector to contribute 28Mt CO₂-eq net removals by 2035

NDC 3.0 land sector commitment

EVIDENCE IN FOCUS**Evidence the delivery tools already work at a pilot scale**

The single management practice most consistently identified as protecting rangeland condition in Kazakhstan is also the oldest. It is seasonal movement, so that no single area carries grazing pressure year-round⁷. The constraint today is institutional and financial rather than ecological. The 2017 Law on Pastures already places pasture management responsibility on district governments¹⁶. But most district administrations lack the planning capacity and budget to enforce rotation plans.

Several West Kazakhstan districts have nonetheless piloted structured rotation plans under the Law on Pastures. These plans allocate summer and winter grazing areas and build in rest periods for degraded sections. Early project monitoring uses satellite data. It reports measurable ground cover recovery compared with unmanaged pasture nearby²⁴. This is the most lightly evidenced claim in this document. The result exists only in SNAPP Resilient Rangeland's internal, unpublished record. It should be treated as a promising early signal, not an established result. Independent satellite verification of these pilots would be the most useful next step for the Ministry.

Mongolia offers the closest working precedent for what such a pilot can become with sustained investment. It faced the same collapse of Soviet-era collective grazing in the 1990s. In response, it built a national network of Pasture User Groups. These are voluntary pastoralist associations with customary access to shared seasonal pastures and their own rotation rules. By 2023, at least 1,575 such groups covered 184 districts, roughly 56% of the country. They were backed by a standardised monitoring protocol⁵⁴. An earlier, independently evaluated donor-funded version in the Gobi found 83 community organisations formed over eight years, covering 13.5 million hectares⁵⁵. A more recent programme reported that southern Gobi pastoralist groups reduced livestock by 23.4% in 2023, against 13.3% among non-participants nearby. This brought stocking rates back within carrying capacity. This is a programme figure rather than an independent evaluation⁵⁶.

Mongolia took roughly two decades to scale this model from pilot projects to a system covering more than half its districts. That timeline is itself useful information for the Ministry. It suggests that the Law on Pastures framework may need sustained investment over a similar period to reach full effect. That framework already provides comparable legal tools. It also suggests that the early, well-documented pilots already running in West Kazakhstan matter, because they are what eventually scales.

08: Examples of good practice

What working rangelands look like

The management practices that sustain rangeland resilience are not theoretical. Beyond the seasonal rotation already discussed, three further examples show the practical tools working, imperfectly and partially, in Kazakhstan today. These are reforming grazing norms, formalising cooperatives, and building trust through community monitoring.

Grazing norms that include wildlife

Standard grazing norms in Kazakhstan are inherited from Soviet-era agricultural administration. They allocate forage based on domestic livestock only. Native grazers are not included in the calculation. Their presence is effectively treated as a reduction in the forage available for livestock. This administrative convention creates a structural incentive to exclude or reduce wildlife from productive rangeland areas, regardless of any conservation objective.

An alternative approach has been proposed through ACBK and RSPB partnership programmes. It would develop grazing norms that explicitly budget for native ungulate densities alongside livestock. Where saiga are present at ecologically meaningful densities, norms should be adjusted to reflect their forage use, with livestock allocations calibrated accordingly. This approach acknowledges the wildlife-livestock tension rather than denying it. It creates the basis for managing that tension, rather than simply suppressing wildlife.

This is not a Kazakhstan-specific approach still to be invented. In parts of the United States, forage available to native wildlife is already an explicit factor in setting grazing allocations and stocking rates on public rangeland, alongside livestock forage, even though the exact allocation method varies by state and by local ecological conditions⁶. This shows that budgeting rangeland forage for wildlife alongside livestock is an established, if locally adapted, management practice rather than a purely theoretical concept. Comparable work is now under way in Kazakhstan itself. RePasKa, a research programme running from 2026 to 2028 with ACBK, RSPB, the University of Goettingen and partner institutions, is establishing grazing exclosure experiments that separate the effects of livestock, horses and saiga on vegetation and on forage quantity and quality. The first exclosures are being set up in central Kazakhstan, with funding for the West Kazakhstan sites still to be secured. Its stated purpose includes identifying how grazing norms could be adapted to accommodate the fluctuating numbers of saiga moving across the landscape, working with the land management and agriculture departments that would have to apply them⁹³.

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Cooperatives and collective grazing rights

Individual smallholder households and larger farms hold pasture under two distinct arrangements that are often conflated: small household ("backyard") plots used mainly for kitchen-garden grazing near the home, and larger leasehold parcels, typically held by registered farms rather than individual households, which average around 176 hectares¹⁷. Even where a household does hold a leasehold parcel rather than only a backyard plot, this is rarely enough scale to practise effective seasonal movement independently. The cost of vehicles, temporary infrastructure and labour for a seasonal move is prohibitive for a household with 30 to 50 animals. Cooperatives that pool the grazing rights and shared costs of seasonal movement across 10 to 20 households can make this economically viable⁸.

Cooperative grazing structures exist in fragmented form across West Kazakhstan, often rooted in extended family networks. Formalising and supporting these structures, with legal recognition, shared infrastructure investment and access to extension services, is one of the highest-leverage interventions available for restoring seasonal mobility. FAO Kazakhstan has been developing models for cooperative rangeland management that could be scaled with appropriate institutional support⁵⁷. These same structures are also the route into carbon finance. A rangeland carbon project cannot be assembled farm by farm. It needs many leaseholders aggregated into a single scheme, which is precisely what a cooperative can do. Building that cooperative capacity is therefore not only the key to restoring mobility. It is the practical precondition for rangelands earning anything from carbon⁶³.

Community-led saiga monitoring

One of the most significant barriers to effective saiga management in West Kazakhstan is a deficit of trust between pastoral communities and government. Government is the body responsible for saiga policy and for balancing it against farmers' interests. Conservation organisations such as ACBK support that relationship technically, but they do not set the policy, and they are not where the trust deficit lies. What state agencies need in order to make payments for saiga presence possible is reliable data, and that data would need verification by state rangers or an equivalent authority. Such payments have been conceived as a reward for hosting saiga rather than as compensation for damage, which is a more workable basis. Water is one of the clearest points where this plays out. Where water points sit determines where livestock concentrate. Long-term research on the deserts of south-central Kazakhstan confirms this. The density and quality of wells constrains which sites can be used at all. As pastures were reoccupied after the 1990s livestock collapse, pastoralists first favoured wells close to their home settlement over better-watered but more distant sites. They spread further out only in later years, as their households became better off^{77, 78}. The same logic applies to saiga and other wildlife, for whom access to water shapes movement and, in places, causes conflict with pastoralists¹⁶. Opening or maintaining wells in ways that also create small wetland habitat is already used to support wildlife in reserves elsewhere in the region. In Uzbekistan's Saigachy Reserve on the Ustyurt Plateau, reserve staff have installed pumps in ten previously unused wells to fill troughs used by saiga and other wildlife, with further artesian well pools planned⁷⁹. In Russia, saiga are recorded aggregating around artesian wells and pools in the Chernye Zemli, Mekletinsky and Stepnoi reserves⁸⁰. It is a low-cost option worth testing in West Kazakhstan. Pastoralists who experience direct costs from saiga competition, for pasture, for water, and for hay meadows, often have no mechanism to report those costs. They have no confidence that their concerns will be taken seriously, and no pathway to compensation or support. Government bodies, and the conservation organisations that support them technically, in turn lack the ground-level data on saiga distribution and movement. Without this data, they cannot anticipate and mitigate conflict.

Community-based monitoring programmes address both problems at once. In these programmes, pastoral households are trained and equipped to record saiga presence, movement patterns and livestock interactions. They provide conservation organisations with far richer spatial and temporal data than any remote monitoring system can generate. They also give pastoral communities a role and a voice in the management of animals that affect them. ACBK has been developing this approach in collaboration with pastoral communities in the Ural population's range. Early results suggest it can substantially improve the quality of data available for adaptive management decisions²⁹. There is also a regional framework to build on. Kazakhstan is a range state of the Convention on Migratory Species' Central Asian Mammals Initiative, whose programme of work for 2021 to 2026 commits participating governments to promoting community-based wildlife management. A 2026 CMS study assesses how this could work in practice across the region. It typically means granting local institutions the right to manage wildlife in a defined area, often alongside land use rights, and to decide how any revenue is used. The study is candid that only a few working examples exist in Central Asia so far, which makes this an opportunity for Kazakhstan to lead rather than a template to copy¹⁰¹.

Kazakhstan is a range state of the CMS Central Asian Mammals Initiative, whose 2021-2026 programme of work commits participating governments to promoting community-based wildlife management. To do so, CMS recommends granting local institutions the right to manage wildlife in a defined area, often alongside land use rights.

The regional opportunity: Kazakhstan as a model

Kazakhstan has achieved the most remarkable large mammal recovery of any country in recent history. It has also made internationally significant commitments to land restoration and carbon neutrality. These are not modest achievements. They are the foundation of a genuine regional leadership story. Kazakhstan's rangelands remain comparatively unfenced. Over large areas, they are close to a natural reference state by regional standards¹. This condition is itself scientifically and economically valuable, and it is worth stating plainly to build confidence, not only to name risk.

Key Message 6

Kazakhstan can lead the region on resilient rangelands, and 2026 is the moment to show it.

Kazakhstan faces several challenges. These include overgrazing near some settlements even as other, more distant pasture sees falling grazing pressure, the breakdown of seasonal mobility in parts of the country, the tension between livestock production and wildlife recovery, and the delivery gap between international commitments and on-the-ground implementation. Every country across the Eurasian rangeland belt, from Mongolia to Turkmenistan, shares these challenges. A Kazakhstan that develops workable solutions to these problems, demonstrates them at scale, and communicates them effectively through platforms like UNCCD COP17 and the 2026 International Year of Rangelands and Pastoralists, is not just managing its own land better. It has a real chance to show what works. Those solutions cannot simply be copied between countries. Kazakhstan's land-tenure system is distinctive in the region, with its mix of common lands, long and short-term leaseholds on pastures managed by local authorities and the Forest Agency⁸⁸. Approaches from Kyrgyzstan or Mongolia cannot be transplanted directly. And what works in Kazakhstan will in turn need adapting before it fits its neighbours.

Leading also means building something Kazakhstan has not yet built: real coordination between the ministries that share responsibility for the land. Pasture sits with the Ministry of Agriculture, and biodiversity and climate sit with the Ministry of Ecology and Natural Resources. The two rarely plan together. Delivery on the ground runs largely through the Ministry of National Economy, which is responsible for regional and rural development, and through district and city akimats. Coordination therefore has to reach beyond agriculture and ecology alone. Delivering resilient rangelands means both ministries planning the same landscapes through one integrated, participatory process. This is the approach Kazakhstan has already committed to under the biodiversity framework²⁶, rather than through two parallel strategies.

2026 is the International Year of Rangelands and Pastoralists. UNCCD COP17 provides the regional audience. Kazakhstan's saiga recovery, its LDN progress, and its ambition in the NDC give it a strong story to tell.

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Back cover: Saiga and cattle grazing © Alyona Koshkina/ACBK

A concluding note: **Working across institutional barriers**

None of the arguments in this document are best delivered from within a single ministry. The recurring barrier is not missing evidence. It is that pasture, biodiversity, water, carbon and rural development are planned separately, by different institutions, for the same land. Breaking down these institutional barriers is therefore not a peripheral recommendation alongside the others in this document. It is close to a precondition for delivering most of them.

A first, practical step would be a standing cross-sector dialogue on resilient rangelands, bringing together the Ministries of Agriculture, Ecology and National Economy with pastoral communities, researchers and conservation organisations, supported by a shared communication platform to carry that dialogue forward between meetings. Good coordination will not resolve every trade-off this document describes, between livestock growth and saiga recovery, between carbon finance and afforestation policy, between common pasture and leasehold tenure. But it is the mechanism through which Kazakhstan can work through those trade-offs deliberately, rather than defaulting to whichever ministry moves first.

This document's hope is a modest one: that setting out the evidence for resilient rangelands in one place can itself be a first contribution to that dialogue.

