

A large, gnarled tree with a thick, textured trunk and a dense canopy of green leaves stands prominently in the foreground. The tree's branches are twisted and spread out, reaching across the upper half of the frame. In the background, a vast savanna landscape unfolds under a clear blue sky. The ground is covered in dry, golden-brown grass, and a large herd of wildebeest is scattered across the plain, grazing. The horizon is marked by low, rolling hills. The overall scene is a classic representation of an African savanna.

VALUING GRASSLANDS

CRITICAL ECOSYSTEMS FOR
NATURE, CLIMATE AND PEOPLE

DISCUSSION PAPER

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February 2024

Grasslands, Rangelands, Savannahs and
Shrublands (GRaSS) Alliance

The organizations behind this briefing are committed to protecting and restoring grasslands. They have come together in an informal alliance to develop common positions, and identify the grasslands of highest ecological importance for protection or sustainable management under the 30 x 30 commitment. They also continue to monitor their status and threats they face while calling for action from all stakeholders.

The Alliance is convened by Dragonfly Advisory.



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EXECUTIVE SUMMARY

Grasslands stretch across the planet, their apparent simplicity masking their ecological, climatic and social importance and complexity. These undervalued and overlooked landscapes are fundamental to planetary and human health. Protecting them is not merely an urgent mandate; it is central to numerous global challenges. Realizing the hidden value of grasslands provides an opportunity to bolster environmental stability and human development in the crucial decades ahead.

Across the globe, grasslands take on different forms, each with unique human and wildlife communities. The Eurasian Steppe, home to nomadic pastoralists, supports wildlife such as the critically endangered Saiga antelope. In Africa's savannahs, indigenous communities coexist with iconic species like lions and elephants. North America's Great Plains, once grazed by vast bison herds, has long sustained Native Americans and more recently ranching communities. South America's Pampas, known for its vast plains, is crucial for bird species like the rhea. Each ecoregion demonstrates an intricate balance between the people and wildlife relying on them.

Photo: Envato

In addition to providing crucial ecological habitats and food and income for over 1 billion people, including some of the most marginalized communities around the world, grasslands play a crucial role in climate stability, storing over 30% of the world's carbon stocks. They also make substantial contributions to freshwater regulation, soil preservation, and other ecosystem services essential for the proper functioning of the planet.

Despite their importance, these ecosystems are under threat. Half of the world's grasslands have already suffered some degree of degradation, and the risks are on the rise. The main challenges include agricultural conversion, such as monocropping practices, intensified livestock grazing and the replacement of native grass species with non-native counterparts in pastures.

Additional factors like woody plant encroachment, fire suppression, and ongoing development are exacerbating the decline. Climate-induced changes have the potential to further disturb the delicate ecological balance of grasslands.



All these factors disrupt the inherent structure and functioning of grasslands - with widespread consequences for climate, nature and people. Soil disturbance and degradation impacts these carbon-rich lands, releasing carbon stores and accelerating climate change. Wildlife faces habitat loss and fragmentation, leading to declines in biodiversity and the endangerment of numerous species. As the health of the grasslands suffers, so too does the wellbeing of its human inhabitants, who face mounting vulnerability as livelihoods and food security are threatened.

For too long grasslands have been underestimated and overlooked. Less than 10% of grasslands are safeguarded from threats at a global level. Despite comparable significance mitigating climate change and conserving biodiversity they have remained in the shadow of forests, and are under-represented in climate commitments, nature conservation agreements, nature-based and social impact investments, and supply chain commitments.

The time is now to elevate grasslands and acknowledge their outsized yet overlooked contribution to global commitments on climate, biodiversity, land, water, food, health, and poverty. Urgent and unified action is needed from governments, investors, and businesses to align policies and commitments to ensure their protection and realize their potential to contribute to the Paris Agreement, Global Biodiversity Framework, and Sustainable Development Goals.

MEASURES TO PROTECT GRASSLANDS AND REALIZE THEIR POTENTIAL

- Elevate grasslands in key international and national biodiversity, climate, and land degradation agreements and plans.
- Include grasslands in the 30% of area to be protected by 2030 under Global Biodiversity Framework Target 3.
- Reduce subsidies and other policies that encourage grassland loss and degradation and afforestation of natural grassland biomes.
- Commit to conversion-free products and supply chains.
- Allocate climate-focused investments to support grasslands protection and restoration, treating them on par with forests in climate investment strategies.
- Support pastoralist and grass-based communities through strategic social investments that sustain the rights and livelihoods of the people dedicated to grasslands' stewardship.

A VISION FOR 2030



1. INTRODUCTION

Grasslands, including savannahs, shrublands, steppes, rangelands, prairies, veld, llano, pampas and meadows, stretch across the globe covering vast territories, encompassing biological and cultural diversity. These expansive, adaptable and resilient landscapes are of profound ecological and social importance; their apparent simplicity can obscure the multitude of valuable benefits they provide.

Protecting, restoring and sustainably managing grasslands is crucial to making progress on climate and biodiversity commitments and targets including the UNFCCC Paris Agreement, the Global Biodiversity Framework, the UN Decade on Ecosystem Restoration and UNCCD Land Degradation Neutrality. Additionally, grasslands are central to the Sustainable Development Goals, particularly No Poverty (SDG1), Zero Hunger (SDG2), Climate Action (SDG13) and Life on Land (SDG15). Yet, they are one of the least protected biomes on the planet and half of grasslands globally have been degraded to some extent.^{1,2}

For too long, grasslands have been in the shadow of forests. It is time to elevate their essential role in mitigating climate change, conserving biodiversity, regulating water, reducing poverty, and alleviating malnutrition. Recognizing and valuing these contributions is critical for the well-being of both nature and society. We need a unified effort to protect, restore, and sustainably manage grasslands, affording them the same level of urgency and resources that forests have long received.

The objective of this discussion paper is to enhance the shared understanding of the invaluable contribution of grasslands to nature, climate and people, particularly among policymakers, businesses, and investors. This will be achieved by:

- Providing a concise overview of the value of grasslands to nature, climate and people.
- Identifying some of the threats to grasslands and highlighting how they have been overlooked.
- Advocating for the global awareness and urgent action needed to protect, restore, and sustainably manage grassland ecosystems.

Grassland, Indonesia.
(Photo: Envato)



2. GRASSLANDS: DEFINITIONS, LOCATION AND COMMUNITIES

DEFINITIONS AND TERMS

There are many types of grass and shrub-dominated landscapes, found under terms such as grasslands, savannahs, shrublands, steppes, rangelands, drylands, prairies, veld, llano, pampas and meadows. This variation exists as grasslands are found in diverse regions, each with unique geological, climatic, and ecological traits, uses and cultural distinctions.

Many grasses are able to withstand extreme climate, fire and grazing, which serve as limiting factors for the growth and persistence of woody vegetation.³ Low rainfall also suppresses tree growth.⁴ Localized and complex interactions between soil, nutrients, water, grazing, fire and climate all influence the relative proportions of grasses, shrubs and woody plants in these open and grass-dominant landscapes.

The multitude of terms for grasslands presents barriers to consistent definitions, data collection, and recognition of their true extent and value.⁵ The varied terminology reflects the heterogeneity of grassland types and their plant compositions worldwide. This makes it hard to perceive grasslands as a single, unified ecosystem type. In contrast, forests, despite their diversity, tend to be seen more cohesively, simplifying communication about their global importance and threats. Unified comprehension of grasslands can help bring their significance into focus.

Prairie landscape.

(Photo: Envato)

Grasslands, shrublands, and savannahs cover

49%

of the global terrestrial surface.ⁱ

In this paper we use “**grasslands**” as an encompassing term for ecosystems dominated by grasses, grass-like plants (sedges and rushes), and shrubs with a relatively low density of trees compared to other landscapes.

There is also variation in the terminology used to describe the extent of human influence, ranging from **natural (native)** with little or no human intervention to **semi-natural**, shaped

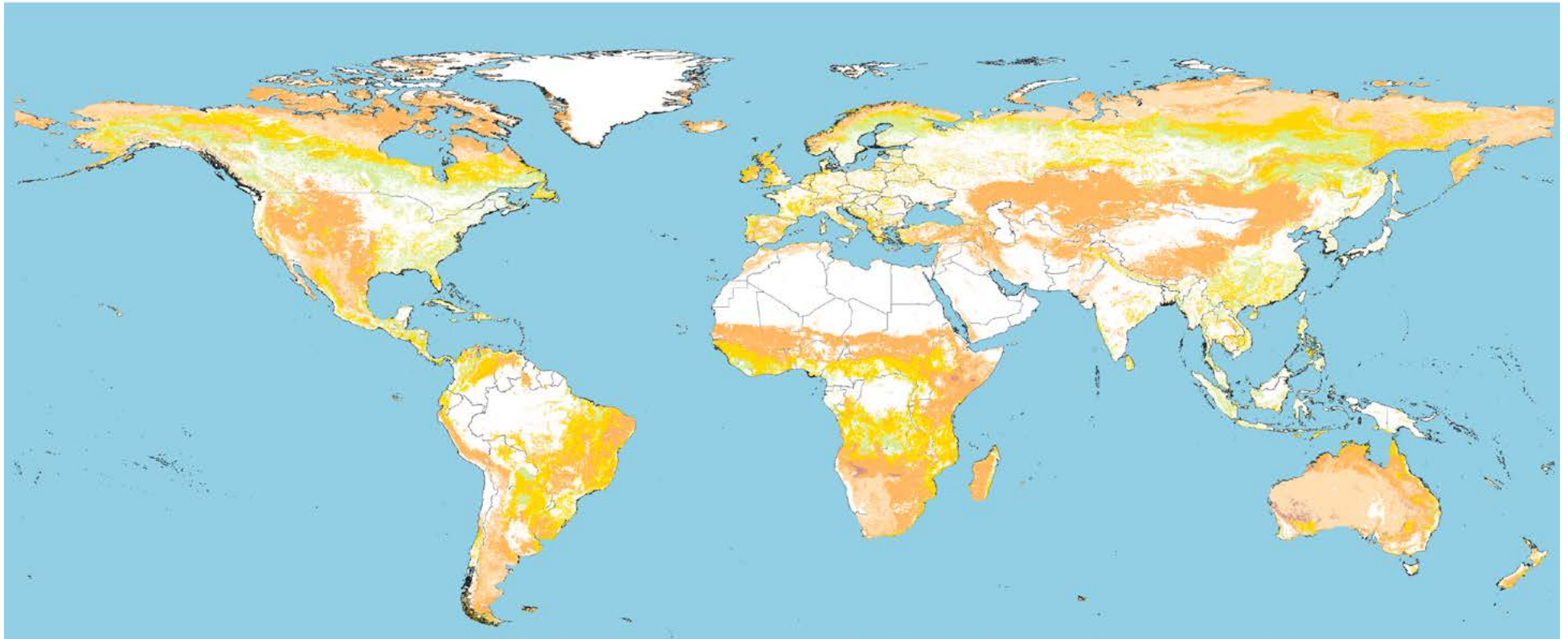
by human activity and requiring ongoing grazing or prescribed fire to maintain their current state, to **extensively managed** areas that have undergone significant human intervention and modification. However, it’s important to note that these distinctions do not encompass the full range of agro-ecological conditions.⁶

In this paper, our reference to “**grasslands**” spans the spectrum of human influence, with a primary focus on advocating for the prioritization of natural (intact) and semi-natural “unconverted” grasslands.

There is recognition of the need to consider grass and shrub-dominated landscapes as an integral ecosystem in global conservation efforts and the **Global Grasslands & Savannah Dialogue Platform** is actively working to bring clarity to the terminology.

ⁱ Area calculated based on MODIS land cover collection 6 using Google Earth Engine and Google Collab for the year 2020.





MAPPING

Area calculated based on MODIS land cover collection 6 using Google Earth Engine and Google Collab for the year 2020

Classes	Area (km ²)	Percentage (%)*
Closed shrubland	550,969	0.4
Open shrubland	13,296,689	9.1
Woody savannah	11,499,308	7.9
Savannah	15,999,428	11.0
Grassland	30,573,956	20.4

* Percent is calculated based on the world's land area (oceans not included)

■ ■ **Shrublands:** mosaic ecosystems of Africa's south, east and sahelian belt, the Chihuahuan Desert in northern Mexico and southwestern US, and Namaqualand in South Africa. Vegetation of the latter typically comprises a mix of low (dwarf) shrubs, succulent plants, and grasses.

■ ■ **Savannahs** are located close to the equator, have warm and consistent climates and typically have scattered trees and can include more succulent shrubland. Examples include African savannahs, South American campos, and Australian tropical grasslands.

■ **Grasslands** include North American prairies, Eurasian steppes, South American pampas, the Andean Paramo, **floodplain meadows** in areas prone to seasonal flooding such as the Danube in Europe, and **wetlands and marshes** such as the Pantanal in Brazil.

PEOPLE AND COMMUNITIES

Grasslands are home to broad and diverse communities, including many indigenous groups whose livelihoods, cultures and traditions are inextricably linked to these ecosystems. The majority of people living in grasslands are found in dryland areas, where grazing livestock is the primary source of food and income.

The League for Pastoral Peoples and Endogenous Livestock Development identifies over 800 pastoralist groups, defining these as communities whose animals rely on natural forage, an essential practice in areas too hot, dry, wet, or steep for crop cultivation. The concept of pastoralism itself is nuanced, encompassing a wide range of practices, from **ranchers** overseeing herds of cattle and sheep to **nomadic** groups constantly seeking fresh forage and water sources. Additionally, there are **agropastoralists** who combine crop cultivation with livestock husbandry, and **herders and rotational grazing**, where practices remain relatively stationary.⁷ The coexistence with wildlife is characteristic of many pastoralist groups. Over centuries, these communities have harnessed the principles of mobility and herding and many cultivate a harmonious coexistence with the natural environment.

RIGHT: A Borana woman with her goats, Borana, Ethiopia.

(Photo: [ILRI/Zerihun Sewunet](#))



Great Plains Cattle Ranchers:

Nearly half of all beef cattle raised in the United States spend some, or all, of their lives grazing in the iconic North American Great Plains, sometimes alongside native ungulates such as elk, deer, and bison.

The **Sicangu Oyate** is a Lakota Sioux tribe located in South Dakota, USA that has reintroduced bison to the land. The revival of bison herds grazing on tribal lands supports efforts to restore the balance of ecosystems and rejuvenate traditional practices.

Hutsul: The Hutsul, an East Slavic ethnic group in Eastern Carpathians herd their sheep on mountain meadows during the summer months. The sheep's milk is used to create traditional dairy products.

Mongolian Nomads: Mongolia is renowned for its expansive steppe landscapes and its nomadic herding communities. At the core of Mongol pastoralism lies the herding camp, a central economic unit formed by two to six households who jointly oversee their flocks, primarily horses, yak, sheep and goats.

The **Gran Chaco Herders** live year-round in one place while tending to mobile herds of sheep, goats, and cattle. About 10,500 households with cattle, sheep, goats, and pigs engage in this type of localized agropastoralism in the Gran Chaco, an arid, subtropical area of savannahs and low forests covering parts of Argentina, Paraguay, Bolivia and Brazil.

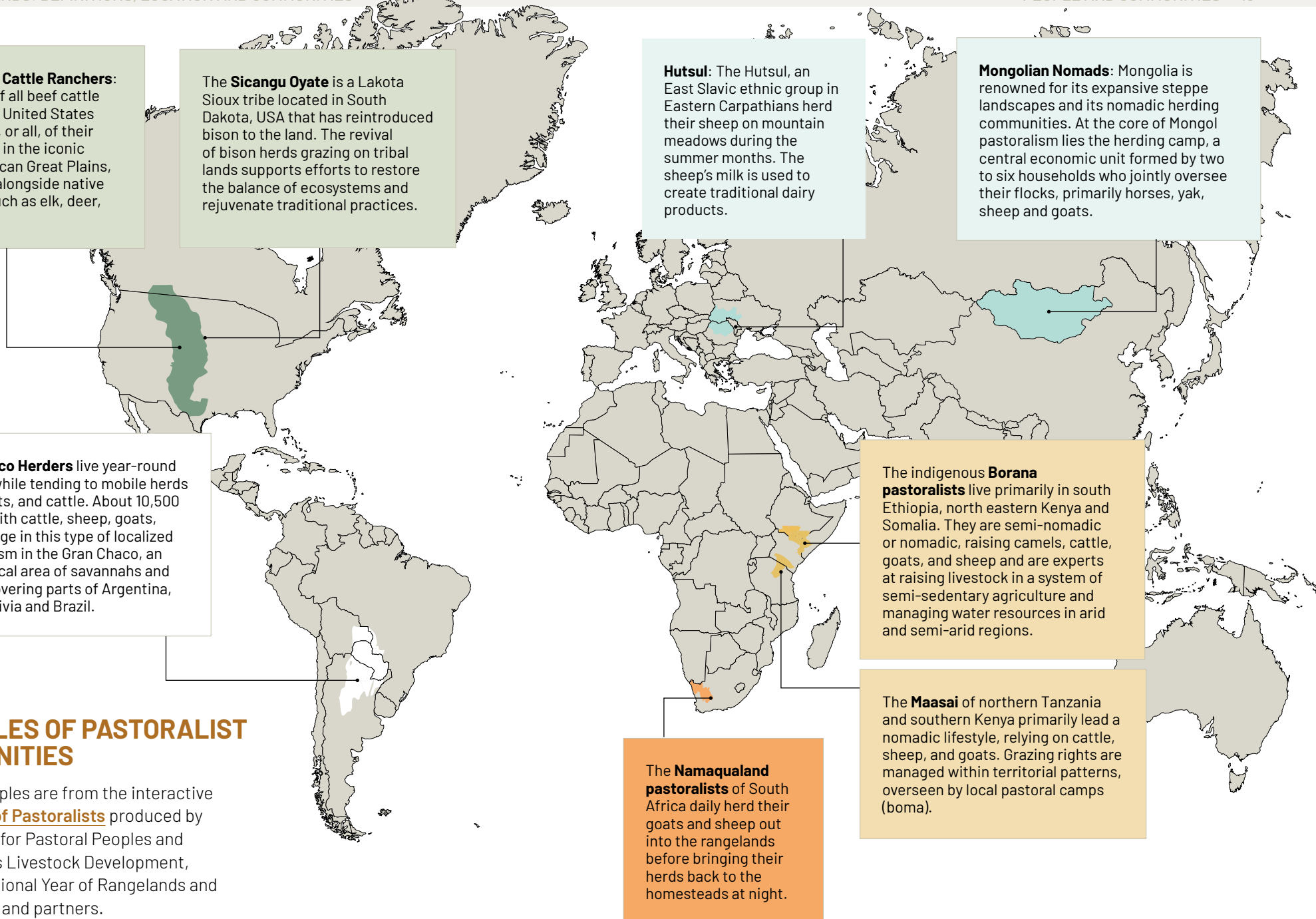
The indigenous **Borana pastoralists** live primarily in south Ethiopia, north eastern Kenya and Somalia. They are semi-nomadic or nomadic, raising camels, cattle, goats, and sheep and are experts at raising livestock in a system of semi-sedentary agriculture and managing water resources in arid and semi-arid regions.

The **Maasai** of northern Tanzania and southern Kenya primarily lead a nomadic lifestyle, relying on cattle, sheep, and goats. Grazing rights are managed within territorial patterns, overseen by local pastoral camps (boma).

EXAMPLES OF PASTORALIST COMMUNITIES

These examples are from the interactive [World Map of Pastoralists](#) produced by The League for Pastoral Peoples and Endogenous Livestock Development, The International Year of Rangelands and Pastoralists and partners.

The **Namaqualand pastoralists** of South Africa daily herd their goats and sheep out into the rangelands before bringing their herds back to the homesteads at night.



3. VALUE AND BENEFITS

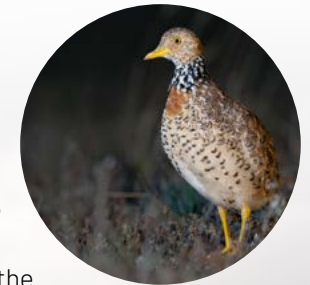
These vast open spaces hold immense ecological, economic, and cultural significance. They provide habitats for rare species and foster the connectivity essential for wildlife movement and migration, plant seed dispersal, and overall ecosystem health. Beyond their abundant biodiversity, grasslands play a pivotal role in carbon storage, water regulation, and soil preservation. Unconverted grasslands are fundamental to global food security and make substantial contributions to national economies. Moreover, they hold significant cultural value for indigenous populations and more recently settled farming and ranching communities.

Grassland, shrubland and savannah account for nearly a third (6.8 million km²) of Key Biodiversity Areas (KBAs) globally.⁸

NATURE: BIODIVERSITY AND ECOSYSTEM SERVICES

Biodiversity and Wildlife

Many grasslands are biodiversity hotspots: home to unique and diverse plant and animal species, such as bison, mountain plover, and prairie chickens in the Northern Great Plains of the US and Canada, the last remaining wild horses in the Eurasian steppes, rich succulent plant diversity in the Namaqualand, and the iconic mammals in the African savannah such as elephants, giraffes, hippos and lions. Many bird species, such as the critically endangered Plains-wanderer, rely on the short grasses of steppes and grazed meadows for their breeding grounds.⁹ Reptiles, amphibians, and small mammals, such as prairie voles, actively contribute to shaping the grassland vegetation.¹⁰ Insects, including vital pollinators, thrive in these environments, while detritivores such as dung beetles play a crucial role in nutrient cycling. Below the surface, interactions among roots, microbes and fungi are vital for functions like nutrient cycling, carbon sequestration, and water filtration.¹¹ Soil biodiversity supports decomposition and the release of essential nutrients, maintaining soil fertility, carbon and grassland productivity.^{12 13}



ABOVE: Plains-wanderer (*Pedionomus torquatus*).

Photo: Wikipedia

Herd of elephants, African savannah.
(Photo: Mint Images/Envato)

Regulating Water

Grasslands are important for controlling and maintaining the quality and quantity of water. Deep and dense roots enable rainwater to penetrate into the ground, recharging groundwater and helping to ensure a steady supply of water. In arid regions, some grass species have adapted to access water deep within the soil, enabling them to maintain vegetation cover during dry spells.¹⁴ Other specialized adaptations include the bushman grasses of the Namib region that harvest moisture from fog.¹⁵ During periods of heavy rainfall, grasslands play a vital role in absorbing surplus water and reducing its rapid discharge into streams and rivers. This underscores the value of grasslands as resilient buffers against extreme weather events, such as droughts and floods, which is ever more important with changing weather patterns. These ecosystems also aid in water purification as they naturally filter out pollutants and excess nutrients when rainwater passes through the network of roots in the soil.

Stabilizing Soil

Deep roots are particularly vital in maintaining soil stability and preventing land degradation.⁵ The extensive root system creates a network that weaves through the soil, strengthening its structure, preventing both compaction and erosion and lowering the possibility of sediment discharge. The protective ground cover that grasses provide further supports soil stability. These mechanisms ensure that the soil remains intact, fertile, and resistant to the forces of erosion and degradation.

Pampas grasslands, Argentina.

(Photo: Envato)

CLIMATE: MITIGATION AND ADAPTATION

Mitigation

It is estimated that

34%

of the world's terrestrial carbon stocks are held in grasslands, primarily in the soil. These stocks may also be more stable than biological carbon in forests.¹⁶

Grasslands play a vital, but under-recognized, role in mitigating climate change.¹⁸ They act as substantial carbon sinks, storing up to 34% of the world's terrestrial carbon.¹⁹ The majority is stored in the ground where deep root systems interact with microbial processes to enrich the soil with organic carbon.²⁰ Notably, well-managed grasslands have the potential to be more stable carbon stores than forests, as they can withstand environmental stresses such as fire and drought.¹⁶

Livestock grazing can either enhance or hinder the carbon sequestration process, depending on how it is managed. Climate-smart livestock practices, which emphasize the relationship between sustainable rotational grazing and healthy animals, can help reduce and mitigate methane emissions and promote soil carbon sequestration.^{21 22}

Once grasslands are converted to agriculture or undergo degradation, the soil structure and composition are significantly altered. This disruption can lead to the grasslands becoming a carbon source rather than a carbon sink and may accelerate climate change. Climate mitigation efforts should prioritize safeguarding irreplaceable soil carbon – once lost, its restoration becomes challenging.²³

SOIL CARBON MEASUREMENT

Despite advances in understanding the accumulation and long-term preservation of soil carbon, precisely estimating carbon stocks remains challenging. Common carbon accounting practices often focus on topsoil to about 30 cm, but research reveals that a significant portion of grassland soil carbon is stored in deeper subsoil layers.²⁴ This suggests that the carbon storage capacity of grasslands may be underestimated, with implications for climate change mitigation and understanding of grasslands' role in carbon sequestration.

Average soil organic carbon content (30 cm depth):

Semi-natural grasslands:
53 tonnes of carbon per hectare (C/ha)

Managed grasslands:
50 tonnes of carbon per hectare (C/ha)⁶

Adaptation

Avoiding conversion of grasslands could prevent up to

4.25 gigatons

of emissions globally by 2050.¹⁷

Healthy grasslands can enhance community and ecosystem resilience in a changing climate. Their natural adaptability to diverse environmental conditions, including droughts, wildfires, and temperature fluctuations maintains ecosystem stability and can ensure a continuous forage supply for livestock. Grasslands absorb excess rainfall, reducing flood risks, and release water gradually, ensuring sustained water supply during dry

periods. Soil-stabilizing qualities prevent erosion and desertification, essential for maintaining productive land. While grasslands are naturally adapted to extremes they are also vulnerable to shifting long term climate patterns and accelerating climate changes pose a threat to grassland integrity.

PEOPLE: FOOD, INCOME & CULTURE

Food

Unconverted grasslands serve as critical communal grazing areas for rural and indigenous communities in many parts of the world.²⁶ These lands, when sustainably managed, provide sustenance for millions of economically marginalized pastoralists and smallholder farmers. Conserving grassland access rights and sustainable grazing practices is vital for ensuring local food security and nutrition and underscores the significance of grasslands in addressing nutrition deficits, as emphasized in the 2010 Bariloche Temperate Grasslands Declaration.

At the same time, grasslands provide significant livestock feed globally. However, the expansion of industrial livestock and feed production onto native grasslands is a severe threat and undermines the land rights and food security of millions of pastoralists and smallholder farmers reliant on common grassland access, especially in arid and semi-arid drylands where alternative livelihood options are limited.

Income

Livestock grazing on natural and semi-natural grasslands, though often viewed as marginally productive, serves as an income source for rural communities through marketable goods like meat, milk, wool and leather. This supports local economies and bolsters resilience for vulnerable populations. In drylands, over 800 million people living below the poverty line rely directly on grasslands and have few alternative income options.²⁵ Furthermore, more than two billion people are directly or indirectly linked to pastoralist livelihoods, highlighting the underestimated economic value of pastoralism.²⁷

Grasslands provide livelihoods for over 800 million people.²⁵

Culture

Grasslands hold cultural and spiritual significance for numerous indigenous and local communities. These landscapes often serve as the backdrop for rituals and ceremonies that reinforce cultural identities and values.² For instance, bison, acknowledged as a keystone species in grasslands, hold sacred status in the culture of the Sicangu Oyate and other indigenous North American communities.⁷ Beyond providing sustenance, bison inspire traditional ceremonies, dances, and songs which are passed down through generations.

Indigenous communities are actively working to restore bison herds to their ancestral homelands.²⁸ These communities possess crucial knowledge on sustainable land use and effective ecosystem management. Native American Nations, together with ranching and farming families, own and oversee 85% of the remaining intact Northern Great Plains grassland. Recognizing and supporting the stewardship of these custodians is paramount.²⁹

Bison bull , Waterton Lakes
National Park, Canada.

(Photo: Envato)

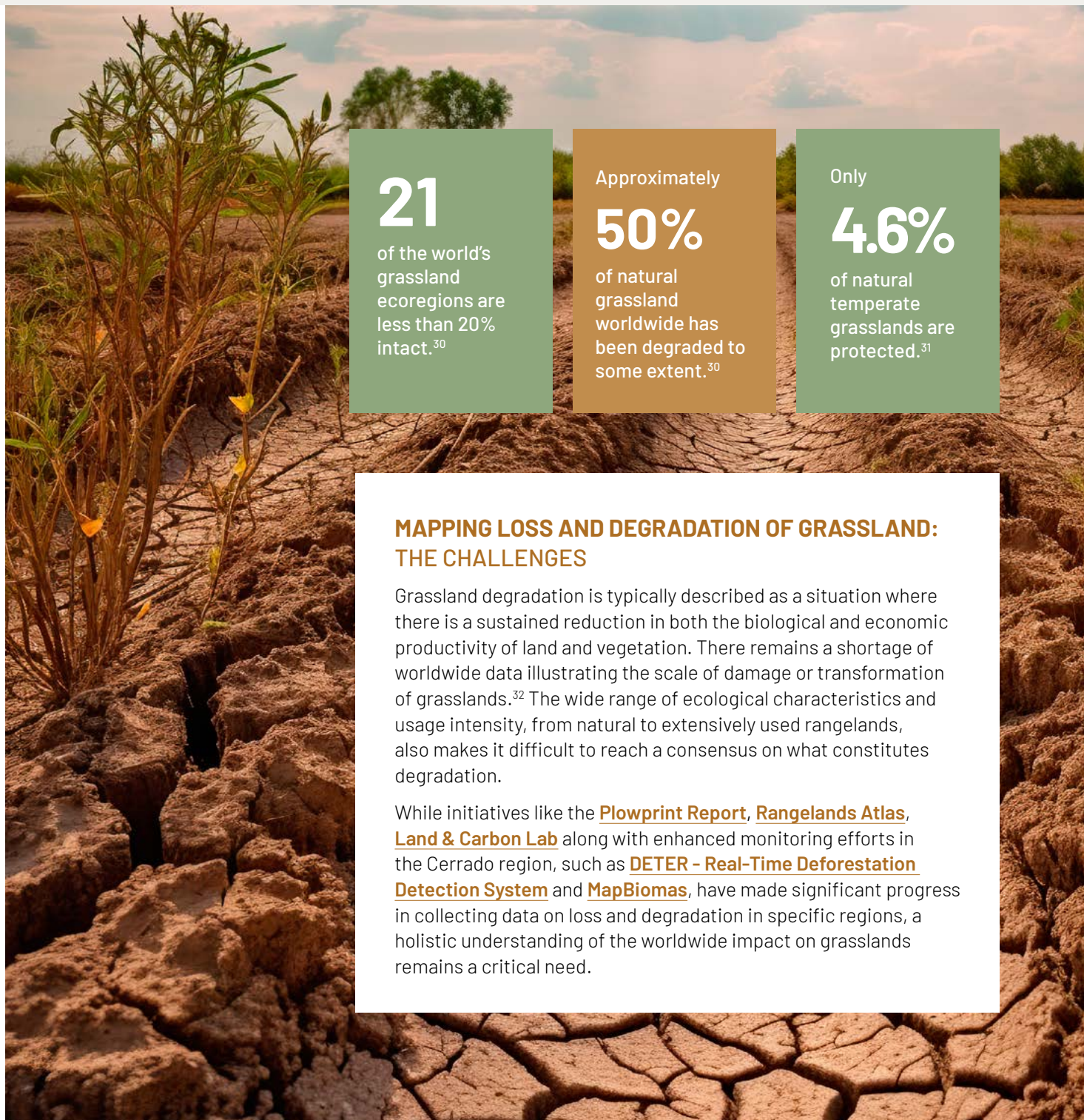


4. THREATS AND PRESSURES

Although globally extensive, grasslands are one of the most at-risk biomes due to significant loss, inadequate protection and inappropriate or absent management.¹ A number of human activities are driving grassland degradation and these are compounded by climate change as well as demographic shifts, political instability and land governance issues. Additionally, the balance between human needs and environmental conservation can lead to conflicts over resources.

Agriculture conversion, overgrazing, afforestation, the spread of invasive species, fire suppression and development are among the key drivers responsible for the loss, degradation, and fragmentation of grasslands. While grasslands exhibit remarkable resilience in the face of environmental challenges, capable of recovering and thriving even after disturbances such as droughts, wildfires, or grazing, they are sensitive to human impacts and at risk of irreversible degradation and large-scale vegetation changes can occur (such as bush encroachment or soil erosion) impacting the provision of ecosystem services, ultimately affecting livelihoods and biodiversity.

Photo: Envato



21

of the world's grassland ecoregions are less than 20% intact.³⁰

Approximately

50%

of natural grassland worldwide has been degraded to some extent.³⁰

Only

4.6%

of natural temperate grasslands are protected.³¹

MAPPING LOSS AND DEGRADATION OF GRASSLAND: THE CHALLENGES

Grassland degradation is typically described as a situation where there is a sustained reduction in both the biological and economic productivity of land and vegetation. There remains a shortage of worldwide data illustrating the scale of damage or transformation of grasslands.³² The wide range of ecological characteristics and usage intensity, from natural to extensively used rangelands, also makes it difficult to reach a consensus on what constitutes degradation.

While initiatives like the [Plowprint Report](#), [Rangelands Atlas](#), [Land & Carbon Lab](#) along with enhanced monitoring efforts in the Cerrado region, such as [DETER - Real-Time Deforestation Detection System](#) and [MapBiomass](#), have made significant progress in collecting data on loss and degradation in specific regions, a holistic understanding of the worldwide impact on grasslands remains a critical need.

Agriculture

Grassland loss is primarily driven by conversion to crop production by agribusiness for commodities such as wheat, soy, corn, and cotton.² Monoculture crop plantings are increasingly taking over land that previously supported complex native grassland ecosystems. Fertilizer runoff and atmospheric nutrient deposition may further decrease ecosystem services.³³ The replacement of natural or native grasslands with more agriculturally productive, non-native species for cattle ranching and fodder production also compromises these ecosystems. Policies designed to safeguard forests have often unintentionally pushed agricultural expansion into the less protected grasslands, resulting in what's known as "leakage."

The projected 60% increase in agricultural production to meet future food demands poses a considerable challenge for grasslands. Their expanses and suitability for crop cultivation make them prime targets for agricultural expansion.^{34,35}

**Since
1970**

bird populations in grasslands have undergone the most significant declines compared to those in any other terrestrial biome.³⁶

Nearly half of the Cerrado in Brazil has been converted into farmland, with native vegetation being replaced by crops such as soy, cotton, and corn.⁵⁸

**10
million**

acres of grasslands were lost between 2016 and 2020 in the Great Plains.³⁷

Alteration of grazing regimes

**From
1961 to
2017**

livestock density in Mongolia has more than tripled.³⁸

The intensification of livestock grazing is severely degrading grassland ecosystems around the world. In many areas, the mobility of pastoralist herds has been restricted by changes in land tenure and growing reliance on sedentary farming models. At the same time, expanding livestock and dairy markets have incentivized unsustainable increases without proper adjustments to stocking rates or grazing systems. This combination of reduced herd movement and intensification is leading to overgrazing, particularly where indigenous sustainable practices have been displaced.

Afforestation

Climate change mitigation efforts often prioritize carbon storage in trees over that in grasslands. Furthermore, the practice of afforestation – planting trees in open ecosystems where they do not naturally occur – has become more widespread with a number of consequences.^{39 32,40} This is due to various complex factors, including grasslands mistaken for deforested areas, and economic demand for higher-value wood products. The mistaken perception that grasslands are less valuable than other ecosystems has further exacerbated this trend.^{41 42 43} Increasing tree cover is a critical climate change mitigation strategy but afforestation efforts must recognize and protect the high socio-ecological value of existing grasslands.^{44 40}

Invasive species

The encroachment of invasive species including native woody plants into grasslands is influenced by a multitude of factors that can vary greatly by region. Atmospheric changes, such as increased CO₂ and nitrogen levels, and shifts in climate and rainfall patterns contribute to this phenomenon.^{45 46}

Absence of fires, or intentional suppression of fire in fire-dependent systems, whether due to human intervention or grazing practices, can exacerbate woody plant proliferation. Furthermore, the replacement of native grass species and many flowering plants with non-native grasses in pastures further contributes to the alteration of the grassland ecosystem.

Introduced by both human and natural activities, **invasive exotic species** can outcompete native grasses and other native herbaceous species causing a decline in biodiversity and affecting wildlife that rely upon grasslands for forage and breeding. Certain invasive species are highly flammable, and can contribute to changes in natural fire regimes,⁴⁷ for instance elevating the risk of occurrence of devastating (high magnitude and severe) wildfires with five grasses identified globally as particularly fire-prone.⁴⁸



Water Battle,
Acacia species.

(Photo: Luminar AI/
Envato)

In the last thirty years,
approximately

55%

of non-forest biomes in
sub-Saharan Africa,
equivalent to

7.5 million km²,

experienced substantial
increases in woody plant
cover.⁴⁶

Development

Between 1984
and 2008, over

**195,000
hectares**

of rangeland
in California
was converted.
Residential and
commercial
development
accounted for
49% of these
conversions.³⁴

Grasslands have faced persistent threats from urbanization, mining, transportation, and energy infrastructure. Urban development, in particular, has the potential to fragment grassland ecosystems into smaller, isolated patches, disrupting critical habitat connectivity and making it challenging for species to migrate or maintain genetic diversity. The growing demand for precious metals presents a further obstacle to preserving grasslands. As the expansion of renewables in grasslands accelerates, it is essential that projects are properly sited to conserve wildlife and habitats, while meeting the urgent need for cleaner energy.

Altered fire regimes

The introduction of exotic plant species, including trees and other herbaceous species, can alter the flammability of ecosystems.⁴⁹ Additionally, intentional burning to promote the resprouting of grasses and other plants contributes to changes in ignition sources. These factors, combined with the rising incidence of electrical storms and droughts due to climate change, have the potential to disrupt natural fire regimes. This disruption generally leads to an increased frequency of high-magnitude, intensive, and severe fires, posing a significant threat to grassland biodiversity. Moreover, it contributes to elevated rates of CO₂ emission and carbon soil loss.

SUMMARY OF IMPACTS

Each of these factors has its unique impacts, but fundamentally, they all disrupt the inherent structure and functioning of grasslands, resulting in a substantial decline in biodiversity and productivity. This disruption gives rise to a spectrum of consequences, which can be summarized as follows:

Native vegetation loss: The disappearance of endemic flora and endangered species. Dominance of a few highly competitive species.

Disruption and loss of wildlife: Impacts the variety of species and their habitats, leading to the loss of critical habitat connectivity, breeding grounds, and migratory routes with associated extinction debt – the delayed process of species extinction that occurs following habitat alteration or degradation.

Reduction of ecosystem services provision: Such as pollination, nutrient cycling, and diminished water availability and quality.

Increased carbon emissions: Release of carbon and the subsequent rise in atmospheric CO₂ levels.

Increased soil degradation: Including erosion, compaction, changes in structure, and nutrient loss.

Altered fire patterns: Changes in fire frequencies, intensities and season.

Decline in land productivity: Loss of food security and income. Reduced forage and water supplies for livestock and wildlife.

Displacement of communities: Particularly indigenous and grazing-dependent groups. Disruption of traditional land uses and customary practices, leading to a loss of cultural identity and knowledge.

Resource competition: Leading to conflicts over land and resources.

Photo: Envato



UNDERVALUED AND OVERLOOKED

Various complex factors have contributed to the lack of recognition of grasslands which is important context for understanding grassland vulnerability, including:

- Limited understanding of the multiple ecosystem services and functions provided by grasslands.¹²
- Varied societal perceptions on their biodiversity and value compared to other ecosystems,⁵ in some countries they are considered unproductive wastelands.⁵⁰
- Perpetuation of the incorrect historical understanding that grasslands are “degraded or deforested areas”.^{51 52}
- Economic interests and global commodities taking precedence over indigenous and local rights and needs.^{53 54}
- Bias toward “pristine” or untouched ecosystems, which can result in grasslands with a history of human management being perceived as less valuable.⁵⁵
- Complex land ownership and land rights issues.
- Difficulty in defining and mapping them accurately.⁵



Nomad camp and herd of sheep, Arkhangai province, Mongolia.

(Photo: Westend61/David Santiago García/Envato)

5. CASE STUDIES

There has been a notable increase in on-the-ground initiatives aimed at safeguarding, restoring, and sustainably managing grasslands worldwide in recent years. These efforts range from community-based projects to large-scale collaborations, often uniting governments, indigenous communities, conservation organizations, and local stakeholders. However, a gap remains between the urgency of the challenges faced by grasslands and the resources and attention allocated to them. Grasslands, often overlooked and undervalued, continue to struggle for the recognition and support they deserve. As we explore some examples of these initiatives, it's crucial to keep in mind that much larger efforts are required to comprehensively and enduringly protect these valuable landscapes.

THE NATURE CONSERVANCY: MONGOLIAN HERDING COMMUNITIES, EURASIAN STEPPE

Conserving Mongolia's grasslands, which cover 80% of the country, is critical to the nation's future and way of life. Recognizing their importance, 20 years ago the Mongolian government pledged to protect 30% of the country by 2030. The country has also committed to an Environmental Protection Law that grants herder groups rights to manage natural resources sustainably.

Among the key lands it seeks to protect is the Eastern Steppe, which is the world's largest intact temperate grassland. Mongolia's grasslands are the only refuge in Asia large enough to support globally-important wildlife, such as the Mongolian gazelle – Asia's last great herd of wide-ranging mammals – and the many migratory birds that rely on these lands as a resting and refueling stop during their long migrations.

Today, 200,000 families who make up 25% of the population are nomadic herders. Conservation organizations, including The Nature Conservancy, are working with herding communities to support livestock management practices and stocking rates that boost productivity and economic outcomes while protecting grassland diversity and soil integrity, including soil carbon storage. This positive feedback loop will help herding communities withstand increasingly frequent climate-related stresses such as prolonged drought, and create opportunities for sustainable funding via carbon markets.



Maasai Mara National Reserve, Kenya.

(Photo: Lev Dolgachov/Envato)

CONSERVATION INTERNATIONAL AND PEACE PARKS FOUNDATION: HERDING FOR HEALTH, AFRICAN SAVANNAH

Conservation International (CI), in partnership with Peace Parks Foundation, is implementing the Herding for Health (H4H) model in East and Southern Africa as a mechanism for rangeland restoration, biodiversity conservation and to enable climate resilience for pastoralists living in Africa's vast rangelands. The model is currently practiced across six southern African countries with a goal to restore 7 million hectares of native rangelands, and directly benefit 0.5 million people by 2027.

While the nuances of implementation are adapted to suit local contexts, the H4H core principles of strategic herding, capacity building, collective governance and unlocking market access are adopted across all sites with Meat Naturally, a private sector partner to the Herding for Health Programme, providing market access support.

Since 2019, H4H has been implemented to support communities living in and around Limpopo National Park in Mozambique. To date, more than 700 farmers with over 15,000

cattle participate in the programme covering approximately 130,000 hectares of land. The project site has created over 40 green jobs, i.e., skilled professional herders and seasonal jobs for small-scale women enterprises who collect seed for reseeded bare land that has been treated by the movement of the combined herds. Night corralling of livestock in predator-proof mobile bomas has an added benefit for the soil and environment due to the manure and hoof action which enhances the soil nutrient composition that enables biomass growth. Increased growth of perennial grasses improves soil stability through greater root structure, which results in better nutrient and water cycles and ultimately enhanced ecosystem function in the landscape. Implementing the H4H model therefore enables ecosystem-based adaptation and mitigation for farmers and such is the case for all the sites where the programme is being implemented.

For sustainability, the programme works with farmers to support collective governance through voluntary biodiversity stewardship agreements with the aim to enable communities to continue implementing the H4H model beyond the lifespan of current project cycles.



Founding Partners



A view of the Yorkshire Dales, UK.

(Photo: Helen Hotson/Envato)

PLANTLIFE: MEADOW MAKERS, ENGLAND

The UK is home to iconic grasslands, such as the chalk downs of Salisbury Plain, the upland hay meadows of the Yorkshire dales, and the coastal machair in Scotland. However, around 97% of the UK's most species-rich grassland has been destroyed since the 1930s, following changes in agricultural policy, development, nitrogen pollution, and land abandonment.

Funding from the UK government allowed the conservation charity, Plantlife, to spearhead a partnership programme of species-rich grassland restoration, green skills development, and community engagement across England.

This public funding enabled the 'Meadow Makers Partnership' comprising conservation and land-owning organizations from Cornwall to Cumbria to deliver landscape-scale restoration with 400 hectares of species-rich grassland restored, created, and now sustainably managed, for generations to come.

A wide range meadow restoration techniques were deployed; initial baseline-surveys of the sites were undertaken; donor meadows were identified for green hay and then spread on receptor meadows; seed was harvested by hand and with leaf vacuum blowers; and some plug planting took place. Where necessary, there were changes in management regimes to further boost biodiversity.

An extremely successful trainee scheme recruited six young Meadow Makers who received six months of training and peer to peer learning, four of whom went on to secure jobs in the environmental sector. Over 12,000 people were engaged in face-to-face and online workshops, webinars, training, events and peer-to-peer knowledge sharing.

THE GRASSLAND ALLIANCE - BIRDLIFE AND PARTNERS: SOUTHERN CONE, SOUTH AMERICA

The Pampas Southern Cone grasslands, spanning over 75 million hectares in Argentina, Uruguay, Brazil, and Paraguay, are globally significant for conservation, yet, less than 0.5% of these grasslands are formally protected and vast areas are threatened. On average, over 60% of native grasslands have already been lost.

In 2006 BirdLife and its Partners (Aves Argentinas, Aves Uruguay, SAVE Brasil and Guyra Paraguay) created the Grassland Alliance. Its mission is to preserve natural grasslands and biodiversity in the Southern Cone of South America through coordinated actions among the four countries (Argentina, Brazil, Paraguay, and Uruguay) and various sectors of society (producers, civil organizations, academia, and governments), within the framework of harmonious and sustainable development of the region.

The vision is for a region of grasslands where:

- Natural field livestock becomes a more competitive and profitable activity, developed sustainably by favoring the conservation of grasslands under grazing systems suitable for ecosystem preservation.
- Agriculture and afforestation are carried out responsibly, with careful soil and water treatment, prudent management of agrochemicals, and allowing sufficient areas for native wildlife in grasslands.
- Urban growth considers the Pampas landscape, ensuring the conservation of natural grasslands.
- Officially recognized protected areas preserve at least 10% of the original natural grasslands in each country and are properly implemented for effective fulfillment of their function.
- The traditional culture of the Pampas holds a relevant place in our societies.

One of the major challenges is the need to generate incentives and enabling conditions to help landowners and producers implement the Alliance's biodiversity-friendly practices. These will help stop the major threat, which is land-conversion to extensive soybean monocropping – a productive system generating much higher economical revenues than sustainable ranching systems.

In addition, there is an increasing threat from carbon development projects proposing afforestation with exotic species on these grasslands.

The Grassland Alliance has been working to address these threats and has developed a sustainable meat production protocol, an Index of grassland conservation,⁵⁶ a Bird Monitoring Strategy with five programs including vegetation monitoring and a Conservation Investment Strategy identifying conservation outcomes, focal areas and species to increase the conservation impact in the long term.

For more than 17 years this Alliance has shown effective conservation results, protecting more than 290 bird species and scientific studies have shown increased and stable biodiversity indexes on fields under the Grassland Alliance productive methods.



Maned wolf (*Chrysocyon brachyurus*) hunting in the grasslands surrounding the Dulce River, Argentina.

(Photo: Pablo Rodríguez Merkel/Birdlife)



WORLD WILDLIFE FUND: NORTHERN GREAT PLAINS, USA

World Wildlife Fund (WWF) is protecting and restoring grasslands in the Northern Great Plains. Of the 73 million hectares in this ecoregion, some 53 million hectares are still intact. WWF's overriding goal is to conserve this core, providing habitat for wildlife while ensuring carbon and water storage.

Towards this end, they have three key areas of work:

1. Scaling sustainable ranching because ranchers manage more than 70% of the remaining intact grasslands;
2. Restoring wildlife, particularly bison and black-footed ferrets in partnership with Native Nations;
3. Incentivizing conservation of grasslands through policy and private sector engagement.

While more than two-thirds of the grasslands of the Northern Great Plains remain intact, they are threatened by agricultural expansion. Hundreds of thousands of hectares (162,000 ha in 2021 alone) convert to cropland annually, primarily to wheat, corn, and soy. Avoiding more conversion is critically important for keeping carbon in the ground and out of the atmosphere. When native grasslands are tilled, they rapidly lose up to 50% of their carbon.

In 2021, WWF launched the Ranch Systems and Viability Planning (RSVP) Network with a goal of protecting and improving management on >400,000 ha by 2025. Ranchers who enroll agree to a ten year "no conversion" agreement of land to crops and to adopting regenerative grazing practices that build soil health, improve grassland productivity, and increase biodiversity. In return, they receive technical assistance, access to training, some financial support, and monitoring of the ecosystem services provided by their grasslands. To date, WWF has enrolled 85 ranches spanning 324,000 ha. WWF also has supported the re-establishment of native prairie on thousands of hectares of previously cropped land through a native grassland reseedling program.



San Luis Valley, Great Sand Dunes
National Park, Colorado, US.

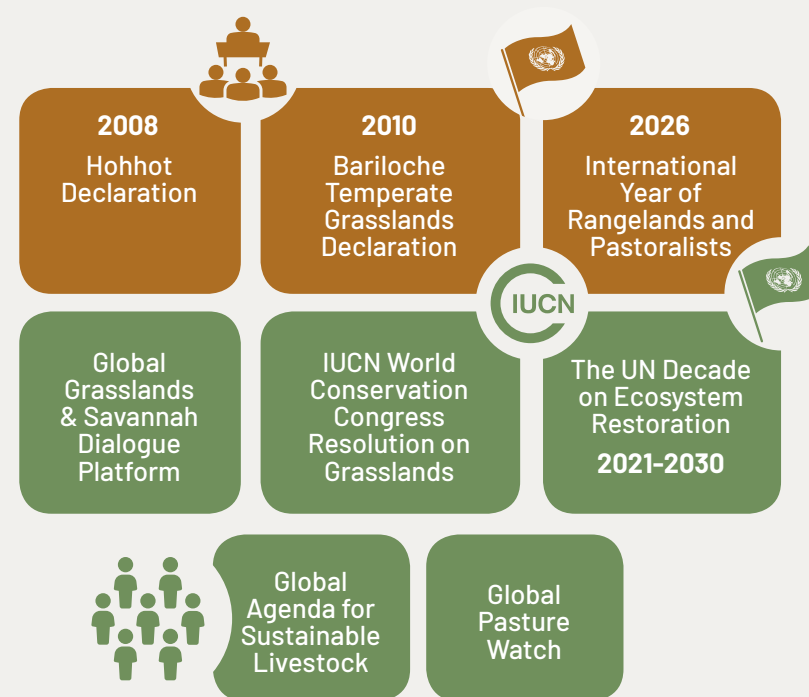
(Photo: [Christian Collins](#))

A GROWING MOVEMENT

The value of grasslands, the threats they face and the need for international cooperation were formally recognized in the 2008 **Hohhot Declaration** which was supported by participants in the Temperate Grasslands Conservation Initiative's first worldwide workshop, held in Hohhot, China in June 2008. The subsequent **Bariloche Temperate Grasslands Declaration** at the International Congress Management of Temperate Grasslands held in San Carlos de Bariloche, Argentina in 2010 pointed to the lack of progress in halting and reversing global grassland deterioration and addressed the conservation challenges facing temperate grasslands. Yet, conversion and degradation continues and the threats continue to increase.

Since then, efforts have been growing globally and locally to protect, restore, and sustainably manage grasslands. Recognising their importance, the United Nations has designated 2026 as the **International Year of Rangelands and Pastoralists**. Other initiatives, such as the **Global Grasslands & Savannah Dialogue Platform**, the **IUCN World Conservation Congress Resolution on Grasslands** and the inclusion of grasslands, shrub lands and savannahs as a focus in the **UN Decade of Ecosystem Restoration, 2021-2030**, are building awareness and beginning to drive change.

New efforts to improve the geospatial monitoring of grassland and pasture extent, management, and condition, such as Land and Carbon Lab's **Global Pasture Watch**, will improve the ability to monitor conversion or track restoration progress. Efforts centered on sustainable livestock production, exemplified by initiatives like the FAO's **Global Agenda for Sustainable Livestock** which has a Restoring Value to Grasslands Action Network, also hold potential to conserve grasslands and enhance the well-being of communities dependent on these ecosystems.



6. FROM AWARENESS TO ACTION

While advancements have been made in the conservation of forests and other biomes in recent decades, grasslands continue to be overlooked and undervalued. Decision-makers often underestimate or are unaware of their potential for enhancing biodiversity, mitigating climate change, and alleviating poverty and addressing nutrition deficits. Grasslands are often passed over by governments in climate and biodiversity commitments. Despite being a major terrestrial carbon stock, grasslands are under-represented in nature-based investments and climate mitigation strategies.⁵ Critically, the food industry, which has the greatest impact due to expansion of crops such as wheat, corn and soy, and livestock, has made progress in addressing deforestation but has failed to take sufficient action on grasslands.⁵⁷

Consequently, there is an ongoing need to bolster the case for grasslands and to support the global movement advocating for their protection, restoration and sustainable management to ensure by 2030:

- No net loss of hectares of grasslands.
- Enhanced protection of grasslands at a level comparable to forests.
- Restoration of degraded grasslands.
- Sustainable management of remaining grasslands.

An urgent and comprehensive review of global policies, corporate commitments, and investments is imperative to achieve this and it is crucial governments, companies, and investors take a proactive lead in prioritizing measures to safeguard the integrity of our grassland ecosystems.

Governments

- Elevate grasslands in key international agreements including the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, and the United Nations Convention to Combat Desertification.
- Include grasslands in the 30% of area to be protected by 2030 under Global Biodiversity Framework Target 3.
- Incorporate grasslands in Nationally Determined Contributions (NDCs), National Adaptation Plans and National Biodiversity Strategies and Action Plans (NBSAPs).
- Align finance, investment, and policy with Target 18 of the Global Biodiversity Framework by reducing subsidies that currently encourage grassland loss and degradation, afforestation of grassland biomes, and unsustainably large livestock populations.
- Recognize grasslands in trade regulations such as the EU rules on Deforestation-free products.

Companies

- Commit to conversion-free supply chains.
- Collaborate with farmers and pastoralists to support sustainable, regenerative land use that fosters biodiversity, preserves carbon storage, and supports the livelihoods of indigenous people and local communities.
- Advocate for government policies to protect grasslands.

Investors

- Require that food and fiber companies seeking financing commit to conversion-free practices.
- Allocate climate-focused and impact investments to grassland protection and restoration, treating them on par with forests and other ecosystems in climate and impact investment strategies.
- Support pastoralist and grass-based communities through strategic social investments that sustain the rights and livelihoods of the people dedicated to their stewardship.

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**Aerial view of African savannah in
the Kalahari Desert, South Africa.**

(Photo: Envato)

