PROTECTING AND UTILIZING GLOBAL GRAZING SYSTEMS

Mohamed Fadal - Thomas Hoerz - Dr. Anita Idel - Dr. Louise Wiuff Moe

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MARTIN HÄUSLING
Member of European Parliament

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Martin Häusling MEP
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Phone: 030-227-70020
martin.haeusling@europarl.europa.eu

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AUTHORS
Mohamed Fadal, Thomas Hoerz,
Dr. Anita Idel, Dr. Louise Wiuff Moe

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Dr. agr. Andrea Beste, gesunde-erde.net

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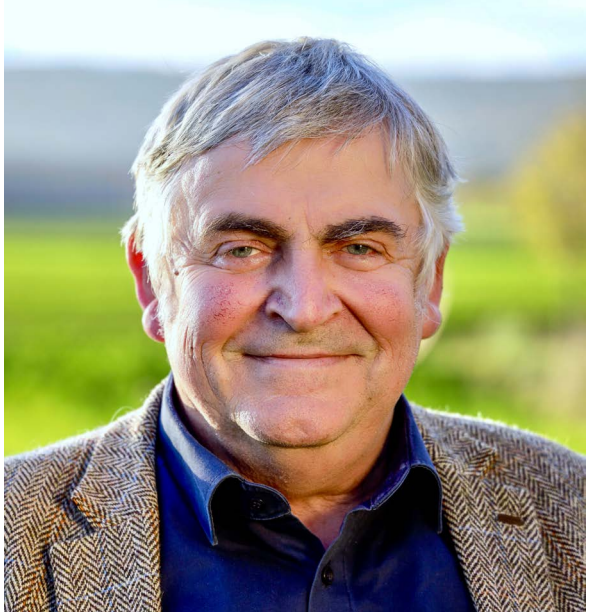
THE GREENS/EFA in the European Parliament

ABBREVIATIONS

AFDB	African Development Bank
AGR	Aroori Grazing Reserve
ASAL	Arid and Semi Arid Lands
ASEAN	Association of Southeast Asian Nations
AU	African Union
BMZ	Federal Ministry for Development and Cooperation (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung - Germany)
CAP	Common Agriculture Policy
CBD	Convention on Biological Diversity
CELEP	Coalition of European Lobbies for East-African Pastoralism
CFA	Cash for Assets (WFP)
CGIAR	Consultative Group on International Agricultural Research
DEZA	Directorate for Development and Cooperation (Direktion für Entwicklungund Zusammenarbeit – Switzerland)
DVRPU	Dry Valley Rehabilitation and Productive Use (GIZ)
eco²	ecology & economy
ECHO	European Community Humanitarian Office
FAO	(United Nations) Food and Agriculture Organization
FFA	Food for Assets (WFP)
FMNR	Farmer Managed Natural Regeneration
GEF	Global Environment Fund / Facility
GISD	Global Invasive Species Database
GIZ	Gesellschaft für Internationale Zusammenarbeit
GLO	Global Land Outlook (UNCCD)
ICPALD	IGAD Center for Pastoral Areas and Livestock Development
IDP	Internally Displaced Person
IFAD	(UN) International Fund for Agriculture Development
IGAD	Intergovernmental Authority on Development
ILRI	International Livestock Research Institute
IOM	(UN) International Organization for Migration
ISSG	Invasive Species Specialist Group (of IUCN)
IUCN	International Union for the Conservation of Nature and Natural Resources
IYRP	International Year of Rangelands and Pastoralists (2026)
LDN	Land Degradation Neutrality
LPPS	Lokhit Pashu-Palak Sansthan
MGAP	Ministry of Livestock, Agriculture and Fisheries (Uruguay)
NGO	Non Governmental Organization
PASTRES	Pastoralism, Uncertainty, Resilience (University of Sussex)
PLUP	Participatory Land Use Planning
PPA	Pastoral Protected Area
R&P	Rangelands and Pastoralism
SDG	Sustainable Development Goal
SOC	Soil Organic Carbon
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNOWAS	United Nations Office for West Africa and the Sahel
VSF	Vétérinaires sans Frontières
WB	World Bank
WFP	(UN) World Food Programme
WOCAT	World Overview of Conservation Approaches and Technologies (University of Bern)
WSW	Water Spreading Weir
WWF	World Wildlife Fund

Rangelands and Pastoralism (= R&P)

The natural base for grazing systems, including the pastoral cultures that form them, are biodiverse rangelands. They form a complex, self-regulating system of soils and soil biomes, water and vegetation. Utilizing rangelands, partly destructive, partly conserving is the pastoral system with its specific mix of animals, pastoral culture and traditions, the livestock economy, the non-animal rangeland products' economy as well as specific regulation, policy and laws. As we refer to the interplay of these two closely interlinked systems very frequently, we suggest R&P as an abbreviation.



MARTIN HÄUSLING, MEMBER OF EUROPEAN PARLIAMENT

Over 50 percent of the global land surface consists of mostly arid, but also too cold, too steep or too high-altitude areas where cereal, fruit and vegetable cultivation are not sustainable. These steppes and grass savannahs are very often used as grazing land. Even in earlier times, pastoralism, especially when it was nomadic in nature, was less valued than agriculture. Historically, agriculture – and with it, sedentary life – was long considered a higher level of civilisation than nomadic pastoralism. This still bears traces of a colonial interpretation and is no longer appropriate in the 21st century. The fact that grazing allows ecosystems to be utilized for human nutrition that would otherwise be unusable for human consumption, and that grazing – when practiced correctly – is a particularly sustainable use of ecosystems, is largely ignored in the debate.

This disregard is currently being exacerbated in the context of the climate debate, in which cattle are being proverbially 'bashed' for their methane emissions, even though they have the potential (along with other ruminants such as camels, goats and sheep) can be used most sustainably for human protein supply, as it simply lives on natural growth, promotes biodiversity and practices climate protection. Apart from soils in permafrost regions, moors and grasslands contain most of the carbon stored in the soil. When they are converted into farmland, large amounts of greenhouse gases are released, biodiversity is often destroyed, and soil fertility and water storage capacity are significantly reduced. The conversion of grassland in Central Europe has been associated with very high CO_2 emissions for many years. Preserving grassland as a carbon sink only works with grass-eating animals.

The Food and Agriculture Organisation (FAO) estimates that for 100 million people in semi-arid areas and probably another 100 million people in other regions, grazing livestock is the only available source of protein and income. However, to date, far more investment has been poured into the further development of crop farming than into improving natural pastures and their livestock. This is particularly true for more marginal pastures, such as those in arid regions. One reason for this may be the low investment incentive: pastoralists improve their yields almost exclusively by optimising natural resources and less by using industrially manufactured, external means of production. In Europe, livestock farmers who rely on grazing systems have often been economically marginalised for many years, and their contribution to functioning ecosystems is not recognised, let alone adequately remunerated.

In almost all countries of the Global South, it is pastoralists who have the poorest access to social infrastructure and education – and their opportunities for political influence are correspondingly limited.

I have taken the International Year of Rangelands and Pastoralists 2026 (IYRP2026) as an opportunity to commission a study on the status quo and the protection and use of global pastoral lands.

I hope that this form of sustainable animal husbandry will receive more recognition and support, and I wish you much enjoyment and new insights as you read!

Martin Häusling, MEP

Photo: Hoerz

I. GRAZING SYSTEMS UNDER PRESSURE - THE RANGELAND–PEACE–SECURITY NEXUS

DR. LOUISE WIUFF MOE AND MOHAMED FADAL

Photo: Hoerz

Rangeland protection is significant not only for ecological, livelihood and social reasons – it also intersects directly with conflict and security dynamics, with tangible impacts on stability and peace. This is particularly visible in for instance Africa's Horn and the Sahel. Land-related conflicts are often oversimplified as simply incompatible herder-farmer land use practices or framed as inevitable resource conflicts, shaped by climate change. This overlooks the critical role of policy and governance frameworks related to land use. Poorly designed or exclusionary land policies – both past and present – have played a significant role in shaping conflict dynamics, food insecurity and forced displacement or migration. On the flipside, inclusive and sustainable grazing systems can play a central role in preventing conflict, enhance food security and prevent forced displacement and migration.

While the climate–peace–security nexus has gained significant traction in policy, the land–peace–security nexus remains critically underexplored - even though issues surrounding land, including access, tenure, pasture, water, and mobility, are central to conflict, peace, and security.[1]

Parts of the research for this section is based on the research project "Pastoralist Climate Change Resilience in Somaliland"[2]

Research project "Pastoralist Climate Change Resilience in Somaliland

1.1 GAPS IN RANGELAND PROTECTION: SEEDS OF CONFLICTS

Rangelands have long been viewed - across historical colonial, state, and development paradigms - as underutilized and economically inefficient landscapes or even worse: wastelands. This perception has often justified their conversion to sedentary agriculture, crop- production, nature conservation areas, infrastructure projects, or extractive industries. Policies and governance based on this logic have – often inadvertently – reshaped land use practices, disrupted natural resource and grazing systems and thereby also altered power relations over land and resources, in turn feeding into conflicts and social fragmentation.

The marginalization of grazing systems is also reflected in legal and institutional fragmentation. Overlapping land regulations (e.g. Ministries of Livestock, Rangelands or Environment vs. Ministries of Agriculture or Economy), lack of recognition of customary land tenure (rights), and weak enforcement mechanisms leave rangeland users vulnerable to dispossession and land grabbing. But even the principles of tenure and ownership are not straightforward:

"During my historical doctoral research during the 1980s among pastoralists in Sanaag and Togdheer in Somaliland, respondents consistently stated that 'God owns the land'. These were pure pastoralists who could travel hundreds of kilometers beyond their home territories and still share grazing resources at their destinations. [...] Despite the proliferation of commercial villages, outsiders are still generally allowed to access grazing lands and public water sources."
(PERSONAL ACCOUNT, MOHAMED FADAL)

Acacia fodder tree and camel, Somaliland 2025, photo: Moe

'God owns the land'

In the pastoral context, individual or collective land ownership is uncommon under the Somali pastoralist xeer (customary law). However, human-made water points — recent or inherited from earlier generations—may be recognized as private or clan-owned. Even today, many pastoral conflicts revolve around defending communal grazing rights — often triggered by the digging of new water points, or the establishment of commercial settlements (tuulooyin), in commonly used rangelands. This tradition of shared use suggests that, if approached in good faith, governments can negotiate the establishment of pasture reserves without necessarily confronting entrenched kinship-based tenure systems.

Ministries, donors and implementing agencies often operate with unclear or competing mandates, and rangeland regions are systematically underserved in terms of public investment, infrastructure and basic social services.

The marginalization of grazing systems is closely linked to broader questions of governance and conflict. Evidence points to a set of interrelated rangeland–conflict pathways, where pressures such as rangeland degradation, expanding enclosures in the context of missing protection of grazing rights and blocked grazing corridors, interact with rising tensions within pastoral communities and between pastoralists and farmers, growing food insecurity, and patterns of displacement and forced migration.

Example:

Obstruction of Grazing Systems as a Conflict Driver in The Sahel

In Nigeria the obstruction of traditional grazing routes has been a major trigger of violent conflict, coinciding with ethnic-religious tensions, between Fulani pastoralists and sedentary farming communities. Farmers have expanded cultivation into historical corridors, while herders - facing environmental pressures in the Sahel - have migrated southward in search of pasture. The resulting clashes have led to thousands of deaths and mass displacement. As documented by the United Nations Office for West Africa and the Sahel (UNOWAS), the failure to protect grazing rights and harmonize land-use governance, turned seasonal migration into a flashpoint for broader intercommunal violence. Similar dynamics are evident across West Africa and the Sahel, where the disruption of longstanding transhumance routes, by settlement expansion and land reallocation, has become a key driver of armed conflict, forced migration, and displacement. These developments reflect broader patterns across the region, where the lack of protection and sustainable regulation of rangelands remains a critical, yet often overlooked, source of instability.[3]

Blocked grazing routes and failed land-use governance have turned pastoral migration in the Sahel into a major driver of intercommunal violence and displacement.

While climate change is increasingly impacting rangelands and food systems that depend on them, policy responses aimed at climate adaptation not uncommonly end up further marginalizing rangeland protection, by centering adaptation efforts around conservation or crop-based agriculture and tenure models that exclude rangeland users – thereby inadvertently playing into the conflict pathways outlined above.

"100 ha gained for crops, 1000 ha lost for rangeland"

Importantly, when rangeland is converted to cropland, it is not a simple one-to-one trade ("100 hectares lost, 100 hectares gained"). Crop farming typically targets the most fertile and strategically located parts of rangelands - areas with better rainfall, soils, and topography. These are precisely the zones that pastoralists need during dry seasons to sustain their herds. Losing this critical fraction undermines the viability of the entire rangeland system, even if the majority remains untouched.

Example

When Climate Protection Feeds Conflict: Lessons From Afghanistan's Kuchi Herders

In Afghanistan, conservation zones established to protect biodiversity have displaced Kuchi pastoralists who for centuries have sustainably managed rangelands through seasonal grazing. This adds to continued tensions between ethnic groups over land access. This trend even continues under Taliban rule. Excluded from ancestral pastures, many now face land degradation, social conflict, and cultural erosion. A 2023 study found that 70 percent of Kuchi families are, in fact, open to conservation collaboration – if their right for grazing and mobility are respected. This case thereby both illustrates how climate protection can lead to the conflictual conversion of pastureland and highlights the need for inclusive climate action that respects local ecological stewardship.[4]

1.2 SUSTAINABLE RANGELAND MANAGEMENT AS A FORCE FOR CONFLICT PREVENTION AND PEACE

Prayer in protected area, photo: Hoerz

While exclusionary and fragmented rangeland policies have played a significant, if underacknowledged, role in impacting conflict, displacement and food insecurity, the flipside is that inclusive and well-prioritized frameworks for sustainable grazing systems offer important pathway to conflict prevention and stability. When rangelands are protected and are sustainably managed through approaches that reflect both ecological dynamics

and social realities, they can serve as buffers against the key pressures that drives conflict, food insecurity and forced displacement.

Firstly, inclusive land governance that recognizes and operationalizes customary grazing rights – while accommodating these with the interests of other land users, such as farmers –can be key in mitigating resource-based tensions and strengthen institutional/governance legitimacy. Evidence points to the value of participatory approaches - such as negotiated grazing access, and community-led planning - in strengthening local governance and preventing conflict in rangeland areas. Reviving cooperative relations and traditions between pastoralists and farmers, and engaging stakeholders - including across borders - can help restore systems of mutual benefit and reduce tensions. As rangelands function as social-ecological systems, approaches that balance diverse interest and support equitable trade-offs are essential. Technical collaboration around land use – such as resource monitoring or grazing management - can serve as a practical entry point for building trust and cooperation, and thereby open pathways to conflict prevention and peace.

Inclusive, participatory land governance that secures customary grazing rights is a practical entry point for reducing tensions and preventing conflict in rangelands.

Secondly, and closely related, as rangelands are central to all rural, not only pastoral livelihoods, their sustainable management is also critical for food security.[5] Improved rangeland management enhances food security by sustaining livestock productivity and ecosystem resilience, which also reduces the vulnerability of rural communities to climate shocks and lowers the risk of forced migration, both in-country to cities and across state borders.

Example

Aroori Grazing Reserve – Community–State Rangeland Collaboration in Somaliland [6]

While resource-based conflict often dominates narratives about the Horn of Africa, the rehabilitation of the Aroori Grazing Reserve (AGR) in Somaliland offers a counter example. AGR – 10,000 ha fenced grass-bush-tree pasture - was rehabilitated in 2016 as a jointly managed initiative between state institutions and pastoralist communities, designed to restore rangeland and strengthen drought resilience. Through negotiated seasonal closures and rotational grazing, the reserve now functions as a strategic fodder bank - helping pastoralists protecting their livestock during climatic stress and decrease displacement risks – in a region where pastoralist communities have otherwise faced rapidly increasing pressures to relocate due to degrading rangelands and recurrent droughts.

In the context of increasing fragmentation of rangelands, because of the expansion of private enclosures AGR provides a buffer and a space for collective ecological stewardship. Its success highlights the conflict prevention potential of inclusive rangeland governance - by securing pastoralist livelihoods, reducing competition over vegetation and water resources and building up trust between communities and authorities. A newly established knowledge center at AGR now facilitates training, research, and exchange, supporting replication of lessons learned.[7]

The conflict prevention potential of community-owned and state-supported sustainable grazing systems and rangeland management aligns directly with the principles of environmental peacebuilding, which frames natural resource governance as a strategic entry point for conflict prevention and post-conflict recovery. Framed through the climate–peace–security nexus, environmental peacebuilding has gained traction in response to climate change and is increasingly embraced by multilateral institutions, especially the United Nations. Focus has centered on for instance water systems or catchment areas, the management of agricultural land and related natural resources. Yet rangelands and pastoralist systems, despite their vast geographic reach and critical role in sustaining livelihoods in conflict-affected regions, have received comparatively limited attention.

Photo: UNDP

The Climate-Peace and Security Agenda

The climate–peace–security agenda reflects the recognition—particularly within the UN—that climate change and environmental degradation pose serious risks to peace and security, by contributing to resource scarcity, ecosystem loss, displacement, and violent competition. At the same time, the agenda stresses that inclusive and just climate action is essential for sustaining peace. The European Union has also increasingly prioritized this agenda, integrating climate-security risks into its foreign, security, and development policies.

Further Informations

IYRP

The good news is: a focus on rangelands is on the rise. Regional organizations, especially African, like the African Union (AU) and the Intergovernmental Authority on Development (IGAD), have spearheaded efforts to include a focus on rangelands and pastoralism in addressing conflict, sustainable livelihoods, climate change and environmental degradation. Their potential contribution to conflict prevention and peace is uniquely positioned to address the intersecting dynamics of climate stress, mobility, and resource governance, including the protection of soils and biodiversity.

Recent developments, including the UNCCD COP16 decision and the UN General Assembly designation of 2026 as the International Year of Rangelands and Pastoralists (IYRP), underline the growing recognition of rangelands as a significant component of environmental peacebuilding frameworks - where they rightfully belong.

INTERNATIONAL YEAR OF
RANGELANDS AND PASTORALISTS
2026

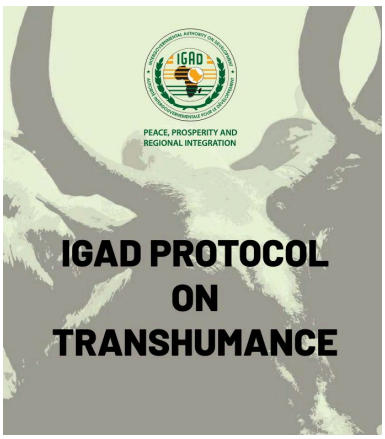
Rangelands and Environmental Peacebuilding in Regional Frameworks

Regional organizations such as the Intergovernmental Authority on Development (IGAD) or the Association of Southeast Asian Nations (ASEAN) have increasingly integrated the 'nexus efforts' into their work, addressing the intersection of land restoration and conflict prevention.

IGAD's Sustainable Ecosystem Management Project, for example, focuses on Sustainable Land Management to prevent conflict and enhance cross-border cooperation among communities.[8] With support from the UN's climate security efforts, IGAD has moreover developed and expanded its Protocol on Transhumance (2021)[9] as a central component of its peace and conflict prevention activities in East Africa. The protocol represents a proactive approach to climate change adaptation linked with migration, specifically addressing the interrelated dynamics of climate change, livelihood insecurity, mobility and conflict dynamics and in particular conflicts related to land access.[10]

Another instance is ASEAN's Political-Security Community Blueprint which includes a focus on "land restoration efforts, aligning them with conflict prevention and regional cooperation strategies."[11]

These engagements highlight the potential of sustainable land use systems as pillars for peace, across regions and beyond borders. Yet, land remains a politically sensitive and often fragmented domain. Many governments still treat it either as a sovereign issue, kept separate from external cooperation, or as a localized concern managed at subnational levels. This makes it all the more important to continue supporting regional and trans-border approaches to sustainable land and grazing systems.



II. BIOLOGICAL AND ECOLOGICAL PRINCIPLES AND POTENTIALS OF SUSTAINABLE GRAZING FOR SOIL FORMATION, CLIMATE PROTECTION AND BIODIVERSITY

DR. ANITA IDEL

This chapter discusses grassland on so-called 'mineral soils'. Ecosystems store carbon above ground in shoots and below ground in roots and soil:

- Moor and peatlands are organic soils. They are the largest carbon container. But they have very little soil-forming (sink-)potential. Drainage makes them the largest natural source of carbon emissions.
- Permanent mineral grassland stores more carbon than forest. It has the greatest sink-potential for additional carbon storage.

2.1 GRASSLAND– A UNIQUE ECOSYSTEM

For their first 140 million years, grasses existed as solitary organisms. Only about 20 million years ago they began to grow „lawn-like". There the coevolution of grassland and grazers began. Today – millions of years later – some unique reactions of the grasses seem perfectly normal to us: Cattle do with grasses what they do with tree saplings – they graze them - but while grasses continue to grow after being bitten/grazed, tree samplings stop growing – so grazing animals can keep areas open[12].


Photo: Unsplash

Photo: Idel

Photo: Idel

Photo: Pixabay

Grasses are unique – they need the bite.

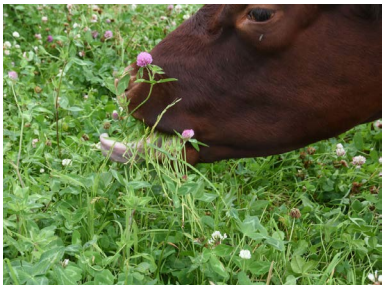


Photo: Kunz

In fact, this regrowth is based on a "unique selling point" of grassland ecosystems: They have successfully adapted to grazing through co-evolution with grazing animals. No matter where we see grassland today, it will only survive if it is "used". And that has been the case for millions of years, thanks to grazing alone[13].

Beyond this specific biological feature, grazing triggers a growth impulse in grasses: their photosynthetic capacity increases, they absorb more CO_2 from the atmosphere and use it to produce more biomass and more humus. Ultimately, the global success of grasses is largely due to the fact that they have developed beyond merely tolerating grazing. They grow not *despite*, but *because* they are being grazed; they benefit from grazing.

Contrary to the many effects of grazing – in particular on biodiversity including the exchange of microbes from saliva to the cow pats left behind – the growing impulse triggered through grazing which has developed over millions of years through coevolution can be imitated through mowing.

All other plants try to avoid being bitten: some even expend a lot of energy defending themselves against being bitten – through spines, thorns and especially bitter substances[14].

Grassland ecosystems are so successful that they cover the largest land area worldwide and store more carbon than the other major permaculture system: forests [15]. As grasses coevolved with large grazing animals, fundamentally different growth dynamics developed between grasses and other plants. Once a blade of grass has been grazed, it is level at the top and retains this straight torn edge. The length growth of the stems starts again from the bottom of the base. Plants such as tree saplings, on the other hand, grow from the shoot above ground. If they have but one shoot, they are unable to grow once they lose that shoot through grazing.

Grasses start to defend themselves with plant poison only when they are grazed too often and/or too low and thereby threatening their regeneration and eventually their survival [16].

Coevolutionary adaptation has made grasses dependent on grazing: Ultimately grassland will cease to exist if it remains permanently "unused": based on their special – completely different – growth dynamic. The biological mechanism consists of the specific path photosynthetic energy takes and how it is distributed: Grasses naturally store less in their own plant biomass, but mainly in the soil [17]. Only if perennial grasses are not grazed (or mowed), they, too, like all other flowering plants transfer energy from the base upwards to form flowers. This energy is then no longer available for humus formation[18].

2.2 WHY ARE GRASSLAND AND GRAZING STILL SO UNDERVALUED – AND EVEN BLAMED?

Whether in science or research, grasslands and grazing are extremely underrepresented in climate research[19,20,21,22]. The reason lies in a general underestimation of their potential for climate mitigation, which is a result of a lack of knowledge, incorrect assumptions and incorrect conclusions.

Grasslands are the most successful biome, followed by forests. No other plant community covers as much of the global landmass as grassy biomes [23]. While understanding this coevolution with grazers is essential in the current planetary crises, it has been critically understudied.

Regarding 'The unrecognized value of grass' [24] Science published a Special in 2022 focussing on "The history and challenge of grassy biomes" and emphasizing, that "Grassy biomes are twenty million years old but are undervalued and under threat today".

Grasses can grow – including above the timber line and in arid or semi-arid regions – where trees cannot due to nutrient and/or water shortages. Therefore, they become overgrown with bushes (or, with increased water availability, become forested) when the grazing animals – their co-evolutionary partners – are no longer available. This process, commonly referred to as natural succession, is usually caused by human activity [25]: it's mostly man-made – an anthropogenic succession – in the past, by the displacement or extermination of grazing animals, and today, by their fencing.

Regarding the great potential of mineral grasslands for climate mitigation we can call it the forgotten coevolution. They are dramatically underestimated – even worse, they are ignored before they could be underestimated – they are mostly overlooked in science and research. We have to derive the reasons for non-perception and non-use.

IN A NUTSHELL:

The narrative of **natural** *succession: although the co-evolution partner – the grazing animal – is excluded due to* **anthropogenic** *factors.*

The forest narrative: Since the most of the humus comes from root biomass (and forests have always more root biomass per unit area than grasses), the conclusion is that trees/forests have the greatest potential for humus formation. This overlooks, that this potential lies in the quality of the roots and thus in the quantity of FINE roots: their decomposition and their previously released energy- and nutrient-rich exudates.

The narrative that blacks soils (chernozems) are formed solely by geology and climate – independent of grazing animals – refers to the forgotten coevolution: The most fertile black soils – the prairies of North America, the pampas of South America or the black earths soils of Eurasia – all have a history of several thousand years as grazed grassland. Mineral grassland is added together with organic soils/moor: Regarding the carbon cycle mineral grassland as a result, appears to be a source of carbon ... instead of recognizing its carbon sink potential. Based on this, misleading average values for soil formation are inferred, accordingly, it would take hundreds of years to form one centimeter of soil.

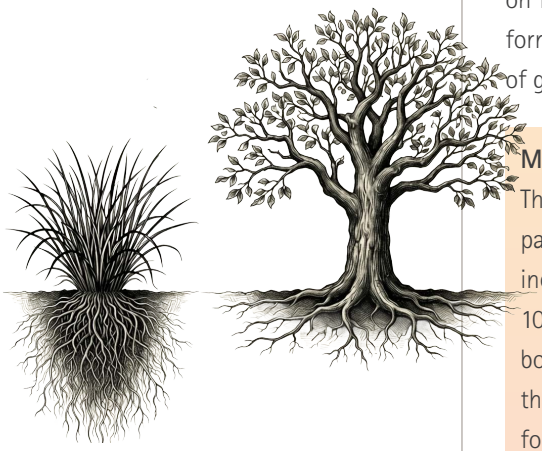
Because grazing management is often not adequate and followed by overgrazing, the overused and degraded rangeland is widely regarded as the normal. Then the poor status quo leads to the wrong conclusion and implies a lack of potential. In 2015, during the UN International Year of soils, the potentials of grasslands and grazing wasn't even mentioned. On the contrary, grassland was often perceived as empty space, as unused land that should be upgraded for agriculture or even forest.

2.3 GRASSLAND AND FOREST ECOSYSTEMS IN COMPARISON

Due to the lower water requirement of grasses compared to trees, permanent grasslands dominated in the low-precipitation glacial periods, which put plants with high water requirements at a disadvantage. It was getting colder and drier as a result, as glaciers increasingly bound the previously circulating water. In the current interglacial age grassland and forest ecosystems – both permaculture systems – are the two largest terrestrial biomes. But they differ significantly in several respects. Worldwide, grassland and forest ecosystems cover a comparable land area. While the potential for humus formation and climate mitigation in grassland ecosystems is routinely underestimated, the potential of forest ecosystems is overestimated [26].

In trees, aboveground biomass predominates over root biomass, in grasses, the opposite is naturally true, root biomass dominates

In trees, aboveground biomass predominates over root biomass, in grasses, the opposite is naturally true, root biomass dominates.[26a] And: Unlike in trees, the root biomass of grasses consists predominantly of fine roots. The main part of humus formation is based on root biomass. However, the specific type (quality) of the roots is crucial for humus formation [27]: The humus building potential lies in the fine roots – which are characteristic of grasses [28, 29].



Miscalculated

The continued overestimation of the carbon sequestration potential of forests is partly due to the fact that increased CO_2 levels in the atmosphere contribute to increased above-ground biomass formation. A meta-study evaluated the results of 108 comparisons between forests and grasslands (only) in terms of soil organic carbon (SOC) at elevated CO_2 partial pressure – and thus climate mitigation: "We found that overall, SOC stocks increase with eCO_2 in grasslands (8 ± 2 per cent) but not in forests (0 ± 2 per cent), even though plant biomass in grasslands increase less (9 ± 3 per cent) than in forests (23 ± 2 per cent). (...) Ecosystem models do not reproduce this trade-off, which implies that projections of SOC may need to be revised [30].

Another reason for the underestimation of grasslands and the overestimation of trees and forests is that the latter store most of their carbon in their biomass above ground – where it's highly visible. Grasses, on the other hand, especially perennial grasses, naturally release carbon mainly into the soil – a consequence of co-evolution with grazing animals.

Regarding the carbon content – stored above ground (in shoots) and below ground (in roots and in humus) – the totality of grassland ecosystems stores more carbon than all the world's forest ecosystems [31]. Fine roots are very important for humus formation: The majority of carbon comes from rotted down fine roots and energy-rich nutrients, known as exudates, that the fine roots have previously released into the surrounding rhizosphere [32]. That's why the worldwide totality of grassland soils store 50 percent more carbon than forest soils [33]. Following Teague et al. assuming appropriate grazing management, „ruminant livestock can increase C sequestered in the soil to more than offset their GHG emissions" [34].

Perennial grasses are characterised by establishing themselves well in their respective locations and remaining there. Their 'use' – through grazing or mowing – leads to an increase in above ground and root biomass as well as the formation of exudates, both of the latter subsequently contribute to humus formation. However, only if the grasses are not grazed or mowed, they, too, transfer energy from the base upwards to form flowers. This energy is then no longer available for humus formation. The resulting seeds represent the plant's attempt to re-establish itself permanently in another location. Thats why seed production by grass every other year is crucial for the rehabilitation of degraded / overgrazed grassy biomes.

The lack of knowledge and the wrong conclusions pose a great danger. Here is just one example: Almost 1 million km2 of Africa's grassy biomes are targeted for tree planting by 2030 [35].

2.4 THE DIFFERENCE BETWEEN LIVESTOCK FARMING ON PASTURES AND ARABLE FARMING

The world's most fertile soils have been created by millennia of grazing. But the knowledge that the co-evolution of mineral grassland and grazing animals is crucial for the development of today's granaries is spreading only very gradually. Whether we refer to the prairies of North America, the pampas of South America or the black earths soils of Eurasia, the idea that climatic conditions alone have enabled or limited the development of the most fertile arable soils, the chernozems, continues to dominate soil science ... Humus consists to over 50 percent of the carbon from CO_2 that plants absorb during photosynthesis. Land use changes generally lead to a decrease of permanent grassland.

Once converted to arable land, the former grassland soils suffer dramatically humus loss – with every ton lost they pollute the atmosphere with 1,8 ton of CO_2. Stopping the conversion of grassland into arable land is a must. As we need arable land it's use has to become more sustainable [36].

An important practice is to (re)integrate grazing animals into arable farming – largely forgotten since the beginning of the chemical age. Consider this: For centuries, the humus-forming potential of grasses was utilized in the three-field system. To fallow did not mean to do nothing, but rather not turn the soil (by ploughing) and rather temporary grazing to restore fertility to eroded arable soils.

In intensive agricultural systems the pressure on the soils and soil biomes with pesticides and synthetic nitrogen fertilizers increases [37]. In addition, arable land is flooded with liquid manure. Both resut in biodiversity loss and nitrate pollution of groundwater and wells. While the soil is compacted by the increasing axle loads of slurry tankers, the question is not, how much slurry the soil can absorb, but how many grazing animals the arable land and grassland soil are needing. In regard to co-evolution there are now excellent research results for arable land through a real alternative: grazing diverse multi species mixtures – grasses, forbs, legumes – as part of crop rotation [38]. That also provides confirmation that the long-proclaimed saturation limit for carbon storage in soils does not exist [39].

Ploughing of grassland, photo: Beste

An important practice is to (re)integrate cattle into arable farming

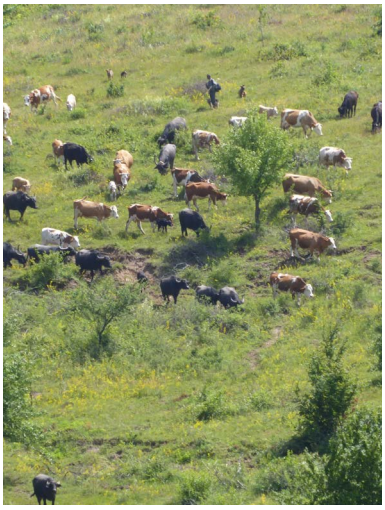


Photo: Idel

2.5 GRAZING AND BIODIVERSITY – POTENTIALS AND BARRIERS

The diversity of grasslands – the diversity of grasses, herbs, and legumes that fed the seed bank until the chemical age – has been the basis of the global success of grasslands - grazers as the largest biome. The diversity of grazing animals is remarkable: no grassland evolved with just one grazing species. But there are dominant species among grazers, mostly ruminants. Grazing management is key:

*IT'S NOT THE COW – IT'S THE HOW...**

Co-evolution is the driving force behind the development of grasslands and their biodiversity. Carrying capacity is generally understood to mean the maximum number/total weight of grazing animals an area can support. But the question should be how many (and which) grazing animals the different grasslands need. „Current herbivore levels are estimated to be four to five times larger than at the Pleistocene-Holocene transition or the start of the industrial revolution". But both of the latter „are likely to be consistently higher than what has generally been assumed" [40]. The "intermittent nature of herbivory in natural systems" [41] is a key factor for maintaining sustainability of grazing – and a potential inherent to mobile pastoral systems. Every natural grassland was created through mixed grazing. In grasslands, herbivores can have a surprisingly wide range of effects on plant diversity [42]. „The high natural densities of wild herbivores in the past show that sustainable livestock production can mimic the ecological functionality of wild herbivory and provide high amounts of animal-sourced products at an acceptable environmental impact" [43].

Grassy biomes cover approximately 40 percent of the global land surface [44]. The area share in agriculture is 70 percent [45]. In intensive farming systems the diversity is increasingly restricted: first below ground in the seed bank by herbicides and species-poor seeds and above ground through fertilizer, which promote the growth of so-called high-yield varieties – at the expense of diversity. When grasslands lose herbivores – their co-evolutionary partners - a decline in quantity is followed by a decline of plant diversity.

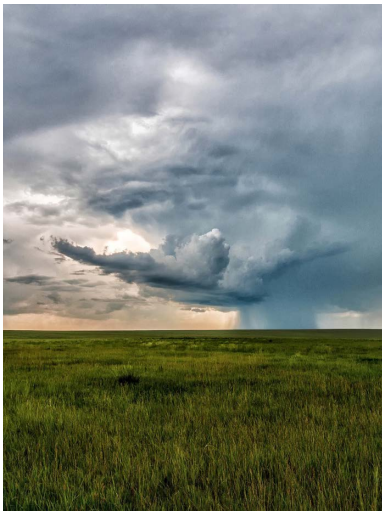
In intensive farming systems the diversity is increasingly restricted: first below ground in the seed bank by herbicides and species-poor seeds and above ground through fertilizer, which promote the growth of so-called high-yield varieties – at the expense of diversity.

Photo: Beste

Phukubye et al.[46] offer a very informative overview of the most important factor in grazing, that can be influenced by humans: its management. They start with Voisin (2001)[47] and Savory and Parsons (2000)[48] and end with 235 experimental sites in 18 countries across the world. Their conclusion for use in agriculture:

Controlled grazing at high intensity for short duration is the best performing grassland management practice worldwide.

Grazing offers and requires the ability to respond promptly to weather changes – droughts as well as heavy rains and flooding. But more and more grassland is being converted into arable land. Millions of hectares are at risk of water erosion during floods because agriculture often extends right up to river banks. Therefore it's so important and necessary to actually convert floodplains and slopes, which are particularly vulnerable to erosion by water and ploughing, into grazed grassland – with the enormous advantage of interconnected biotopes. But even where grassland still grows, in the global north it is being grazed less and less – and mowed instead. Stables or feed lots have been common for a long time and became dominant for animals on intensive farms. The associated uniform fertilization with chemicals and / or liquid animal manure reduces biodiversity – and thus resilience.



Grassland stores rain

Also indispensable as a natural part of grassland ecosystems and thus for the food chain is the (uncontaminated) dung of grazing animals: The pads of a single cow provide food for over 100 kg of insect biomass per year – and thus for the survival of birds, bats and other animals in the food chain [49, 50]. However, this is only possible if the cow is grazing, because the cowpat is unique and impossible to substitute. The benefits of cowpads, however, are threatened by routine treatment of grazing animals with anthelmintics, many of the cowpad-associated insects are now on the red list of extinction.

Geotrupe spiniger on cowpat, photo: Buse

Last but not least: our health

Science refers to a period of 130,000 years of co-evolution between humans and aurochs [51]. As a result, we observe a 'farm effect': long-term studies from the past 30 years show that young children who grew up on dairy farms suffer significantly less from asthma, autoimmune diseases and allergies [52].

Overgrazing

In addition, pasture management costs are rising due to larger herd sizes and climate change. In particular the latter requires considerable flexibility in order to respond promptly to periods of drought as well as major rainfall events. There is no one 'right' grazing management approach; the opportunities lie in utilising the variety of options that provide the flexibility to adapt according to circumstances.

Excessive grazing pressure reduces the biological diversity of grasses, forbs and legumes and thus the resilience of the pasture. If repeated too often, it can lead to overgrazing: the grass plants die because their energy reserves are depleted. The poor condition of the pastures resulting from unsustainable grazing is then often misinterpreted as grasslands lacking potential or as an inevitable decline in productivity due to climatic conditions.

III. SYNERGIES INSTEAD OF CONFLICTING GOALS ("MULTIPLE WINS"): WHAT GRAZING SYSTEMS CAN ACHIEVE

THOMAS HOERZ

We still fail to value and protect rangelands, despite their feeding around 20 percent of the world's population with almost zero external inputs.

We do not value, protect or even fully understand the ecosystem that covers more than half of the world land surface, this economic and cultural system, that feeds approximately 20 percent of the world population. A narrative of 'modernizing agriculture' still seems to largely overlook pastoral systems, that operate with almost zero input, simply by adapting to nature and climate. We have not even started to add up the benefits of good rangeland and pastoralism stewardship – and what is at risk if we keep forgetting, marginalizing or even demonizing those.

3.1 THE ROLE OF PASTURES AND LIVESTOCK IN THE GLOBAL SOUTH FOOD SECURITY

We all know about the environmental and cultural value of European or American R&P in virtually each country of the global north. They are fighting from their economic niche to be recognized and appreciated.

photo: Pixabay

Alpine forested rangeland, photo: Hoerz

In contrast, rangelands in the global south often cover a large part of the land surface and produce decisive amounts of protein-rich food in the absence of intensive, stable-bound animal husbandry. The FAO estimates that globally, less than 3 percent of dietary calories stem from rangeland animals, whereas in the global south, especially in drylands, millions of pastoralists have no other source of food, be it through direct consumption of milk, blood and meat or through the sale of animals. Intact rangelands and healthy animals can there be virtually be a matter of survival.

There is hardly a more direct link between environmental sustainability and food security than in pastoral systems: it is the link between the naturally grown fodder that animals consume and the food security provided by animal products and animal sales. Additionally, an intact rangeland vegetation provides substantial amounts of 'wild foods' (fruits, vegetables, roots). The sheer magnitude of global rangelands is staggering: in 146 countries, pastoralism is practiced, 14 percent of the world's population are pastoralists[53]. Many more of the worlds' rural population live partly of grazing animals, complementing their crop production by animals' consumption of harvest residues and providing essential dung for the fields. Pastoralists and Agro-pastoralists both keep animals also as a 'bank account' to have something to sell in times of need or for special events such as weddings.

Photo: Pixabay

Part of the global rangeland is organized in ranches, privately owned, sometimes fenced. Private ranches dominate in the Americas, sadly often on former rainforest land or natural prairies. Rainforest conversion to rangeland has been recognized as one of the most destructive and unsustainable land-use systems.

Rich ecosystems are first burnt down, impoverished grassland cannot sustain productivity beyond initial years, leaving a largely unproductive and ecologically impoverished landscape. Only dense forest can maintain full soil fertility in the humid tropics and only traditional shifting cultivation with long forest recovery periods (without grazing animals that destroy the shoots of trees) can reduce environmental degradation to some degree.

Photo: Häusling

In North America, ranches are often managed on prairies that had been grazing ground for bisons before human animal husbandry was introduced (and before bisons were almost extinct).

Communal land ownership with a traditional culture and economy of pastoralism, partly nomadic, dominates African and Asian drylands.

3.2 RANGELANDS AND PASTORALISM RESILIENCE UNDER CLIMATE CHANGE THREAT: WHAT'S NEW?

Climate Change, with a shift to weather extremes and unpredictability of rainfall, wind and extreme temperatures, stresses people and vegetation in any landscape, R&P is no exception here. What makes Climate Change worse for R&P are the many decades of impoverishment, both of pastoralist economy and rangelands' ecology: pastoralist families in the global south, on average, manage far less animals than in the past and rangeland soils have, in general, far less vegetative protection against ferocious rains – just to name two negative factors among others. While pastoralists often are professionals in dealing with uncertainty and scarcity [54], changes have become overwhelming, if no adaptation of the whole system of R&P is initiated.

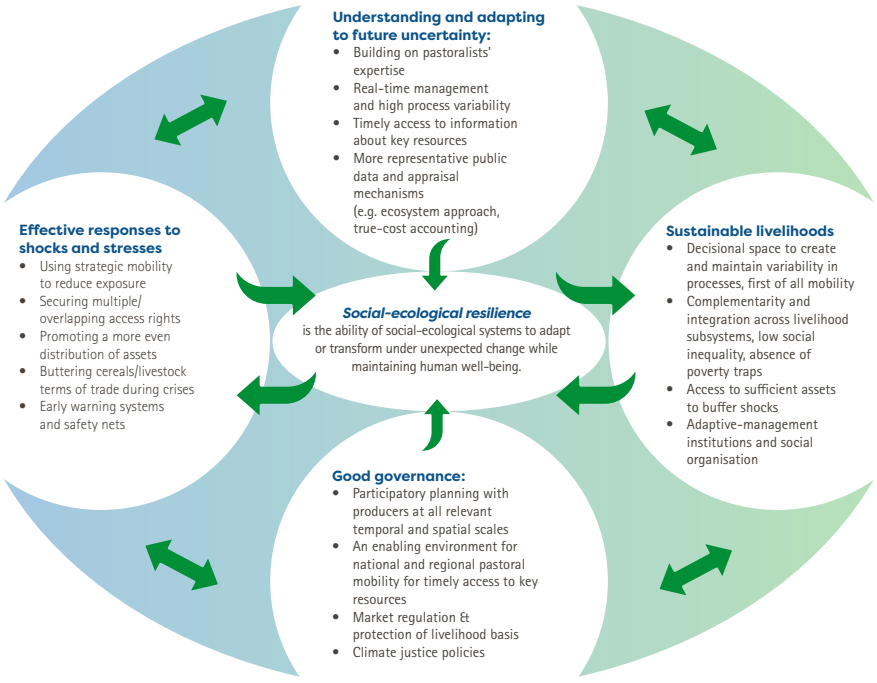
After the flood, photo: Hoerz

Erosion Ethiopia, photo: Eiblmeier

Intact rangelands are a decisive pillar of climate resilience and can even 'bounce forward' when properly supported.

But Climate Change offers one decisive opportunity: it is the well-documented climate resilience of intact rangelands itself that draws increasing interest among planners and decision makers. Rangelands bounce back 'naturally' after droughts and a residual productivity is maintained through drought-resilient grass, bushes and trees within the rangeland biomes. Throughout this volume, we argue for action to support rangelands and pastoralists to even bounce forward and also recover areas that were once unsuccessfully turned into cropland and left as wasteland. Expanded and enlarged rangelands are one decisive element of a landscape's or a country's Climate Change resilience strategy. More detail on R&P resilience can be found in a publication of GIZ with CELEP and the IYRP [55].

A social-ecological resilience framework based on pastoral systems.



Source [56]

There are local, regional and international contributions to food security through pastoralism:

1. **Local and direct consumption** of what rangelands and animals offer. This is the lifeline and safety net for all pastoralists that live in (relative) isolation and poverty in African, Asian and South American drylands such as the well known cattle herders Maasai in Kenya and Tanzania, the camel and goat herders Afar in North-eastern Ethiopia, the Koochi nomads in Afghanistan or the lama herding Aymara in the Bolivian highlands. Milk plays the overarching role to achieve food security, especially for children, pregnant and nursing mothers. Male animals are rarely slaughtered for emergency consumption, female animals almost never – too dominant is the hope for a recovery of herds after they have been decimated by drought or disease. In areas that depend partly on humanitarian cash or food aid, animals or milk bought with humanitarian funding and distributed, can provide essential proteins and minerals for human health and child development, that local markets or humanitarian grain-heavy food rations cannot provide. Such aid also strengthens pastoralist economy and reduces vulnerability.

   Necessary interventions to increase food security comprise enhanced nutrition education, an inclusion of purchasing animals at fair prices for humanitarian food aid and a support to the local milk and animal value chains. Of particular importance for the economic development of pastoralism is animal health and the rangelands' sustained or improved productivity, in particular their ability to withhold and store water. Like for the regional and international contribution to food security, participatory systems to improve the grazing regime are needed: sufficient time for rangelands to recover after being grazed, a turn from selective to non-selective grazing (see box below). Animal-health provision that can reach remote areas and can reach out even to nomadic pastoralists, can have humanitarian character such as animal vaccination campaigns. Animal health improvement can also be a development objective, for example when local veterinary drug stores and veterinary capacity ('barefoot veterinarians') are promoted. The FAO [57] and NGOs like Vétérinaires sans Frontières have ample experience and best practice at hand.

2. **Regional contributions** rely on functioning exchange systems between pastoralists and crop-farmers or urban populations. With a radius of usually below 100 km, pastoralists sell or exchange milk and animals against grain and other agricultural food produce. Beyond food security, the sale of milk and animals finances school fees, clothing, transport needs and other essential expenses. Regional trade with animals is often needs-based, short-term or based on emergencies: when drought is looming, it is better to sell off animals, starting with males, before they lose value by starvation or before they even perish. In such situations, pastoralists face the tough choices between safeguarding some (rapidly shrinking) income and safeguarding the herd's recovery after drought.

   Necessary interventions include, besides rangeland improvement and animal health interventions as above, the installation of regional animal markets, regional supplies of dry season buffer fodder, drought emergency fodder and end-fattening fodder to add to the weight of animals before sale. Wherever possible, such supplies are more sustainable when based on commercial trade, but in emergencies humanitarian aid organisations should consider fodder supplies to complement food and cash aid.

Pastoralism secures local nutrition primarily through milk, providing essential nutrients that markets and food-aid cannot replace.

Vétérinaires sans Frontières

Winter fodder, Afghanistan

Photo: Hoerz

3. **International animal trade** is a less direct and more long-term contributor to pastoralists' food security. South American ranches produce largely for frozen meat export, New Zealand cattle and sheep ranchers for the milk, butter, meat and wool export and lama herders in Bolivia almost exclusively for the wool as export item.

Pastoralists capture only a small share of export value because traders control timing and markets.

In traditional African pastoralism, herders often have a low share in the animal-based export value chain, as traders and shipment agents for live animals control markets. Where animal exports are seasonal, such as the Haj in Saudi Arabia or Ramadan in the Muslim world, pastoralists have little choice. They cannot set the selling date when animals have their best body weight. If the highest demand coincides with drought and poor pasture, even poorly nourished animals have to be sold at throwaway prices. Large-scale ranchers often have a better position to access shares of the international value chain and can control better, when animals go through an end-fattening stage to increase their selling weight.

3.3 THE IMPORTANCE OF NATURAL VEGETATION FOR SOIL PROTECTION AND WATER BALANCE FOR PRODUCTIVE AND RESILIENT RANGELANDS

The role of rangeland ecosystems has several essential features that complement food provision: They store water on vast areas and feed springs and wells, without which human existence in drylands is not possible. Rangeland vegetation protects soils from erosion by breaking the ferocity of water and opening infiltration channels into soils. Every lost ton of soil through erosion is lost forever. Loosing soils is an irreversible process, an irreplaceable loss.

Canyon after conversion to agricultural land, photo: Eiblmeier

Erosion and soil degradation lead to reduced space for plant root growth, enhanced vulnerability to drought and shrinking survival rate of young seedlings and grasses. The following reduction of biodiversity has direct negative effects on animal and human health through reduced nutrition quality. Other than fields for crop production, range-

lands have an all-year vegetation cover and no disturbance of the soil structure through ploughing. Improving rangeland plant cover increases water infiltration and water storage, which leads to better plant growth and more fodder production, another positive cycle and objective harmony.

Climate proofing through crop production?

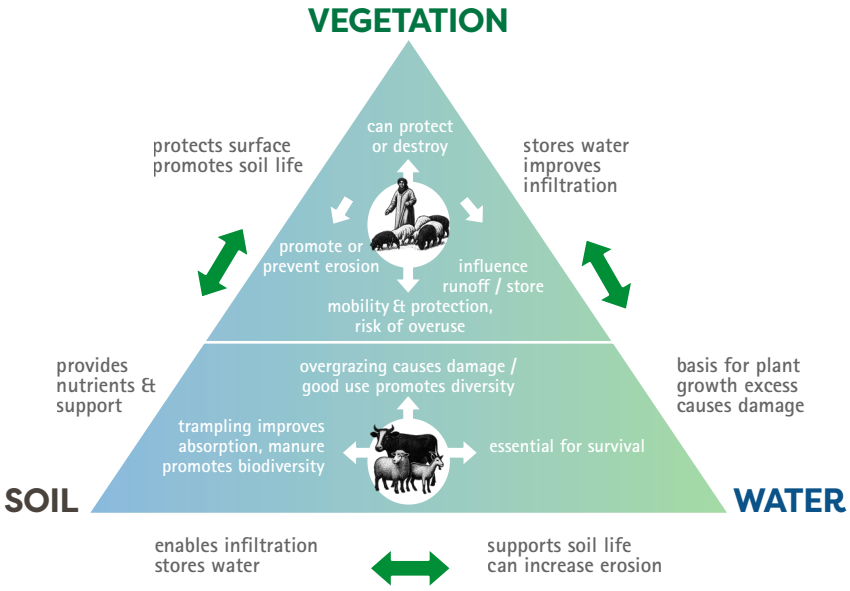
In times of ever decreasing rainfall reliability, and an increase of exceptionally strong rains, the conversion of rangelands to cropping agriculture has all but negative effects:

- Intact rangelands cover and protect soils much better than ploughed land, fields with young crops or harvested cropland.
- Intact rangelands offer much better infiltration channels for rain and have usually a better 'sponge effect' to absorb and store water thank fields with crops.
- Once annual crops seeds are planted, and even more so once seeds have germinated, a series of rain events that follow each other closely, are needed for a good crop development. Failure of the 'right' rainfall pattern can lead to total crop loss.
- Rangelands, even if degenerated, can absorb, store and utilize any rain at any time.
- Biodiverse rangelands, especially with bush and trees, can break wind speeds much better than cropland. The larger fields are and the less trees and hedges are integrated, the higher the negative effects of winds.

N.B. 'intact', 'natural' or 'biodiverse' rangelands refer to such vegetation that can mostly be utilized by herded animals, as rangeland is not mere biodiversity, it is also an economic system.

Intact pastureland during the dry season, photo: Hoerz

The Core Triangle of Pastoral Systems: Soil, Water, Vegetation



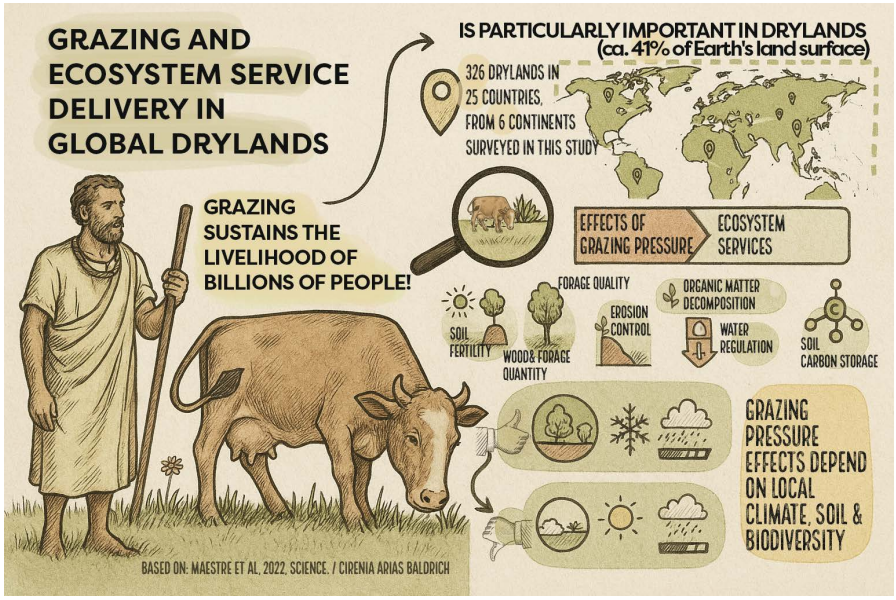
Quelle: Hoerz

All plants in dry rangelands accumulate substantially more carbon in the soil than aboveground. This fact, the vast areas available and the harmony of objectives (more carbon sequestered = more fodder produced) make drylands a promising sink for carbon. Utilizing carbon credits for further rangeland improvement has proven feasible. However, substantial question marks remain, as to how the capital flow is managed and utilized. What we can conclude: objectives towards food-, fodder- and water security, poverty reduction, economic success, soil conservation and biodiversity must dominate decision making. Carbon credits should only be sought for, if they strengthen the achievement of all former objectives and do not weaken the R&P system.

3.4 RANGELANDS AS MULTIFUNCTIONAL ECO$_2$ SYSTEMS

As functioning agro-eco$_2$-systems (economy & ecology), rangelands are in many aspects the exact opposite of crop-producing systems: While conventional crop production reduces the biodiversity to one single species or even variety of plant, R&P promote high biodiversity. While for crops, high output (yield) in conventional systems is achieved with high input of mechanization, energy, agro-chemicals and commercial seeds, rangelands aim at stable, sustainable output with low or often zero input. Pastoralism aims at maintaining and supporting the natural ecosystem for stable output, crop production needs to maximise the reduction of the ecosystem.

With improved grazing management on rangelands, a surprising number of self-steering control loops in a positive direction can be achieved, both economically and ecological, once rangelands are given the opportunity to recover after being grazed or browsed and if livestock keeping tries to copy wildlife in its inherent sustainability. More vegetation – more soil protection – more water infiltration – more fodder – more income – increased animal and human nutrition and health – more carbon sequestration – more biomass for energy. A win-win (x 8) situation without substantial external and chemical investments other than better decisions where and when to graze with how many animals of



which kind. The ever-increasing threat by invasive plants, such as Prosopis juliflora from Latin America, reducing the fodder plants to almost zero on ten thousands of km^2, do not add to biodiversity, they impoverish grazing biomes and render rangelands inaccessible. Often, they had been introduced by well-meaning development projects to 'regreen' degraded drylands, neglecting their ferocious invasive power and speed. There is some hope to control them by turning the bitter leaves into edible hay and by utilizing their woody parts for alternative or firewood.

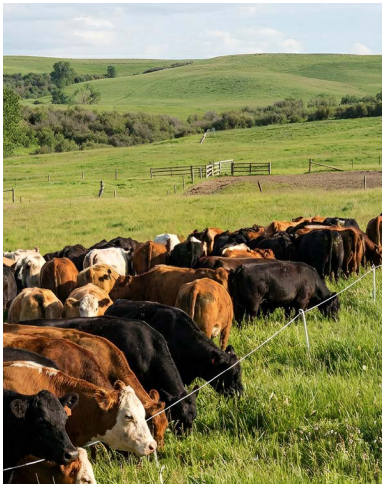
Animal density – number of animals per ha – is one factor, but not the decisive one. More important seems the way, herds and their movements are managed (see chapter II and box below)

This is perhaps the biggest 'weakness' of pastoral systems: their lack of demand for external and commercial inputs: no machines, no diesel, no hybrid seeds or agro-chemicals are required for sustained output. These missing profit opportunities for local and global corporations lead to low lobbying activity and may be one reason for the lack of economic and political interest in grazing systems in general and in traditional pastoralism in particular.

Because pastoral systems need almost no commercial inputs, they offer little profit potential and therefore receive minimal political and economic interest.

. Stocking rates, selective vs. non-selective grazing

Overgrazing, i.e. too many animals per ha or too long duration of grazing on a given piece of rangeland is commonly cited as the main reason for rangeland degradation and yes, overgrazing is indeed a problem in some settings. Undergrazing, forced by insecurity or disputed land ownership, is the mirror problem as it increases pressure on accessible land and underutilizes forage resources on inaccessible land. Furthermore, it can lead to an invasion of thorny bush that can render rangelands inaccessible – a widespread problem in Namibia, for example. Little emphasis has been placed on how selectively animals graze and how unselectively they should graze. Given the opportunity and space, livestock tends to eat the most preferred plant species at a young, tender and juicy state. This leads to a gradual impoverishment of the fodder base.



Mobgrazing

Forcing animals to eat also the older and less preferred plants leads to a more complete use of vegetation and longer recovery periods for the grazed areas. In ranches, this is successfully done by portioning of rangeland. On communal, unfenced rangelands, traditional herding in dense groups ('mob grazing' – wildlife do this for being more secure from predators) has similar effects towards sustainable rangeland use and vegetation improvement. Long and short distance movements of herds have the same objective as rotational grazing: decisively not grazing on certain parts for recovery, intense grazing on others.

Pastoralist displacement is driven primarily by violent conflict and extreme poverty.

Humanitarian interventions in pastoral settings, to fight hunger and malnutrition, are a special form of intervention, but they affect millions of pastoralists, internally displaced people and refugees in and around large camps, usually established in drylands, in Kenya, Sudan, Somalia and other countries. Displacement has two main reasons: violent conflict and extreme poverty. Violent conflict virtually closes down vast areas to pastoralists: the danger of animals being looted or human life lost is too high. In remote rangelands, in particular in Sub-saharan countries, extreme poverty is a direct effect of rangeland degradation, aggravated by climate change, leading to increased numbers of internally displaced persons (IDPs). Successful interventions, offering cash or other work incentives to improve water retention and erosion control, can bring displaced camp dwellers and the local population together for a common goal. Conflict resolution between displaced and host population has a starting point by working together for the live-sustaining environment and sharing humanitarian resources. Often, several UN organizations, such as IOM, UNHCR, FAO and WFP work together, supported by local and international NGOs.[58]

CHAPTER 4

IV. SMART GRAZING SYSTEMS: WHAT ALREADY WORKS TODAY - THE MULTI-LAYER SYSTEM OF SUPPORT TO RANGELANDS AND PASTORALISM

THOMAS HOERZ

4.1 SETTING THE STAGE - WHERE BEST PRACTICE IS PRODUCED AND WHERE IT GETS STUCK

Analysis of global pastoral landscapes and pastoralism shows that its positive potential for sustainable use of ecosystems, food security and peacebuilding is still too often overlooked. (see chapter I). Successful R&P projects are based on a shared vision and joint efforts at several levels: locally, nationally, across the region and internationally. The basis for sustainably protecting and utilizing rangelands and promoting pastoral economy and culture is laid by the respective governments.

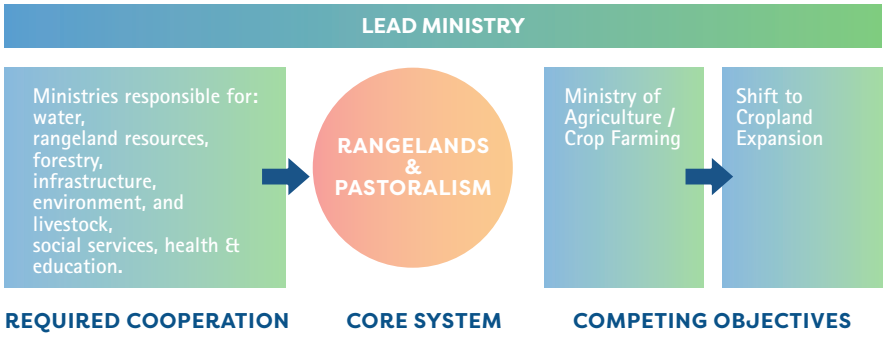
R&P hosting countries need a set of new social contracts as defined by the IDOS publications[59] that govern all facets of R&P, from legislation to policy and enforcement, down to local communities – a coherent cascade of social contracts.

Often, but not always, there is a leading Ministry such as the Ministry of Environment and Climate Change in Somaliland, or the Ministry of Arid and Semi-Arid Lands (ASAL) in Kenya. In Mongolia, a country where pastoralism is exceptionally dominant, protecting and promoting R&P are anchored in the constitution, therefore each relevant Ministry has to refer to their individual role towards R&P. One important effect is that rangelands cannot be privatized (see below). Whereas in India, herders on natural rangeland, such as the camel and goat herders in Rajasthan still wait for a recognition of their role and rights.

Rangeland governance requires coordinated mandates across ministries — otherwise pastoralism is pushed aside by competing policies.

Ministries with a defined focus on R&P, will have to cooperate with other specialized Ministries such as for water, forestry, roads, environment and livestock for the eco^2 – the economic and ecological - 'success' of rangeland and pastoralism; and with Ministries of health and education, among others, for the social services to pastoral communities. In many cases, however, competing objectives of Ministries lead to a shift from pastoralism to crop farming.

Policy fragmentation drives land-use shifts away from pastoral systems



Policy coherence required across ministries

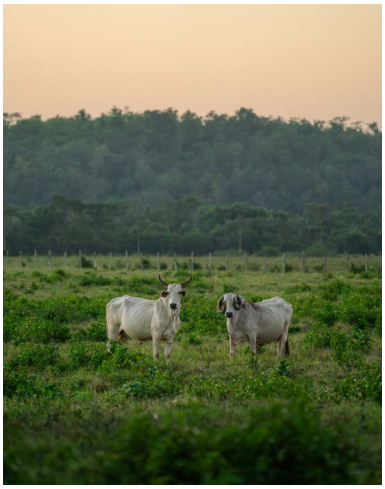
A major European donor, the German Federal Ministry for Economic Cooperation and Development (BMZ) for example, planned and currently implements a multi-million Euros project together with the Ministry of Agriculture, not with the respective Ministry for R&P, in a District in Somaliland that has an almost 100 percent pastoral land use. A positive example – in the same country – are projects financed by EU and the same BMZ: R&P is decidedly in the focus, with outcomes aiming at rangeland protection, water and soil conservation, income-generating work programmes and wildlife protection to safeguard the last remaining cheetahs.

The United Nations and other multilateral organizations have decisive impact not only on Government policies and laws, but also control large amounts of funding for rural development. In recent years, there was a remarkable increase in sound policy development, taking note of the previous neglect, the urgent global need for and the potentials of sustainable pastoralism, rightly pointing out the importance of safeguarding the environmental basis of this economic segment. Organisations like the UNCCD, UNEP, UNDP,

It is well-documented, that there is no way to mitigate climate change, end hunger, poverty and conflict, if we do not recognize the specific and often hidden role of rangelands and pastoralism.

FAO, WFP, IFAD, IGAD, among others, have published global policy suggestions and guidelines to governments, donors and implementers (see references under the respective names and short description in good practice examples in 4.3 below).

Among international donors, the World Bank, African and Asian Development Banks and IFAD do have comprehensive policies and guidelines for R&P. At the national governmental donor level, this awareness is still far less developed. All too often, countries dominated by pastoralism, receive far more funding for agricultural crop-producing projects than for rangeland and livestock development. One reason for this may be the underlying intention to promote the export of machinery, pesticides, fertilizer and other agro-inputs from donor countries, which R&P has only marginal need for. Or the export of crops like cocoa, coffee, tea or palm oil from development funds receiving countries. R&P cannot offer similar export/import opportunities, its lobbying power is therefore rather weak.



Turning a stable forest ecosystem into 'industrial rangeland' is no longer promoted by international public funding. Public awareness about this disastrous land use is just too widespread. Exceptions do still exist, as witnessed in Brasil under the Bolsonaro Government

Photo: Pixabay

The special case of rainforest conversion to rangeland follows a different pattern. Turning a stable forest ecosystem into an unsustainable, almost 'industrial rangeland' (no pastoralist culture here, only marginal workers!) is no longer promoted by international public funding. Public awareness about this disastrous land use is just too widespread. It largely thrives on short-term profit expectations of private capital, often against national law. Exceptions do still exist, as witnessed in Brasil under the Bolsonaro Government, where rainforest conversion for rangeland and crops was massively promoted.

Turning to the implementing level of institutional actors, where best practice and progress should materialize, 'development, diversification and resilience' in pastoral settings is often equalled with introducing vegetable, grain, fruit or other forms of crop production. Much less often do projects have fodder production and storage, rangeland improvement and animal husbandry, including animal-based value chains, among their chief outcomes. 'Development' and 'diversification' in pastoral areas must much more often be aimed at within the rangeland and pastoral (R&P) system.

At the level of communities, not many organisation representing pastoralists' demands and suggestions have thus far gained sufficient influence and political power. Promoting R&P still has the aura of 'romantic ethnographic conservatism' with little pragmatic strive for food-, nutrition- or water security. But on the ground, in projects and initiatives, success stories can be found.

4.2 EXAMPLES FOR COMPREHENSIVE AND WELL-COORDINATED GOVERNMENT-DRIVEN POLICIES

Examples for comprehensive and well-coordinated Government-driven policies, and examples for less comprehensive regulations, based on inclusive land rights, defined government budgets, clear responsibilities and lead roles, environmental peace building, and government guidance to donors, international and national actors.

Mongolia is arguably the country in Asia with the most elaborate legal and policy framework to protect rangelands and to promote sustainable pastoralism. Rangeland, by law, cannot be privatized. Mobility of pastoralist is explicitly promoted, at a minimum

from winter to summer camps. The Government of Mongolia actively supports structures of local-level responsibility for communal use and maintenance of rangelands. Social services must adapt to the mobility of pastoralists. Mongolia and her role in promoting rangelands and pastoralism became apparent, when the Government and many international organisations worked successfully towards the declaration of the International Year of Rangelands and Pastoralism in 2026. However, there are still remaining threats to the pastoralist economy and ecology by mining and a trend towards rangeland conversion to crop production and to stationary ranching, while a visible desertification – the Gobi desert moving north - is noted.

Kenya offers in Africa perhaps the most sound legal and policy base for R&P. For decades, under the Ministry of ASAL (arid and semi-arid lands), rangeland, livestock, infrastructure and social services in drylands was supported in a coordinated fashion. Now it is combined with East African Community issues, highlighting the need for transboundary solutions. Within the three land categories – public, communal, private – rangelands have predominantly communal ownership. The Communal Land Act (2016), formalizes pastoralist communities' land ownership and grazing rights, but requires them to formulate grazing plans. Private, spontaneous fencing is illegal – theoretically and by law. However, travelling through Kenya's drylands, private enclosures are visible everywhere. There is a growing movement among pastoralist communities with the well-known Maasai in the lead, that demands the actual and full implementation of what is a progressive and inclusive state regulation.

Uruguay serves an outstanding positive example in the Americas. It links livestock productivity with rangeland ecology with an integrated policy and legal framework, supported by strong extension services and land-user cooperatives – serving as a model for climate-smart pastoralism in similar settings.

India, despite having one of the largest pastoral populations gobally, has not developed a legal and policy response that offers more than partial protection to pastoral communities. Rangelands are considered partly wastelands, forest or tribal land. The Forest Rights Act (2006) provides so far the strongest safeguards. Other regulations are only for certain regions, certain communities or elements of the livestock value chain regulations. Actual rangeland governance remains scattered across various ministries and states. Additional sedentarization pressure (for access to social infrastructure) and insecure land tenure contribute to the decline of pastoralism and rangelands on India's territory.

Cameroon, Afghanistan and Pakistan represent the least regulated end of the spectrum. Pastoralism remains legally almost invisible, as well as economically and ecologically unsupported. Pastoral mobility and communal land and grazing rights remain largely unrecognized and transhumance corridors may exist on paper, but have little legal status and remain unenforced.

More country-specific briefs can be found in project reports and in a comprehensive country-by-country chapter of the UNCCD Global Land Outlook 'Rangelands and Pastoralism'[60]

4.3 EXAMPLES FOR SOUND POLICIES AND GUIDELINES OF INTERNATIONAL ORGANISATIONS AND DONORS

UNCCP Global Land Outlook – Thematic Report on Rangelands and Pastoralism (2024)[61]. The latest and most comprehensive global overview with a general chapter and a vast collection of global country case studies and an impressive collection of references. It also offers an overview of the preparations of the IYRP26. The volume's recommendations form a solid base for government and donor policy and required legal frameworks towards the development of sustainable R&P. On the other hand, the volume's recommendations lack a practical and bottom-up set of needed actions that could guide organisations working on the ground in a given (and incomplete!) set of policies and laws.

ILRI has published, the Rangeland Atlas (2021)[62] in an impressive collaboration with ***UNEP, FAO, ILRI, WWF, IUCN, CGIAR, International Land Coalition and Rangeland Initiative Global***. It complements the UNCCP GLO (above) perfectly as it differentiates different rangeland types and puts them on the global map. The 'three climate thresholds' (predicted changes in variation of annual rainfall, the length of growing period and the temperature) display a somber picture for the ecology of rangelands.

The ***FAO*** document Pastoralism – making variability work (2021)[63] is a comprehensive and acknowledged summary describing the state of rangelands and pastoralism and the need for their protection and rehabilitation. The FAO Pastoralist Knowledge Hub (since 2015) serves as a technical repository and a neutral forum to address existing gaps in global policy discussions concerning pastoralism. It centralizes knowledge, including literature, technical tools, assessments, and research, facilitating informed, evidence-based decision-making and promoting pastoralism-friendly policies. By fostering partnerships and engaging in effective policy dialogues, the Hub ensures that pastoral issues are integrated into key policy discussions, enhancing global understanding and support for pastoralist communities [64]. The ***FAO*** *Global Assessment of Soil Carbon in Grasslands (2023)*[65] offers insights into the state and the potentials of grasslands to mitigate climate change.

WFP contributes each year billions of US Dollars through their chief modalities Food-for-Assets (FFA) and Cash-for-Assets (CFA) in humanitarian situations of natural and man-made disasters. They address, among others, soil & water conservation, including rangeland conservation measures. The FFA Corporate Guidance & Programme Pages (2019 with ongoing updates) combines a large range of country and projects studies. The Climate Change Policy (2024/25)[66] and the Resilience Policy (2023/24)[67] feature rangelands prominently as part of the problem and focal areas for solutions.

IFAD has not published a comprehensive document on rangeland and pastoralism in recent years, but the Lessons Learnt: Pastoralism Land Rights and Tenure (2014)[68] and Engaging with Pastoralists – a Holistic Development Approach (2018)[69] still offer valuable insights and guidance. Other recent and related project documents may be interesting for practitioners.

IGAD Protocol on Transhumance (2020)[70], produced by IGAD Centre for Pastoral Areas and Livestock Development (ICPALD) is a policy and legal document, requiring member countries to sign a commitment to allow free movement of pastoralists across borders. All but one (Eritrea) of the eight IGAD members have signed the protocol: Djibouti, Kenya, Somalia, South Sudan, Sudan, Tanzania, Uganda, making Eastern Africa the largest 'free pastoral movement zone' in Africa. Other important documents include the Regional Rangeland Strategic Framework (2020)[71] and the Pastoral Land Use Planning / Guidelines for Practitioners (2024)[72] with ILRI.

The World Bank (WB) has developed, in cooperation with IGAD, the Sustainable and Resilient Livestock Strategy in View of Climate Change (2023)[73] for the period 2022-2037 in a remarkable move to acknowledge the need for much more long-term planning and implementing than often done.

The African Development Bank (AFDB) offers insights in regional programmes, such as the Drought Resilience and Sustainable Livelihoods Programme in the Horn of Africa (2023)[74] with annual updates since 2015 and insights for planners and practitioners, with a comprehensive policy, guiding their website knowledge for policy, and other internet-based research.

On the ***EU Commission***'s website, the UNCCD Thematic Report on Rangelands and Pastoralism (2024, see above) features prominently. The EU also forms part of the UN declaration of the IYRP in 2026. There is not one comprehensive policy paper regarding R&P of the EU traceable, but a host of national and regional programming, addressing pastoral economy and ecology. Much of the relevant R&P topics are embedded under documents of the Common Agricultural Policy (CAP), rural and agriculture development, biodiversity or land-use policy.

ECHO, the European Community Humanitarian Office, speaks less by policy paper but more by allocation of funding. The share that rangelands and pastoralists in need receive, to combat drought, floods and disease, is impressive. ECHO links humanitarian aid with livelihood support to safeguard livestock production, for example through emergency feed or water points. The website echocommunity.org provides a forum for publications and webinars, among which are those with specific reference to R&P.

NGOs: most of the larger international NGOs such as CARE, OXFAM, Save-the-Children or Welthungerhilfe have developed policies and guidelines for their projects that govern their work in global pastoralist settings. The test of such policies being put to work would be an examination of their country strategies, annual programmes and projects in countries with a high relevance of R&P. While this paper cannot go into such detail, readers with special interest in a certain 'R&P Country' or a certain NGO are encouraged to examine, if R&P programming is getting the weight it deserves.

Among ***Universities***, two need to be mentioned, who have built up tremendous knowledge on R&P issues: the University of Bern maintains the WOCAT database on sustainable land management in close cooperation with UN organisations and partner Universities. The University of Sussex offers courses and resources specifically on R&P issues.

University Bern, WOCAT database

University Sussex, courses

MetaMeta

One consulting company – MetaMeta – is mentioned here as an example that private business can engage and make a difference. MetaMeta has produced a host of practical sourcebooks for land rehabilitation, water management, water-conserving roads and micro-climates. These sourcebooks are among the best in guiding practicioners in the field and policy makers to add detail to regulations and laws.

4.4 EXAMPLES FOR GOOD AND BEST PRACTICE ON THE GROUND: WHY AND HOW DOES IT WORK?

Without the full framework of Government, UN and other institutional support, large-scale, national or regional rangeland improvement and sustainable pastoralism is not feasible. But there are many local, sub-national examples globally, that show how successful rehabilitation of and preservation or even positive change in pastoral ecology, economy and culture can be effected, even under insufficient legal or policy frame conditions.

Example 1

Dry Valley Rehabilitation and Productive Use (DVRPU) in Ethiopia

giz.de / only in German

GIZ and the Ministry of Agriculture in Afar and other lowlands / drylands have initiated the DVRUP programme since 2015 and ongoing. It is funded by the German BMZ and the Swiss DEZA. It has since spread in other countries with dry lowlands. The backbone of individual community projects is two-fold: 1. Water Spreading Weirs (WSWs). These are stone-concrete constructions laid across a dry river or wadi to divert a part of the seasonal and often ferocious water flows into the surrounding land to infiltrate and feed vegetation. With a multiplication of available soil water, the annual and perennial fodder vegetation is boosted and crops like vegetables, fruits or grain become possible. 2. Sensitization, training and support to organizing communities form the basis for local participation. Actively working towards a buy-in of local, regional and national authorities forms the complementary support system to local engagement and a further dissemination. The visual impact of vegetation recovery and soil and water conservation is convincing. Income effects for participating communities are well documented. Still uncertain, but intensely addressed, are the long-term maintenance and overall sustainability of physical and organisational structures.

Example 2

Lokhit Pashu-Palak Sansthan (LPPS) in Rajasthan, India

Lokhit Pashu-Palak Sansthan (LPPS)

works since the mid 1990s to improve rangelands and the camel-value-chain for Raika and Ranghar pastoralists. Its well-documented success rests on strong community mobilization and participation from the outset and due to its multi-level work: from inside the community, to a local, regional and a national outreach for the recognition of pastoral rights. On the technical side, a combination of veterinary interventions, value-chain development and rangeland management proved a holistic and effective approach. While convincing gains in income have been measured and documented, the improvement of rangeland conditions are documented by case studies and measurements at sentinel sites.

Example 3

Community Protected Pastoral Areas in Somaliland

Since 2016, the German NGO Welthungerhilfe has worked with now 35 pastoral and agro-pastoral communities to protect defined patches of rangeland to increase their productivity and climate reslience. Up to now, some 5,000 ha of rangeland have been designated and registered for community-based protection and use. Welthungerhilfe harnesses a wide range of donations, from humanitarian cash-for-work to water source rehabilitation funding to food security and environmental funding. This was possible because protected areas offer work opportunities with long-term positive impact, increase water infiltration, provide dry-season fodder, improve milk yields and increase biodiversity. Protected areas were furthermore made attractive through bee-keeping and the installation of clean water sources. Community participation and ownership is achieved through a patient approach and a refined protocol. This process culminates in a tri-partite contract between community, the Ministry responsible and the NGO, defining the land to be protected, the user rights and the obligation of each partner as well as sanctions for non-compliance. While the degree of protection varies and no scientific measurements were done, there was a remarkable visual increase in vegetation cover, biodiversity and water infiltration for fodder and 'wild foods'. The major weakness of such multi-project-based rehabilitation is the short duration of funding allocations. The follow-up support to participating communities was therefore patchy and the long-term sustainability is not yet documented.

Welthungerhilfe

Example 4

Sustainable Management of Natural Pastures in Uruguay since 2017 implemented under FAO technical leadership, partnering with the Uruguay Ministry of Livestock, Agriculture and Fisheries (MGAP), the IUCN, local research organization, cooperatives and rural associations. This long-term programme was funded by the EU and the GEF, among others. It started with a clear acknowledgement of the natural grasslands as ecosystems with economic value. Combining work at the very grassroots of highland R&P systems such as reseeding, protection, controlled grazing with national policy and regulation development and the strengthening of institutions - governmental and non-governmental – that eventually link pastoralist communities with the state was the intended set-up. In the end, this programme developed a holistic basis of what eventually counts for pastoralists: sustainable economic success, embedded in a secure land tenure and with control of animal-based value chains.

FAO, Uruguay

4.5 MONITORING AND EVALUATION: HOW DO WE MEASURE SUCCESS AND FAILURE?

Firstly, measuring success or failure require a longer observation timeline than conventional projects offer. Only after at least 5 years, better 7-10 years, can we assume that good rangeland management and the pastoral economy have taken root and are protracted by the primary stakeholders – the pastoralists, the governments, organizations and the economic actors.

Vietnam Photo: Pixabay

Columbia Photo: Mix-Tape, Envato

Africa Photo: Kampowski, Pixabay

Valloire Photo: jacqueline macou, Pixabay

Secondly, a robust, yet adaptive and complex enough set of monitoring data to be generated, guided by indicators for success or failure needs to be generated and developed for all fields of work towards sustainable rangeland and pastoralism. Among the areas for which internationally acknowledged indicators should be developed and data sets generated, are:

- Organisational stability of pastoralist cooperatives, user groups, community organizations and their reach within communities and the wider surroundings. Their political influence at national level could form part of this set of indicators.
- Ecological landscape development with the key parameters of (fodder) biomass, biodiversity in flora / fauna, trends of invasive plants and erosion control.
- Grazing patterns, herd management, the recovery periods of vegetation and trends herein.
- Hydrology with measurements of water infiltration vs. water run-off and trends of groundwater levels.
- Income development: trends of pastoralists' income from livestock products and other rangeland products (with sustainability criteria of the various incomes).
- Value chain development: degree to which pastoralist share value chain gains and degree to which pastoralists have occupied spaces in the value chain.
- Quality, comprehensiveness and state of actual implementation of laws and governmental policies. Ideally, a science-based, best-practice blue-print is developed by an international, inter-governmental drafting group.
- Quality, comprehensiveness and state of application of policies developed and applied by donors, UN organizations and NGOs. A group of participants from each segment could perform this task, in close collaboration with the inter-governmental drafting group.
- Inclusiveness: degree to which women, youth, the elderly, the differently abled and minorities take part in decision making and sharing benefits.

Thirdly, there is a need for a central authority or knowledge hub, best among the relevant UN organisations, to collect such standards for indicators and data collection and for communicating them widely to states, donors, the UN and NGOs.

V. POLICIES AND ACTIONS FOR SUSTAINABLE RANGELANDS & PASTORALISM: RECOMMENDATIONS ALL AUTHORS

Key Messages

- Inclusive and sustainable grazing systems and the laws, regulations, policy and programme design leading to these, can play a central role in preventing conflict, enhance food security and prevent forced displacement and migration.
- The Rangeland-Peace-Security nexus offers a framing to build public and political support for grazing systems and land restoration.
- The EU and other donors should explicitly integrate the Rangeland–Peace–Security narrative into its existing Climate–Security portfolios and frameworks, recognizing the central role of land access, use, and governance in conflict prevention, food security and prevention of forced migration.
- *A plea for locally adapted, fair, and ecological R&P laws, policies and action*

Governments of R&P hosting countries should complement their set of agricultural, economical and environmental set of laws, policies and regulations with along-term R&P lens (sustainability!), acknowledging the many benefits of R&P that go beyond mere export value or import substitution.

Donors considering to invest in R&P hosting countries and regions should investigate in the role of R&P within the agricultural and economic sector, define missing governance instruments to promote R&P and allocate funding with sensitivity for the sovereignty of cooperating partner countries in all fields of the R&P system, including governance, pastoralists' rights, livestock value chains and sustainable rangelands.

The UN and international organisations, engaged in R&P hosting countries and regions should support Governments, donors and implementers with adaptations of global knowledge and best practice to foster a south-south and north-south exchange and joint, global learning on R&P issues.

Implementing non-governmental organisations in R&P hosting countries should engage in a dialogue to improve governance and donor allocation, where they perceive deficiencies. They should defend and act upon existing and sensible R&P legislation and policy and should strive for a meaningful participation of pastoralists and their representatives

- Strengthening grazing systems in agricultural and development policy: climate justice, food sovereignty, ecological restoration
- Diverse use of the IYRP2026 Suggestions for different levels of politics, civil society, research, teaching

IYRP 2026 INTERNATIONAL YEAR OF RANGELANDS AND PASTORALISTS

The International Year of Rangelands and Pastoralism was decided by the UN General Assembly in 2022. The IYRP offers a wide range of topics and ideas how to act to make the theme known among the interested public, the media, governments and organizations. With world maps of rangeland types and pastoralist communities, a calendar of specific topics for each month and dozens of country studies, the IYRP website *is a multifaceted call for local action.*

DEMANDS

Martin Häusling, Member of European Parliament

1. **Legally protect rangelands and grazing rights**

2. The EU should actively support national legal frameworks within and outside the EU that recognise and protect traditional grazing rights, transhumance routes and the mobility of livestock farmers.

3. Secure land tenure and access to pasture and water are essential to prevent land grabbing, conflict, and the conversion of rangelands into cropland or infrastructure.

4. **Prioritise grazing systems in climate, biodiversity, and soil policies**
EU climate and biodiversity strategies should explicitly recognise well-managed grazing systems as key contributors to carbon sequestration, soil formation, water regulation, and biodiversity conservation. Permanent grasslands and rangelands must be protected from conversion and supported as climate-resilient ecosystems.

5. **Redirect agricultural and development funding towards pastoral systems**
CAP instruments, development cooperation, and international climate finance should allocate targeted funding to grazing-based livestock systems, including extensive pasture-based farming in Europe and pastoralism in the Global South. Payments should reward ecosystem services rather than input-intensive production.

6. **Support participatory governance and conflict-sensitive land-use planning**
The EU should promote participatory, community-led land-use planning and rangeland governance, involving pastoralists directly. Such approaches strengthen local institutions, prevent land-use conflicts, enhance peacebuilding, and improve resilience to climate shocks.

7. **Strengthen pastoral livelihoods, markets, and animal health services**
EU policies should support pastoral economies by improving access to local and regional markets, investing in animal health services adapted to mobile systems, and supporting fair value chains for milk, meat, and wool. This includes integrating pastoral products into food security, humanitarian aid, and regional trade strategies.

Pastoralism is not an outdated or marginal system, but a highly adaptive, low-input, and multifunctional land-use system that is crucial for sustainability, food security, climate resilience, and peacebuilding.

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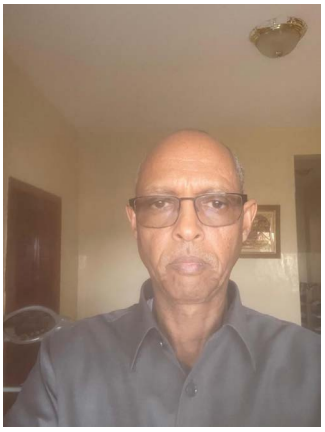
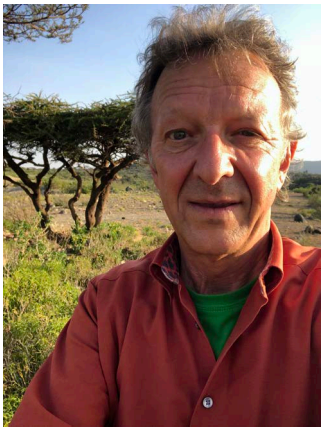
AUTHORS:

Dr. Anita Idels work focuses on the potential of sustainable grazing for soil fertility, climate relief and biodiversity - in research, teaching and practice.
www.anita-idel.de , Info@anita-idel.de

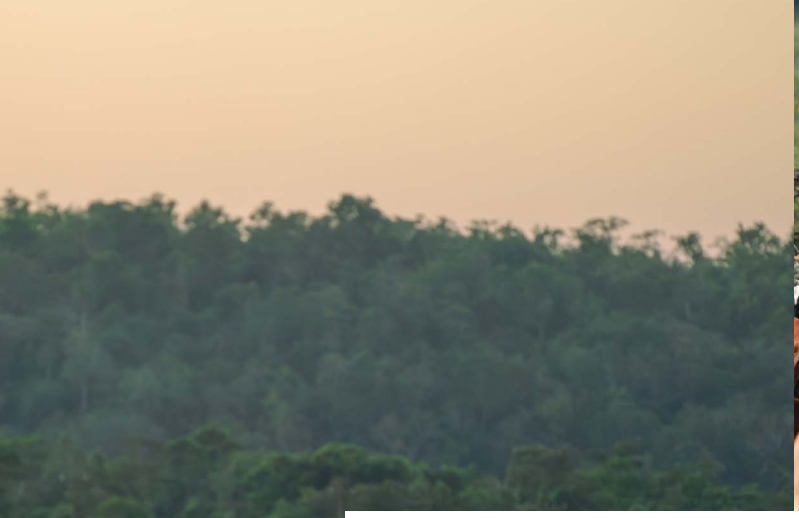
Dr. Louise Wiuff Moe is an Associate Professor at Roskilde University, and the PI of the 5-year research project 'Pastoralist Climate Change Resilience in Somaliland (PACCS) funded by the Ministry of Foreign Affairs of Denmark.
louisewm@ruc.dk



Mohamed Fadal is Founding Director of the Social Research and Development Institute (SORADI) and partner in the Pastoralist Climate Change Resilience in Somaliland (PACCS) project.
mohdfadal255@gmail.com



Thomas Hoerz, agronomist by profession, has worked in development, food security and humanitarian action for over 35 years in drylands of Africa and Asia as a practitioner for the UN, governments and NGOs.
hoerz@climework.de



PROTECTING AND UTILIZING GLOBAL GRAZING SYSTEMS

Mohamed Fadal - Thomas Hoerz - Dr. Anita Idel - Dr. Louise Wiuff Moe

In this study, the four authors Mohamed Fadal, Thomas Hoerz, Dr. Anita Idel and Dr. Louise Wiuff Moe write about a topic that is completely underrepresented in international and European politics: grasslands, pastures and pastoralists. They write about how much the potential of this ecosystem and way of life for securing food, income and peace is overlooked. Grasslands are particularly neglected when it comes to climate protection, even though grassland ecosystems are at least as effective as moors and forests in this regard, if not more so. In Chapter 3, Thomas Hoerz sums up what is certainly one of the main reasons why the topic of rangeland and pastoralists receives little attention in agricultural policy worldwide:

"This is perhaps the greatest "weakness" of pastoral systems: their low demand for external and commercial inputs. No machinery, diesel, hybrid seeds or agrochemicals are needed for sustainable production. These lost profit opportunities for local and global companies lead to low lobbying activity and could be a reason for the lack of economic and political interest in grazing systems in general and traditional pastoralism in particular."

But there are rays of hope. Some countries where grazing plays an important role, some international institutions and some individual projects show that there is another way. You will find some of them in this study.