

# GLOBAL LAND OUTLOOK

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## Thematic Report on Rangelands and Pastoralists



**United Nations**  
Convention to Combat  
Desertification

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# Preface



**Ibrahim Thiaw,**  
UNCCD Executive Secretary

Pastures, meadows, and rangelands are more often perceived as resource and land frontiers that have yet to be exploited – and are of little value until they are transformed by human hands. The term "development" is often taken to mean human action, agricultural development, destruction of natural habitats, draining of wetlands, or urban development. Rangelands are often referred to as arable land, a sign that planners see them as better "developed" when transformed than when left in their natural state.

When we destroy a forested area, we talk about deforestation. Seeing a 100-year-old tree fall rightly generates a great deal of emotion. On the other hand, the conversion of rangelands - even those that are several hundred years old - is done in "silence" and generates little public reaction. Rangelands are as little appreciated as their users are integrated into our societies. Marginalised, pastoralists and livestock breeders find it hard to influence development policies. They are voiceless, powerless, and generally, a minority in the political and administrative machinery. Although estimated to number half a billion souls, they are sometimes classified as indigenous peoples or as societal outsiders.

Rangelands are extensive ecosystems that provide biodiversity and support rural livelihoods, yet they are threatened by land degradation, climate change, and land conversion. Their importance cannot be overstated in our collective pursuit of sustainable development and planetary stability; however, they have long been underappreciated in global environmental discourse.

Therefore, I am delighted to introduce the Global Land Outlook thematic report on rangelands and pastoralists. It reflects our commitment to reduce and reverse desertification and land degradation, and build drought resilience through sustainable land management that can improve the well-being of millions of people worldwide. As part of the UNCCD's ongoing efforts to support Sustainable Development Goal (SDG) 15 and Land Degradation Neutrality (LDN), this report aims to set a solid foundation for sustainable management and restoration practices in close collaboration with the pastoralists and communities that reside, manage, and depend on rangelands. It showcases the importance of respecting pastoral heritage, cultures, and traditions, and highlights their role in protecting and restoring rangeland resources for current and future generations.

By recognising the intrinsic value of rangelands and the irreplaceable role of pastoralists in preserving them, we are acknowledging the interconnection between ecosystem and human health and well-being. Responsible land governance, smart and targeted investments supported by policies and measures that value and protect rangelands and their communities are vital. Healthy, well-managed rangelands help combat desertification and climate change while delivering food, water, shelter, and economic opportunities. Sustainable rangeland management practices enhance resilience and the capacity of communities and ecosystems to withstand the pressures and shocks of global change. As we witness the alarming decline of species worldwide, the preservation of rangeland biodiversity is integral to our broader nature conservation efforts.

In anticipation of the International Year of Rangelands and Pastoralists (IYRP) in 2026, this report serves as a catalyst for global awareness and action. It analyses numerous case studies and good practices from around the world, drawing on the experience and lessons learned, and advocates for a new paradigm to inspire governments, donors, and other stakeholders to prioritise rangeland health in cooperation with local communities. Through these collaborative efforts and a commitment to shared responsibility, we can preserve these rich cultural landscapes for the benefit of people, nature, and the climate.

# Foreword

In 2022, the United Nations declared 2026 the International Year of Rangelands and Pastoralists (IYRP) and named the Food and Agriculture Organization (FAO) as the lead UN agency for its implementation. The IYRP aims to raise awareness and advocate for healthy rangelands and sustainable pastoralism, and to promote capacity building and responsible investment in favour of the pastoral livestock sector.

The idea to commemorate rangelands and pastoralists was spearheaded by Mongolia in collaboration with the International Support Group (ISG). Thanks to Mongolia's vision, we have an opportunity to redefine the narrative surrounding rangelands and pastoralist communities, and to collectively shape a sustainable future for our planet. As the Co-Chair of the ISG for IYRP2026, I view the GLO Thematic Report on Rangelands and Pastoralists as among the first steps towards these aims.



**Maryam Niamir-Fuller,**  
Co-Chair of the International  
Support Group for IYRP 2026

By shedding light on the challenges we face in preserving and managing rangelands globally, and recommending ways to help alleviate and address them before it is too late, this report offers policymakers, practitioners, and communities alike a pathway to support the well-being of rangelands and pastoralist communities and cultivate a sustainable future.

Pastoralism has a much lower overall environmental footprint than other forms of livestock production, as it works with nature not against it. But its share of the global market for meat and milk products is far outstripped by intensively farmed operations. Efforts are underway to reduce the environmental footprint of intensive livestock farms, but unfortunately all too often the pastoralist is also thrown into the same policy basket as the intensive farmer. The IYRP aims to unpack this basket – to show that pastoralists and their rangelands are different and can be even more sustainable with the right approaches to dedicated and targeted policies and investments.

The IYRP aims to raise awareness as well as encourage more knowledge generation, building on the traditional and local knowledge of pastoralists. Already well in advance of 2026, the ISG, consisting of over 300 organisations and associations, has created new scientific evidence and global maps, and established platforms for cooperation. It recently released a Science Review of Land Degradation Neutrality that complements and strengthens the findings and recommendations of the GLO report and offers positive policy options at national and international levels that could have immediate impact.

Mind sets are starting to change. We must translate our shared aspirations into concrete actions – stopping indiscriminate conversion of rangelands into unsuitable land uses, advocating for policies that support sustainable land management, investing in research that enhances our understanding of rangelands and pastoralism, empowering pastoralist communities to preserve their sustainable practices while also gaining tools to thrive in a changing world, and supporting all stakeholders, especially pastoralists, to implement measures that effectively thwart further degradation and preserve our land, our communities, and our cultures.

May this GLO thematic report propel rangelands and pastoralists to the forefront of global consciousness and, in conjunction with the upcoming IYRP2026, serve as a catalyst for lasting change.

# Executive Summary

## Key Messages

**The conversion and loss of rangelands is done in silence and attracts little public attention.** Often marginalised or considered outsiders, many pastoralist and rangeland communities are unable to influence the policies and programmes that directly impact their food security, livelihoods, and cultural identity. They are voiceless and powerless and represent a small minority in the political and administrative machinery that governs development and investment decisions in the rangelands.

**Pastoralist livelihoods and cultures around the world are under threat from shortsighted policies, weak governance, and economic incentives that undermine their production systems.** Pastoralists are broadly defined as extensive livestock farmers, herders, and ranchers – whether indigenous or not – whose way of life is closely linked to the health and productivity of rangelands. Up to 500 million people across the world practise this form of animal husbandry. Yet, in many regions, they have little recourse to address the conversion, fragmentation, and degradation of rangelands.

**Rangelands operate as complex social-ecological systems with critical values, processes, goods, and services.** They are diverse, multifunctional, and encompass a wide variety of ecosystems (e.g., drylands, grasslands, savannahs) that have co-evolved with human communities. Covering over 50 per cent of the Earth's land surface, rangelands are comprised of grasses, herbaceous plants, and shrubs that are grazed by livestock and/or wildlife. In addition to meat, dairy, fibre, and other animal products, rangelands and their biodiversity underpin critical ecosystem services from local to global scales (e.g., nutrient/water cycling, carbon sequestration, animal/human health).

**Despite the extraordinary diversity and intrinsic value of rangelands and pastoralist systems, they rarely feature in global policy discussions or national development priorities.** Rangelands provide important environmental, social, and economic benefits that are often taken for granted, in part due to the lack of understanding of their extent, condition, use, value, and diversity. While there are many threats to rangeland health, one is the imbalance in the supply and demand for animal forage which leads to overgrazing, invasive species, and bush encroachment as well as the increased risk of drought and wildfires.

**Pastoralism and extensive livestock production systems are deeply rooted in the rangelands and often the most effective means to protect, sustainably manage, and restore rangelands.** Appreciating that food and fibre production is the most common economic use of rangelands, sustainable grazing is a proven, cost-effective management approach to enhancing their health, productivity, and resilience. Traditional and regenerative grazing practices can often mimic natural processes that build soil organic matter, increase water retention, sequester carbon, conserve biodiversity, and reduce the spread of invasive species.

**Greater political attention and informed investments are urgently needed to safeguard and improve the health and productivity of the rangelands and their inhabitants.** This report offers insights and guidance on the policy and operational frameworks and other enabling factors for attracting greater attention and investments in sustainable rangeland management projects and programmes. Illustrated with case studies and good practices from around the world, it highlights the critical role of pastoralist communities in the planning and implementation of rangeland initiatives that deliver benefits in all three dimensions of sustainable development.

## Key Actions

**Sustainability Framework:** National and sub-national authorities can design and implement legal and operational frameworks that align rangeland management and pastoralist livelihoods with the Sustainable Development Goals (SDGs), fully considering the environmental, social, and economic dimensions, and support efforts to:

- **Endorse and enact national laws and regulations** that are aligned with international treaties, obligations, and commitments that support the diversity, resilience, and multiple values of extensive livestock systems and rangeland ecosystem services.
- **Recognise and enforce legitimate land rights**, respect the unique circumstances and needs of rangeland communities (e.g., mobility, transhumance, communal governance), and nurture their participatory role in the conservation, sustainable management, and restoration of rangelands.
- **Facilitate multistakeholder platforms and networks** for research and learning, knowledge co-creation and exchange, and monitoring and evaluation – and to create accessible databases and repositories that collect and disseminate information on rangelands and pastoralist systems.

**Environmental Dimension:** National and sub-national authorities can take measures to support the ecological integrity, connectivity, and functioning of rangelands through conservation, sustainable use, and restoration activities that safeguard and enhance the multiple benefits they provide to societies and economies, and support efforts to:

- **Reduce and avoid rangeland conversion** resulting from inappropriate land uses (e.g., crop monocultures, tree plantations, afforestation) that diminish the diversity and multifunctionality of rangelands, especially on indigenous, pastoral, and communal lands.
- **Adopt and support pastoralism-based strategies** that directly address the natural and human-induced drivers of rangeland degradation, such as biodiversity loss, climate change, overgrazing, soil erosion, invasive species, drought, and wildfires.
- **Design and implement nature conservation measures** that reduce and halt biodiversity loss (above and below ground) by harnessing synergies with pastoralist practices and extensive livestock production systems that boost rangeland health, productivity, and resilience.
- **Integrate climate change mitigation and adaptation measures** into sustainable rangeland management plans and programmes (or vice versa) to increase carbon sequestration and storage while enhancing the adaptive capacity of rangelands and their communities.

**Social Dimension:** National and sub-national authorities can take measures to build social capital in rangeland communities through participatory governance and adaptive management approaches that promote gender equality, social cohesion, and trusted institutions to foster collective action, and support efforts to:

- **Provide capacity building, skills training, and technical support** to build the human and social capital needed for collective action that safeguards rangeland health and livelihoods, with particular attention to mobility, gender-responsiveness, and social inclusion.
- **Support rangeland and pastoralist associations and networks** that celebrate and defend their cultural heritage and values, increase connectivity and social services, and ensure the provision of human resources and expertise needed for responsible and inclusive rangeland governance.
- **Facilitate women-led, women-driven, and women-only initiatives**, groups, and institutions (along with mixed gender ones) to ensure that women's voices are heard and respected – and to activate their contribution to all dimensions of sustainable development in the rangelands.
- **Establish trusted institutions and mechanisms to manage wildlife and resource conflicts**, resolve territorial and land tenure disputes, reduce inequalities in access and benefit sharing, and negotiate trade-offs and leverage synergies for the benefit of rangelands, their communities, and society-at-large.

**Economic Dimension:** National and sub-national authorities can take measures to support the economic viability of extensive livestock production and the livelihoods they support through flexible long-term investments and incentives, including context-appropriate strategies and programmes that link markets and value chains to sustainable rangeland production systems, and support efforts to:

- **Create innovative economic and financial mechanisms** that are accessible to rangeland stakeholders, incentivise good management practices, provide decent work, stimulate market participation, and increase investments in sustainable pastoralism from public and private sources while avoiding adverse consequences for rangeland communities.
- **Develop market and value chain strategies and action plans** that support economic livelihoods and income diversification – and expand innovative and profitable opportunities for rangeland communities engaged in extensive livestock production.
- **Promote adaptive investment and risk management tools**, such as livestock and drought insurance, resource pooling and sharing, and community credit schemes, to better manage risks and uncertainties in a creative but economically sound manner.
- **Conduct economic valuations of rangeland ecosystem services** to better understand their contribution to people, nature, and climate, to help inform rangeland policies, planning and programmes, and to attract donor funds, private sector investments, and public sector allocations for sustainable rangeland management and restoration.



# 1. Overview

Rangelands play a central role in achieving **Land Degradation Neutrality** (LDN) and contributing to local, national, and global sustainability agendas. Rangelands operate as complex social-ecological systems with critical values, processes, goods, and services.<sup>1</sup> Rangelands and their host ecosystems (e.g., drylands, grasslands, savannahs) have co-evolved with human communities whose food security, livelihoods, and cultural identity directly depend on the resources and opportunities that they provide.<sup>2</sup>

The United Nations designated 2024 as the **International Year of Camelids** (e.g., camels, llamas, alpacas, vicuñas, guanacos), a way of life for millions of pastoralists in dryland and mountainous rangelands around the world. Subsequently, the United Nations declared 2026 the **International Year of Rangelands and Pastoralists** (IYRP) to raise awareness and promote increased investment in the sustainable management and restoration of rangelands, while recognising and supporting pastoralist communities and their significant contribution to sustainable development.<sup>3</sup>

The IYRP designation underscores the importance of healthy rangelands and sustainable pastoralism to achieve the **Sustainable Development Goals** (SDGs), specifically target 15.3 to halt desertification and reduce land degradation supported by national LDN commitments under the **United Nations Convention to Combat Desertification** (UNCCD). Healthy rangelands are also critical to fulfil the commitments and targets under the **Convention on Biological Diversity** (CBD) and the **United Nations Framework Convention on Climate Change** (UNFCCC).

As part of the global effort to combat desertification, land degradation and drought, the UNCCD's **Global Land Outlook Thematic Report on Rangelands and Pastoralists** ("the report") puts forward an integrated conceptual framework that is aligned with the LDN approach<sup>4</sup> and offers flexible pathways to improve rangeland conservation, management, and restoration outcomes. The case studies presented in the report point to the need for greater policy support, increased investment, and partnerships at all levels and across all relevant sectors.

The report focuses on the relationship between rangelands and their human communities, most notably pastoralists, but also other land users that manage rangeland resources sustainably under a purposeful and regenerative management approach. The underlying premise is that this approach can be scaled up and out to protect rangelands and their functions,<sup>5</sup> as well as to accelerate progress towards many SDG targets,<sup>6</sup> **Global Biodiversity Framework** (GBF),<sup>7</sup> **United Nations Decade on Ecosystem Restoration 2021–2030**,<sup>8</sup> and the **Paris Agreement**.

## 1.1 Aim and scope

The report explores the complex environmental, social, and economic dimensions that link rangelands and local communities. It describes the important role and untapped potential of pastoralism and extensive livestock management systems to contribute to a just transition, climate resilience, and more equitable rural development, recognising that many of the challenges confronting rangelands originate beyond local communities and are not under their control.

Drawing on case studies submitted from around the world, the report offers new perspectives on how pastoralism can contribute to more effective rangeland governance and stewardship and examines the potential for replicability and scalability. It draws on a diversity of approaches (e.g., territorial, ecosystem, cultural) and initiatives (e.g., global, national, local), supported by policy, implementation, and investment frameworks, to conserve, sustainably manage, and restore rangelands.

The report also reflects on lessons learned to improve the design, planning, implementation, and finance for future rangeland initiatives. The relationship between rangeland health and management practices is addressed with a Driver-Pressure-State-Impact-Response (DPSIR) perspective, analysing both positive and negative impacts as well as addressing synergies and trade-offs. It concludes that local, multi-actor, transdisciplinary, adaptive, and inclusive approaches can be effective in improving the health and productivity of rangelands and safeguarding the livelihoods and cultural values of their communities.

## 1.2 Structure and contents

This **first chapter** provides an overview of the report, its theory of change, and key definitions and explanatory notes. The **second chapter** aims to characterise rangelands, pastoralism, and the challenge of environmental degradation by analysing the drivers and responses within an enhanced conceptual framework to guide strategies and actions. Drawing on case studies, scientific literature, and other knowledge sources, the **third chapter** offers a historical perspective and reflects on the lessons learned to improve the quality and performance of rangeland and pastoralist projects and programmes. The **fourth chapter** includes snapshots for 10 regions of the world which are illustrated with case studies at different scales. The **fifth chapter** describes existing initiatives that promote and support rangelands and pastoralists around the world. The **sixth chapter** includes conclusions and additional guidance to support policymakers and other stakeholders in designing and implementing policies, projects, and programmes that protect and enhance rangeland health.

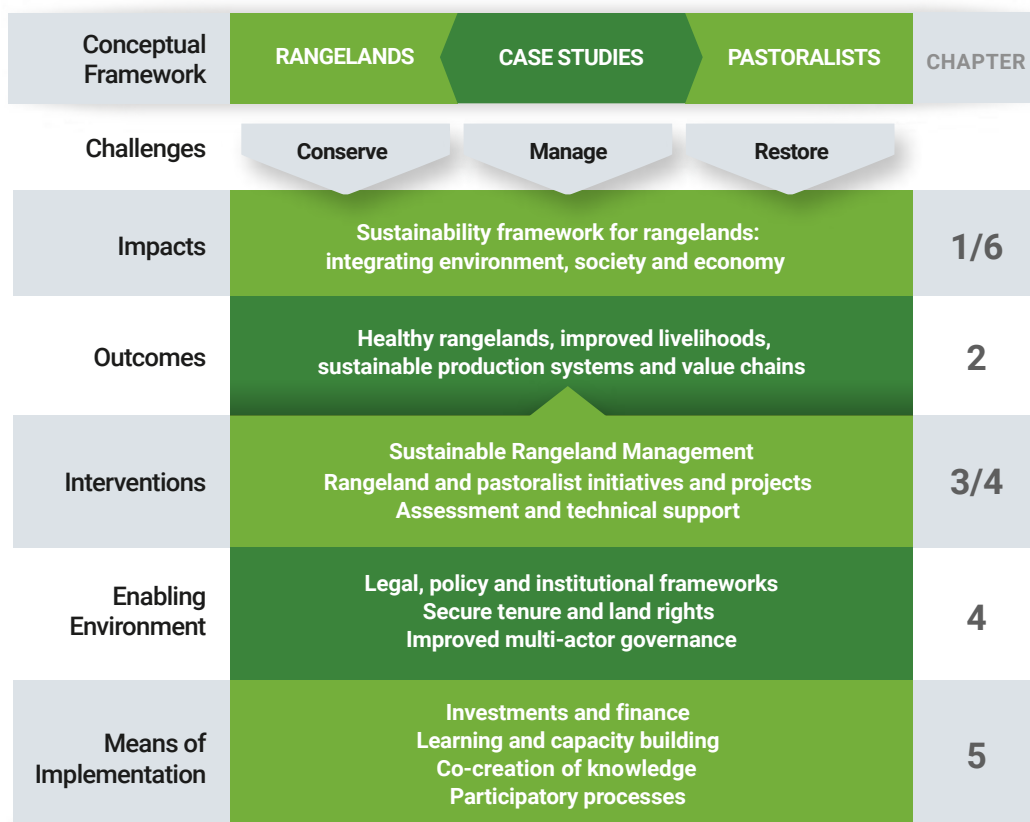
## 1.3 New approaches

The report encourages a rethink of the conceptual framework currently applied to combat desertification and degradation in rangelands through an increased focus on the management practices employed in pastoralist and extensive livestock systems. It draws attention to

pathways for improved policies, planning, implementation, and monitoring, with guidance for policymakers and other stakeholders on how to improve rangeland health under a sustainability framework with its three integrated dimensions. The report hopes to catalyse action at different scales to optimise rangeland benefits through sustainable production systems and value chains. The strategic approaches presented in the report can help create the appropriate enabling environment, mobilise resources (through incentives and investments), and improve the quality and outcomes of interventions that target rangelands and their inhabitants (Figure 1).

The report applies elements of adaptive management models to improve rangeland planning and interventions based on a systemic and iterative decision-making approach, meaningful stakeholder engagement, sustained finance, and long-term monitoring. This approach can be supported with transition scenarios that integrate strategic, tactical, operational, and monitoring protocols that account for trends and feedback loops.<sup>9</sup> The report introduces a robust conceptual framework to help better integrate rangeland and pastoralist initiatives into the different levels and scales of decision making. Integrated land use planning and landscape management are relevant tools and most effective when they recognise the main features of pastoralism, such as mobility, multifunctionality, diversity, adaptability, resource pooling (reciprocity and exchange), and the non-exclusive use of different and often variable natural resources.

**FIGURE 1** Theory of change<sup>10</sup>



## 1.4 Definitions and explanatory notes

The report focuses on land use and management practices in rangelands, acknowledging the diversity of their host ecosystems and biomes grazed and browsed by livestock and wildlife. This section introduces and defines key terms and concepts used in the report, some of which may engender differences in interpretation around the world, across disciplines, and among practitioners.<sup>11</sup>

**Land use** is defined as the purposes and activities (primarily grazing and browsing in rangelands) through which people interact with land in these grass-dominated terrestrial ecosystems.<sup>12</sup> **Land cover** refers to the character of the elements located on the surface of the land, either biophysical (e.g., vegetation, grasses, shrubs, trees) or artificial (e.g., buildings, livestock shelters, energy infrastructure). Land conversion or transformation, referred to as **land use change** or **land cover change**, is a major global challenge resulting from socioeconomic transitions including agricultural expansion, urbanisation, and consumer demand, among other factors.<sup>13</sup>

**Land management** is any process or activity by which humans allocate or transform land resources for specified uses and goals, such as to generate social, environmental, or economic benefits.<sup>14</sup> **Sustainable land management (SLM)** implies the use of land resources to meet changing human needs while safeguarding their long-term health and productive potential, including the maintenance of their environmental functions.<sup>15</sup> In the report, SLM in the rangelands is referred to as **sustainable rangeland management (SRLM)** which can be described as a knowledge-based process that integrates social, economic, and ecological principles into rangeland policies and practices.<sup>16</sup>

**Explanatory Note:** The report acknowledges that pastoralist activity always has human intelligence behind decision making and planning for the protection and use of available resources (whether it is a single herder deciding the daily itinerary or a community moving from winter to summer pastures). Accordingly, the report considers all pastoralist systems as land management systems. The decision to not allow grazing or restrict other land uses (whether temporarily or permanently) is also understood as a form of land management. Abandonment is considered a discontinuation of land management typically resulting from the loss of rangeland functions and services.<sup>17</sup>

**Integrated land use planning (ILUP)** involves designing and implementing the most appropriate land use strategies and practices based on systematic assessments of social, economic, and environmental conditions.<sup>18</sup> The purpose of ILUP is to map and assign a mosaic of compatible land use types for a given territory in a way that is socially just and desirable and economically viable, while safeguarding ecological functions and the provision of ecosystem services

for current and future generations. ILUP is an important enabling factor for the efficient and effective implementation of SRLM and restoration activities. The capacity and flexibility of ILUP instruments can allow for the combination of sustainable pastoralism and other rangeland uses within a given landscape which can promote both diversification in pastoralist production systems and the use of **adaptive land management** practices<sup>19</sup> to boost community and ecosystem resilience under rapidly changing conditions.

**Land degradation** in the rangelands is defined as a deterioration in land condition (i.e., reduced biological and economic productivity) typically caused by direct human interventions (e.g., overgrazing, mining) or indirect drivers (e.g., anthropogenic climate change, socioeconomic transitions). Land degradation can be expressed as the persistent or long-term reduction or loss of ecosystem goods and services,<sup>20</sup> which reduce biological productivity, ecological integrity, and/or economic values. Land degradation in the rangelands is a serious concern that impacts both people and nature and contributes to climate change.<sup>21</sup> Land degradation in arid, semi-arid, and dry sub-humid areas is known as desertification.

**Land degradation neutrality (LDN)** is defined as “a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and to enhance food security remain stable, or increase, within specified temporal and spatial scales and ecosystems”.<sup>22</sup> LDN directly responds to SDG target 15.3 by seeking a balance between land degradation and restoration through continuous improvement in management practices, while considering trade-offs and synergies with other SDGs. The UNCCD endorsed LDN as a primary vehicle to drive the implementation of the convention and embraced LDN in the vision of its 2018-2020 Strategic Framework.<sup>23</sup>

**Ecosystem restoration** is defined as the process of assisting the recovery of degraded, damaged, transformed, or destroyed ecosystems to reinstate their ecological processes, functions, and services.<sup>24</sup> The United Nations is supporting the Decade on Ecosystem Restoration (2021-2030), along with GBF target 2, in an attempt to recover lost biodiversity habitat and ecosystem services, and to mitigate and adapt to climate change while enhancing food security and creating livelihood opportunities.<sup>25</sup> The inherent synergies among these targets and commitments make rangelands an optimal ground for developing adaptive approaches that maximise the full suite of benefits for people, nature, and climate.<sup>26</sup>

**Explanatory Note:** While the focus of non-agricultural land restoration has been primarily on forests, the report recognises the need and potential to restore rangeland ecosystems, such as grasslands, savannahs, or shrublands. Interest in restoring these ecosystems is growing rapidly and has become a priority for the UN Decade on Ecosystem Restoration.<sup>27</sup> The report applies the principles and

standards of ecosystem (or ecological) restoration, which strive to conserve or regenerate the full suite of rangeland functions and services.<sup>28</sup> However, many afforestation projects in the rangelands have raised serious concerns and intense debate.<sup>29</sup> The report strongly maintains that the transformation of rangelands into forests or tree plantations should be avoided unless scientifically justified by the historic, ecological, and socioeconomic characteristics of the targeted area.<sup>30</sup>

Differentiating between “rangelands” and “grasslands” can be controversial. Both terms are often used as synonyms,<sup>31</sup> although their many nuances are subject to debate. The report defines **rangelands** as natural or semi-natural ecosystems grazed by livestock and/or wild animals. Their vegetative cover is comprised of grasses, forbs, bushes, and shrubs, and may include open forests and agroforestry systems. Rangelands are considered complex social-ecological systems<sup>32</sup> whereby their natural resources provide a broad range of goods, services, and values that must be considered in baseline and functional assessments.<sup>33</sup> Many rangelands are found in the **drylands**, which are characterised by water scarcity typically with an Aridity Index below 0.65.<sup>34</sup> Other important rangelands include mountain and tundra biomes that host pastoralist systems with high-value cultural and natural heritage (e.g., reindeer herding in the Arctic, domesticated camelids in the Andes).

**Grasslands** are defined as ecosystems dominated by grasses or grass-like plants,<sup>35</sup> although they can contain trees or other woody vegetation as in the case of shrublands, woody grasslands, open forests, or savannahs.<sup>36</sup> Grasslands are ecosystems of remarkable biodiversity.<sup>37</sup> In addition to natural grasslands determined by climate and soil types, secondary grasslands can arise as a consequence of land use change or other human activities.<sup>38</sup> The extent and degree of ecological integrity and human intervention (e.g., seeding, mowing, fertiliser use) influence grassland characteristics. **Old-growth or ancient grasslands**, encompassing rich,

biodiverse grasslands, savannahs, and open woodlands,<sup>39</sup> tend to maintain higher ecological values.<sup>40</sup> At the other extreme, monospecific seeded grasslands indicate the transformation of vegetative cover and resemble cultivated land more than a natural ecosystem.

**Explanatory Note:** The report utilises “grasslands” as an ecosystem concept, primarily defined by vegetation cover, while the term “rangelands” is employed as a land use and land management concept within the conceptual framework (Figure 6). Rangelands, considered by some as a cultural ecosystem, are primarily defined by their use for grazing (by livestock, semi-domesticated animals, or wildlife) or the gathering of feed, whether potential or actual.<sup>41</sup> They often comprise a mosaic of land uses and ecosystems, such as grasslands, savannahs, shrublands, drylands, deserts, steppes, mountains, and open forests, as well as agroforestry and silvopastoral systems.<sup>42</sup>

**Grazing systems** are livestock-based production systems that integrate grazing practices with the management of soil, water, and biodiversity resources within a specific socioeconomic context.<sup>43</sup> **Pastoralist systems** are based on mobile grazing animals under nomadic, transhumant, or sedentary management systems.<sup>44</sup> **Pastoralism** encompasses the extensive production of livestock, using pasture or browse as the main source of feed.<sup>45</sup> This definition is expanded in the report to include any extensive rangeland production system that dynamically manages livestock and land resources to optimise economic, social, and environmental benefits.<sup>46</sup> Beyond livestock production, pastoralism encompasses cultural identity, knowledge pools, traditional institutions, and landscape heritage that shape the way of life for these rangeland communities.<sup>47</sup> Some common terms used to describe pastoral systems and their features around the world include transhumance, nomadism, and animal husbandry.<sup>48</sup>



**Explanatory Note:** The report employs “pastoralism” as a comprehensive term, encompassing the entire range of extensive livestock production systems in the rangelands, including those that use rangelands as part of agropastoral, silvopastoral, or agroforestry systems. Where pastoralism is used under a more restrictive scope, this is clearly indicated in the text. In addition, some grazing systems are not considered pastoralism (e.g., grazed crops, intensive pasture systems) and are outside the scope of the report.

**Pastoralists** refer to the individuals, households, and communities that practice pastoralism. Pastoralists raise sheep, goats, cattle, horses, donkeys, pigs, camels, yaks, llamas, alpacas, semi-domesticated species (e.g., bison, caribou, reindeer), or harvest from wild species (e.g., vicuña). Some poultry systems, based on ducks or chickens, can also be considered pastoralism in certain contexts. Pastoralist systems are widely distributed, from the arctic to the tropics, often with herds of mixed species and breeds in the same production unit. Pastoralist communities tend to manage their land, water, and other natural resources in a sustainable, independent, and flexible way, often governed by rights to common resources and traditional or customary arrangements that safeguard rangeland health. Pastoralist livelihoods are diverse and subject to stressors, risks, and uncertainties due to global change impacts, including climate change and socioeconomic transitions.<sup>49</sup> Traditionally, pastoralists have overcome these constraints, which have become increasingly more challenging, with resilience strategies and adaptive capacities.<sup>50</sup>

**Explanatory Note:** The term “pastoralist” used in the report is often not recognised by pastoralists themselves, who may prefer to self-identify with other terms, such as herders, shepherds, ranchers, producers, farmers, or other terms customary in their respective countries and cultures. The report fully acknowledges all these identities and the diversity that underpins them but adopts the use of pastoralist as a comprehensive term to facilitate a global perspective and approach.

Pastoralist systems and their management practices drive sustainable livestock production that is compatible with other land uses that respect ecological integrity and prioritise the functional health of rangelands. Pastoralist systems can merge with agricultural production systems (**agroforestry** and **agropastoralism**),<sup>51</sup> or other systems that integrate trees into livestock production for shade and shelter (**silvopastoralism**)<sup>52</sup> and for grazing in forests and woodlands (**agrosilvopastoralism**).<sup>53</sup>

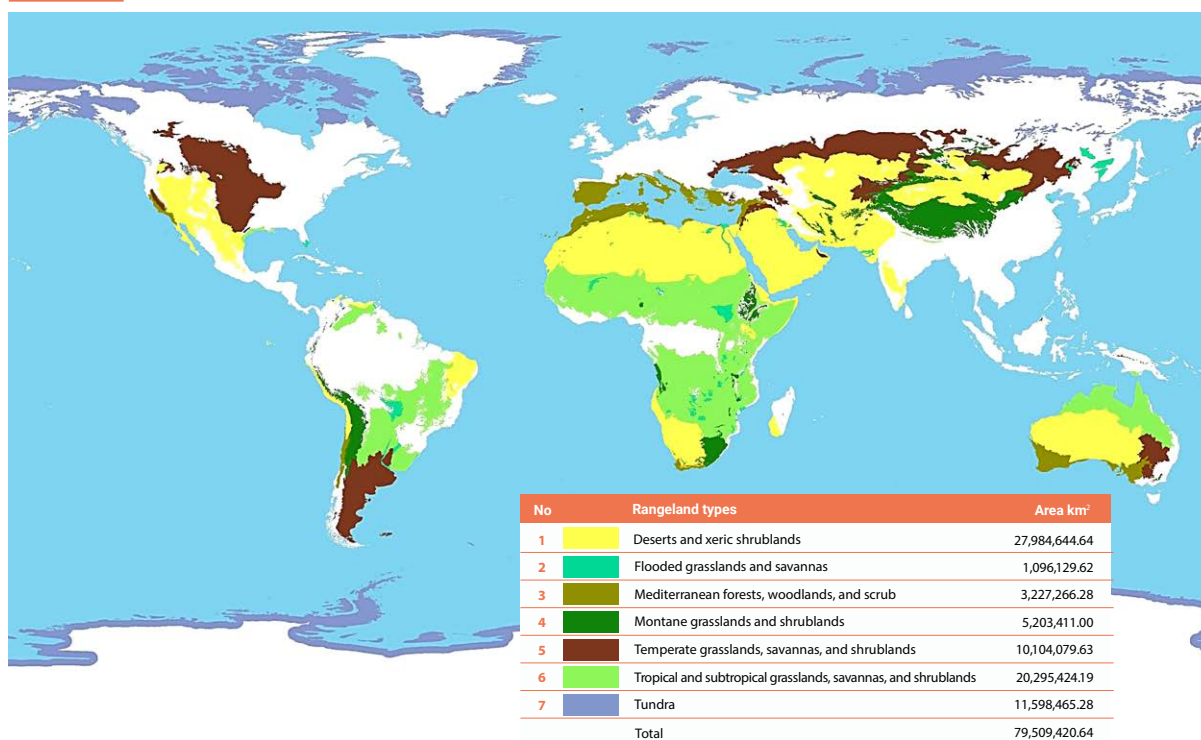
**Land governance** concerns the rules, processes, and structures through which decisions are made about access to land and its use, the way those decisions are implemented and enforced, and the way in which competing interests are managed. **Rangeland governance** refers to the relationships between formal and informal institutions, and their policies, rules, and practices that shape human and environmental interactions on those lands.<sup>54</sup> The responsible and inclusive governance of rangelands constitutes the foundation of many initiatives driving collective action to conserve, sustainably manage, and restore them.<sup>55</sup> The meaningful participation of all stakeholders is a key enabling factor that can be enriched with information exchange, tenure security, polycentric institutional arrangements, and adaptive management systems.<sup>56</sup>



## 2. Rangeland health and degradation

Rangelands cover 80 million square kilometres, over 54 per cent of the terrestrial surface, constituting the largest land cover/use type in the world. Of this, 78 per cent (~ 62 million square kilometres) occur in the drylands, mainly in the tropical and temperate latitudes (Figure 2). Drylands are characterised by their hyper-arid to sub-humid climates, indicating different degrees of water scarcity with aridity indices ranging from 0.05 to 0.65, respectively.<sup>57</sup> Many temperate rangelands which experience water scarcity are often considered de facto drylands.<sup>58</sup>

**FIGURE 2** Indicative map of global rangelands according to ecoregions<sup>59</sup>



### 2.1 Rangeland characteristics

Rangelands are highly diverse, both biologically and culturally, and occupy a range of biomes and ecosystems (Table 1). They support the livelihoods of approximately 2 billion people,<sup>60</sup> with a multiplicity of uses and management systems that demand tailored context-specific approaches.<sup>61</sup> Rangelands support pastoralist and extensive livestock production systems, primarily based on grazing, browsing, and pasture management, which are often the only sustainable type of land use in the rangelands. According to the Rangelands Atlas, livestock production systems in rangelands cover 67 million square kilometres or 45 per cent of the global land surface, almost half of which is situated in drylands.

Rangelands generate 16 per cent of global food production and 70 per cent of feed for domesticated herbivores, most significantly in Africa and South America.<sup>62</sup> Livestock provide food security and generate income for the majority of the 1.2 billion people living under the poverty threshold in developing countries. Rangelands provide high-quality, animal-sourced proteins that directly contribute to the nutrition and health of their inhabitants.<sup>63</sup> While pastoralism offers significant potential for poverty reduction and more resilient livelihoods,<sup>64</sup> indigenous peoples, pastoralists, agropastoralists, and other rangeland communities remain among the poorest and most marginalised people in the world.<sup>65</sup>

**TABLE 1**  
**Rangeland extent according to biome<sup>66</sup>**

Biome	Rangeland cover (%)
Deserts and xeric shrublands	35%
Tropical and subtropical grasslands, savannahs and shrublands	26%
Temperate grasslands, savannahs and shrublands	13%
Tundra	15%
Montane grasslands and shrublands	6%
Mediterranean forests, woodlands and scrub	4%
Flooded grasslands and savannahs	1%

### Rangelands as social-ecological systems

Rangelands can be managed for a multitude of economic, social, and cultural values that are supported by ecosystem health and functionality.<sup>67</sup> This includes vital ecosystem services – from local to global – from provisioning and regulating to cultural and supporting services. Many scientific publications highlight the effectiveness of pastoralist practices in preserving and managing those services.<sup>68</sup> Provisioning services, such as food, feed, forage, water, and fibre, are widely recognised, however, rangelands and their biodiversity can be managed to deliver other goods and services, such as nutrient/water cycling, carbon sequestration, animal/human health, recreation, and ecotourism.

In terms of supporting services, rangelands hold exceptional biodiversity values, including habitat for numerous mammals and endangered species, representing one-third of all global biodiversity hotspots.<sup>69</sup> Protected areas in the rangelands currently cover 9.5 million square kilometres or 12 per cent of the global rangelands. Additionally, many rangelands are managed under other effective area-based conservation measures (OECMs), an approach where long-term conservation and high-value biodiversity areas are prioritised.<sup>70</sup> With respect to regulating services, rangelands comprise about 30 per cent of the global carbon pool,<sup>71 72</sup> and account for most of the interannual variability in the global carbon sink.<sup>73</sup> As stewards of the rangelands, pastoralists go beyond livestock production to safeguard critical ecosystem services, establishing a clear link between effective biodiversity conservation and pastoralism.

The value of cultural services, such as identity and heritage, within rangelands is also noteworthy. They are home to 24 per cent of all languages and host numerous world heritage sites in recognition of their unique landscapes and cultures and the wealth of traditional knowledge – a critical source of information to scale up SRLM and restoration practices.<sup>74</sup> As in the past, rangelands continue to shape the culture and value systems, knowledge and world visions, and sense of purpose for pastoralists and other rangeland communities.

Pastoralism and extensive livestock rearing in rangelands are widely distributed throughout the world. Currently, pastoralism is practised in more than 100 countries and supports about 200 million households with herds that total nearly a billion animals and account for about 10 per cent of the world's meat production.<sup>75</sup> With the limited use of external inputs, pastoralists manage the soil, water, and biodiversity to produce subsistence and value-added goods, such as dairy, meat, wool, and leather. Many of these products offer significant entry points for their participation in new markets that reward more sustainable value chains. The effective governance of rangelands requires an improved understanding of their dynamics, carrying capacities, and the future demand for their goods and services. There has been a recent shift from the unsustainable demand for the tangible or market goods produced in the rangelands, to policies and regulations that recognise and value the wider range of services they provide to people, nature, and climate.<sup>76</sup> The challenge is to ensure that supply and demand are balanced in a sustainable manner, which includes addressing the synergies and trade-offs under transdisciplinary and multi-actor frameworks.

## 2.2 Rangeland degradation

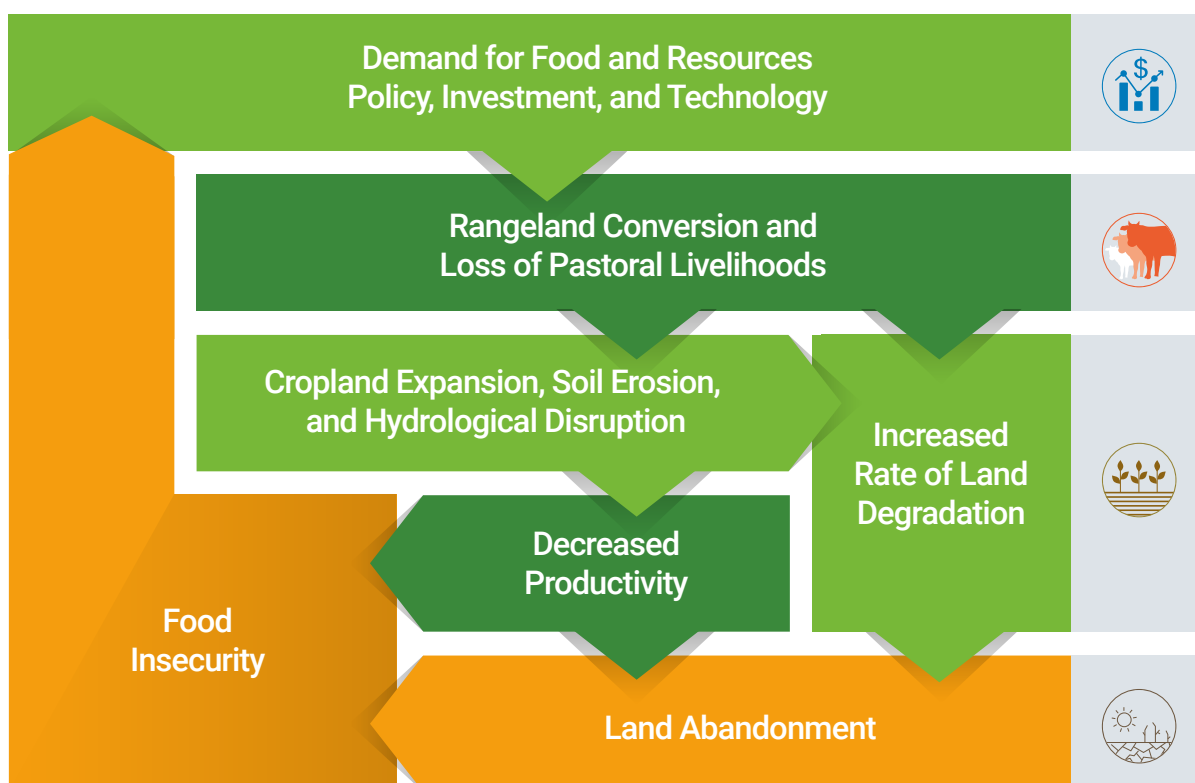
While there are different understandings of rangeland degradation,<sup>77</sup> they all point to the persistent loss and deterioration of rangeland health which is manifested in their reduced capacity to deliver ecosystem goods and services. Unsustainable land and livestock management practices, together with climate change and biodiversity loss due to land conversion, are among the direct drivers of rangeland degradation. Additional drivers which lead to rangeland degradation and fragmentation include tenure insecurity, conflicts over water and grazing boundaries, policies that incentivise the overexploitation of rangeland resources, and trends in market behaviour.<sup>78</sup>

Land degradation poses a significant threat to rangelands and their communities, taking a heavy toll on pastoralists by undermining their access to the natural resources needed to sustain their livelihoods. Rangeland degradation reduces income, productivity, and mobility which have negative implications for human and animal health, with the potential of conflict over increasingly scarce land and water resources. These impacts are differentiated across households, communities, and regions, disproportionately affecting marginalised or disenfranchised groups, such as women, youth, and indigenous communities.

Rangeland degradation can also have far-reaching impacts due to hydrological disturbances, becoming a source of sand and dust storms which can increase animal mortality and reduce health and productivity in the wider landscape. The shortsighted use and management of rangelands typically result in:

- i. the fragmentation or loss of vegetation cover
- ii. declining soil fertility due to soil erosion, salinisation, alkalinisation, compaction, and crusting;
- iii. water scarcity and moisture fluctuations;
- iv. the loss of biodiversity above and below ground; or
- v. any combination of these.<sup>79</sup>

**FIGURE 3** Feedback cycle of rangeland degradation<sup>80</sup>



Rangeland degradation can trigger secondary consequences, like woody encroachment, invasive species, and the increased risk of drought and wildfires.

The indirect drivers fuelling rangeland degradation are demographic shifts and the rapidly increasing demand for food, water, fibre, fuel, metals, and minerals. These pressures are often exacerbated by:

- i. weak or ineffective governance,
- ii. poorly implemented policies and regulations,
- iii. the lack of investment in rangeland communities and sustainable production models.<sup>81</sup>

These are virtually the same drivers contributing to land degradation and land use change occurring across all biomes and ecosystems of the world. The paradox is that efforts to increase food security and land productivity have converted millions of hectares of rangelands for crop production, aggravating land degradation processes and resulting in decreasing yields (Figure 3).

### Rangeland assessments

There are notable disparities in the assessments of land degradation which estimate its degree and extent globally. Land degradation is difficult to measure objectively, as it is seen as a mix of biophysical and socioeconomic factors which are often viewed subjectively.<sup>82</sup> Estimates of rangeland degradation have changed over time, reflecting the progress made in the understanding of rangeland dynamics and indicators, assessment and monitoring

tools, and management practices in the land use sector.<sup>83</sup> Nonetheless, there are still critical gaps in the knowledge and data related to economic valuation, carbon pools, water cycle regulation, and shrub encroachment, to name a few.

The first global rangeland assessment conducted in the early 1990s found that 73 per cent of the world's rangeland area was degraded.<sup>84</sup> This was widely contested due to the lack of field data needed to accurately verify rangeland degradation. In the last few decades, there has been a strong push to adopt a more holistic assessment approach which integrates the use of indigenous and traditional knowledge.<sup>85</sup> More recent estimates of rangeland degradation have declined significantly,<sup>86</sup> with some indicating that about 20 per cent of rangelands are experiencing negative trends, but experts are now concerned that these assessments may significantly underestimate the actual loss of rangeland health and productivity.<sup>87</sup> According to the Food and Agriculture Organization of the United Nations (FAO), up to 35 per cent of grasslands are at risk of degradation, with other rangelands showing significant risk at 26-27 per cent.<sup>88</sup>

## 2.3 Monitoring rangeland health

Data collection and real-time monitoring can be expensive and not easy to perform, rendering it difficult to assess rangeland health status and degradation trends. The use of Earth observation data is now common in many rangeland assessments, including numerous studies on land degradation utilising remote sensing tools and technologies along with open access data archives.<sup>89</sup> Flagship initiatives,



such as the Group on Earth Observations Land Degradation Neutrality (GEO LDN)<sup>90</sup> and the FAO System for Earth Observation Data Access, Processing and Analysis for Land Monitoring (SEPAL) project,<sup>91</sup> have given a sharper focus on monitoring land degradation trends and highlighting rangeland health as a key global priority.

Another way to assess rangeland health relies on the experience and involvement of pastoralists and other rangeland users. The Participatory Grassland and Rangeland

Assessment (PRAGA) is a methodology developed by FAO and the International Union for the Conservation of Nature (IUCN) and financed by the Global Environment Facility (GEF). PRAGA aims to assess rangeland health according to the management objectives of local land users and is based on a combination of scientific, indigenous, and local knowledge. It is designed to support decision making with actionable information and data that can help guide policy and action to halt degradation and restore rangeland health and productivity (Figure 4).

**FIGURE 4** Nine key steps to implement the PRAGA methodology

STEPS	PHASES	ACTION
01	PREPARATORY	Partnership development: local and national ownership of the process
02		Identifying the landscape for assessment
03	BASELINE	Baseline review
04		Large scale assessment and remote sensing
05	PARTICIPATORY	Participatory mapping of target landscape
06		Participatory indicator selection
07	ASSESSMENT	Composition and selection of assessment team
08		Field assessment
09	ANALYSIS AND INTERPRETATION	Data management post- assessment and validation

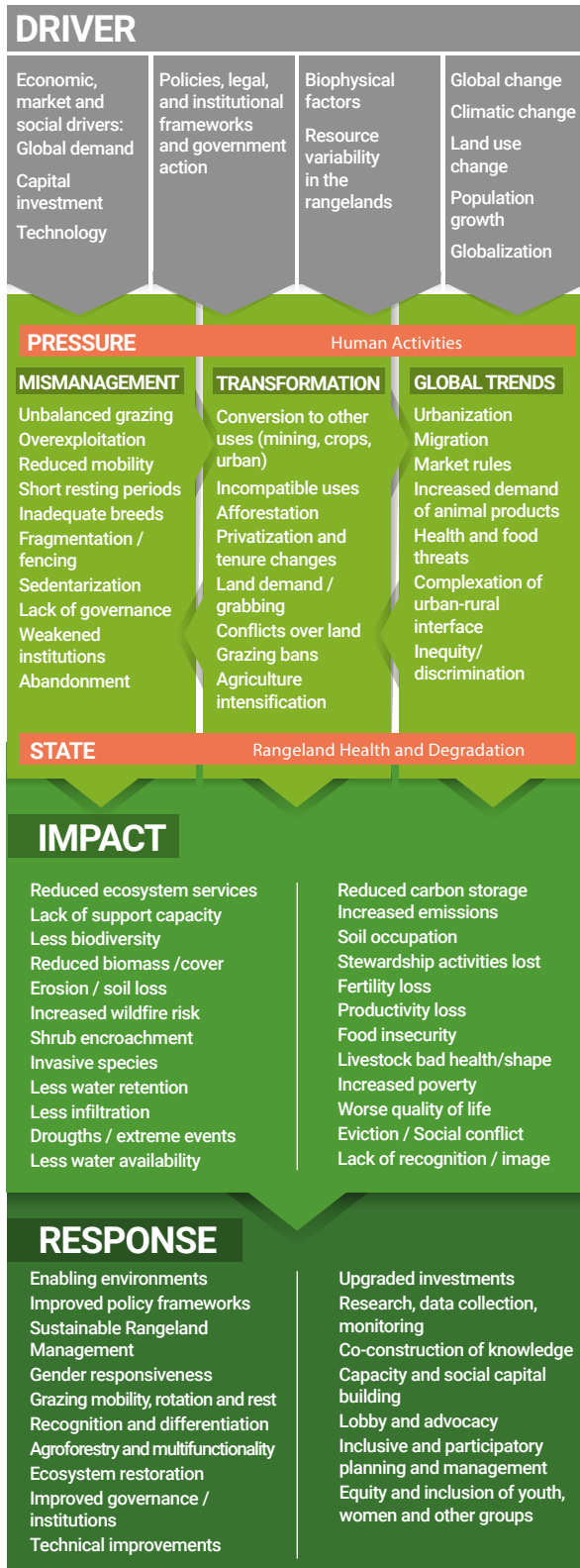
A global framework can assist countries and communities when designing a monitoring and evaluation approach for SRLM and restoration that is specific to local circumstances. Assessments can be organised according to the key underlying factors of degradation, and integrated into a conceptual framework that addresses social-ecological processes in rangelands. Like human health,<sup>92</sup> rangeland health is impacted by many causes and has symptoms that are particular to the context and circumstances. A comprehensive framework to assess landscape functions can be used to monitor degradation and restoration, such as the methodology designed by the United States Department of Agriculture, which involves creating indices based on simple field indicators that reflect the key attributes of rangelands (Table 2).<sup>93</sup>

**TABLE 2** Three attributes and 17 indicators used by the United States Department of Agriculture to assess rangeland health<sup>94</sup>

Soil/site stability	Hydrologic function	Biotic integrity
1. Rills		12. Functional/structural groups
2. Waterflow patterns		13. Dead or dying plants or plant parts
3. Pedestals and/or terracettes		15. Annual production
4. Bare ground		16. Invasive plants
5. Gullies		
6. Wind-scoured and/or depositional areas	14. Litter cover and depth	
7. Litter movement	10. Effects of plant community composition and distribution on infiltration	17. Vigor with an emphasis on reproductive capability of perennial plants
8. Soil surface resistance to erosion		
9. Soil surface loss and degradation		
11. Compaction layer		

**FIGURE 5**

**Driver-Pressure-State-Impact-Response (DPSIR) model of rangeland health and degradation status**



While there is not one assessment methodology that would be uniformly applicable to all situations, there are sufficient common elements to begin monitoring under a flexible global framework that is tailored to different contexts. The rangeland health framework constitutes a steppingstone in the process to build a conceptual framework that addresses the challenges and envisions solutions as demonstrated by the Driver-Pressure-State-Impact-Response (DPSIR) model<sup>95</sup> which addresses complex challenges at the interface of society and the environment (Figure 5).<sup>96</sup>

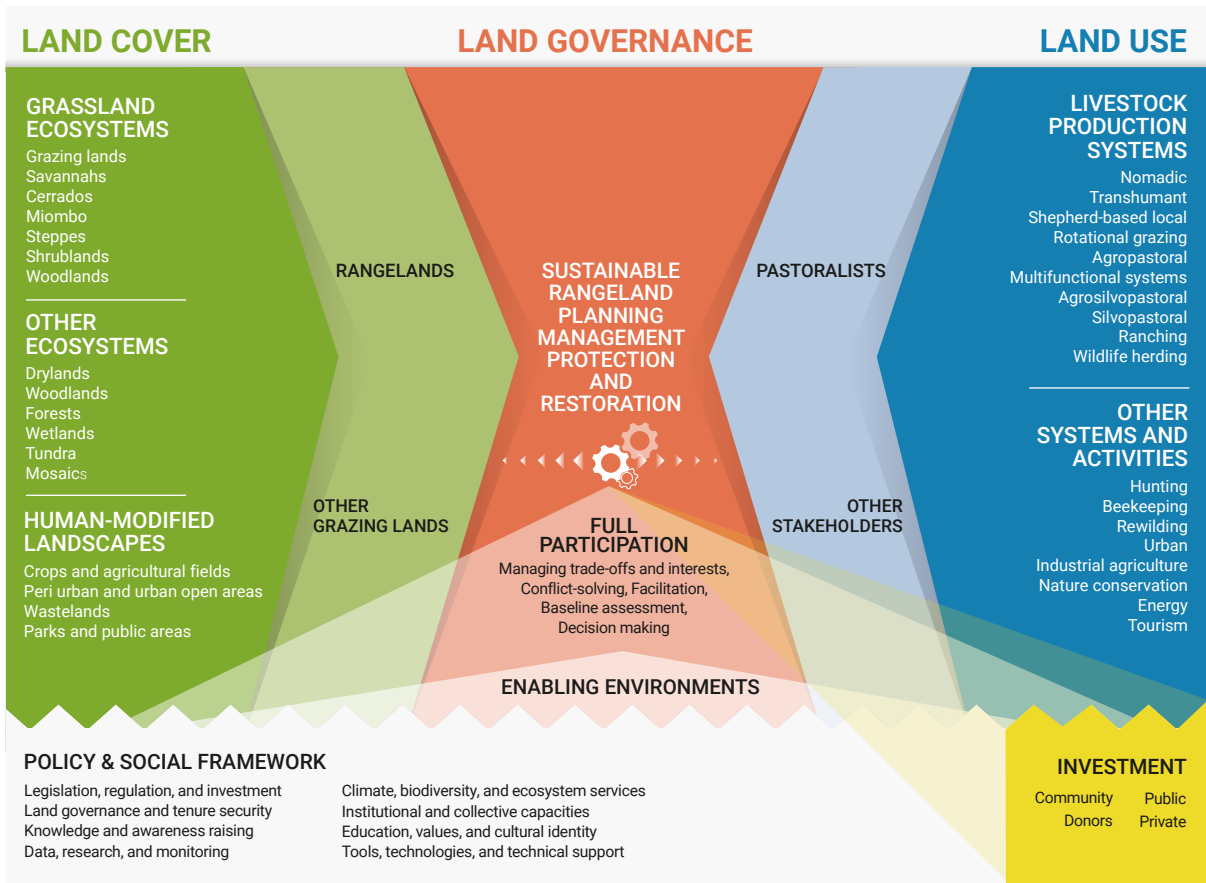
## 2.4 Conceptual framework for rangelands and pastoralism

Rangelands are associated with their actual or potential use for grazing and, thus, primarily characterised as managed lands. Raising livestock is an important, but not exclusive, activity in the rangelands which can offer a mix of social, economic, and environmental benefits. The multifunctionality of rangelands is seen as a desirable outcome which demands sound management practices and committed people implementing them.<sup>97</sup> The report emphasises the development and operationalisation of policy, planning, and implementation mechanisms under an umbrella of sustainable management approaches. This is reflected in the conceptual framework where the elements and relationships shaping rangelands are organised in an interactive way, pointing to multifunctional approaches that link rangeland health and specific management systems (Figure 6).

The framework shows how pastoralists and rangelands are intimately linked within the same social-ecological system and points to the need for a systemic approach to understanding and managing rangelands. Beyond just land users, pastoralist communities have been, and still are, considered stewards of the rangelands.<sup>98</sup> They bear the ultimate responsibility for, and consequences of, their management practices. While the participation of other land users and stakeholders in rangeland governance is important, pastoralists must be prioritised as shareholders with the capacity to sustainably manage and restore rangelands.

It is this complex network of relationships occurring in diverse political and social environments that ultimately shapes the use and management of rangelands. Addressing land governance challenges opens the scope of interventions to the whole territory and to all stakeholders involved, often seen as a prerequisite for achieving the national and global objectives addressed in the report.<sup>99</sup> The conceptual framework, complemented with the DPSIR model, underpins the global effort to protect rangelands and contributes to the effectiveness of initiatives at national and local levels. As many rangelands share common features, multi-scale approaches and context-specific interventions will help refine a global conceptual framework. In addition to generic strategies and approaches, case studies and good practices can also help inform specific response measures, management systems, and governance approaches used by various initiatives (Chapter 4).

**FIGURE 6** Social-ecological conceptual framework in the context of rangeland management and restoration



Technical solutions to avoid, reduce, and reverse rangeland degradation through conservation, sustainable use, and restoration practices are cost-effective, widely available, and supported by scientific evidence. Incentives in the form of secure tenure, access to markets and credit, and the provision of extension services are important forms of support for pastoralists engaged in SRLM and restoration

activities. Participatory and multi-actor initiatives help ensure the inclusion of all relevant stakeholders in planning, implementation, monitoring, and evaluation. There are numerous manuals, guidelines, and training materials that offer a range of technical measures to avoid, reduce, and reverse degradation trends in rangelands (Chapter 5).<sup>100</sup>



# 3. Learning from the past, planning for the future

Using examples from all regions of the world, the report demonstrates the untapped potential of rangeland projects and programmes to provide multiple co-benefits for people, nature, and climate (Chapter 4). Evidence suggests that successful SRLM and restoration projects and programmes have several common elements:

- i. informed, targeted, and sustained finance;
- ii. meaningful participation of all relevant stakeholders in the assessment, planning, design, implementation, monitoring and evaluation stages;
- iii. establishment of clear goals and measurable ecological and socioeconomic objectives;<sup>101</sup>
- iv. space for innovation and adaptive management;
- v. focus on governance, enabling environments, and supporting policies;
- vi. use of qualitative and quantitative data, indicators, and other information for monitoring, evaluation, and communications.

Even when these elements are contained in SRLM and restoration projects and programmes, the specific challenges and complexities of rangelands and pastoralism result in an alarmingly high rate of failure.<sup>102</sup> This is not unique to rangelands, especially considering the unequal power dynamics associated with land and natural resources that often marginalise many rural communities. As with nature conservation and rural development, rangeland users and managers must be proactive, undertake systematic analyses, and implement strategies that learn from these failures rather than seeking to mechanically replicate actions that may have been successful in very different contexts.<sup>103</sup>

The systematic analysis of rangeland projects and programmes was common during the 1990s and 2000s,<sup>104 105 106 107</sup> but has since diminished significantly with a few notable exceptions.<sup>108 109 110</sup> Despite recent efforts to support and implement new rangeland and pastoralist initiatives,<sup>111</sup> there is still limited evidence on the main constraints and bottlenecks. While there is increasing public attention and scientific literature devoted to the contextual and conceptual understanding, much less has been reported on the technical aspects. This chapter addresses both the underlying concepts and the technical aspects of rangeland and pastoralist projects and programmes while providing a critical historical perspective and offering pathways of action that can enhance the success of current and future policies, projects, programmes, and investments.

## 3.1 A historical perspective

History provides an obvious first step to understand the various challenges that limit the success of rangeland and pastoralist projects and programmes. While perspectives on pastoralism, rangelands, and rural development have evolved considerably over the past 50 years, current initiatives tend to perpetuate common misconceptions. In the 1950s and 1960s, livestock and rangeland initiatives were focused primarily on technical improvements in production systems (e.g., industrial breeds, forage production, groundwater extraction, veterinary care) with the exclusive aim of modernisation that overlooked the value of pastoralist livelihoods and management systems.

In the 1970s, pastoralism began to gain increased global recognition. However, attention was still centred on how to transform pastoralist livelihoods through settlement and modernisation. For many new nation states, government priorities, much like those of their colonial predecessors, were focused on efforts to assert their authority, secure borders, and reduce conflict. Investments were directed towards improving infrastructure, technical assistance with animal health, industrial livestock production methods, and marketing as part of an overall strategy of intensification.<sup>112</sup>

In the last decades of the 20th century, rangeland management gradually shifted its approach with more projects and programmes that created grazing reserves, reduced herd sizes, promoted cooperatives, and improved land governance and tenure security. In general, the scientific understanding of rangeland functioning improved, while many outdated colonial perceptions receded. This paradigm shift had important implications for SRLM and restoration which have yet to be fully realised, especially with regard to poverty, decent work, and environmental sustainability.

Since the 2010s, methodologies, analytical tools, and good practices have advanced but have not matched the pace of improvements in the conceptual understanding and frameworks for action. Land and livestock managers involved in rangeland and pastoralist initiatives need practical applications that respond to these new, updated frameworks.<sup>113</sup> While it is increasingly popular to design and promote community based SRLM and restoration projects under adaptive approaches,<sup>114</sup> many historical flaws and challenges remain (Table 3).<sup>115</sup>

**TABLE 3**  
**Conceptual causes of failure**

Conceptual defects	Actions with shortcomings	Causes	Consequences
<b>Insufficient recognition of pastoralism</b>	Developing goals for pastoralism that are misguided, under a conventional perspective	Misconceptions of pastoral systems and prejudices over pastoralists	Project failure, abandonment
	Promoting changes regardless of their impact on basic needs	Misunderstanding of traditional pastoralism's role in subsistence and risk prevention	Impoverishment, conflict, vulnerability
	Destocking, resizing herds, promoting "alternatives"	Lack of recognition of the economic, social and cultural values of pastoralist culture	Vulnerability and marginalisation
	Developing actions that focus on the role of adult men	Disregard for the roles of women, youth and other groups	Inequity, lack of replacement
	Conducting poor baseline assessment	Undervaluation of traditional knowledge, insufficient knowledge available	Shortcomings
<b>Underestimation of the complex interacting forces in pastoralist environments</b>	Transforming rangelands towards different uses	Economic interests, misguided policies	Loss of pastoral lands, increased stress, loss of critical assets for pastoralists
	Focusing on large stationary infrastructure, slaughterhouses, water...	Ignoring need for mobility and flexibility in pastoralism, maladapted water infrastructure	Lack of water, uneven grazing
	Reducing pressure, destocking, developing misled grazing plans	Misguided interventions on grazing and mobility regimes	Uneven grazing, land degradation
	Focusing on overstock herd sizes, fenced ranching, private land rights	Misled rangeland management, lack of flexibility	Uneven grazing, land degradation
	Developing actions that are not flexible under changing conditions	Lack of awareness of change and variability, unexpected events harming project planning	Increased risk of failure
<b>Oversized technological interventions</b>	Focusing on high-performance breeds, external inputs, feed supplementation...	Aim for intensification of pastoralist production	Collapse of natural resources
	Encouraging settlement	Sedentary mindset of external developers	Conflict, impoverishment
	Focusing on fencing, water points, centralised infrastructure	Inadequate investments based on non-flexible approaches	Loss of mobility, economic failures
	Prioritising technical action.	Overlooking social, economic and cultural issues and needs	Poor social outcomes, hidden constraints
<b>Misunderstanding of pastoralists' decision-making and governance institutions and processes</b>	Developing participatory actions that overlook/lack key agents	Non-definition of the community involved, participants not well chosen, lack of diversity in representation of participants	Inefficiency of participation
	Not developing specific actions to secure rights	Land rights and security of tenure overlooked and insufficiently considered	Insecurity, conflict, misuse of resources
	Promoting "alternative" activities for pastoralists	Attempt to change pastoralist perception or behaviour; pastoralism is weakened	Conflicts, imbalanced power, abandonment
	Implementing state and promoters' interventions unilaterally	Overlooking of existing governance institutions and local management capacities	Weakened traditional governance institutions, conflicts, degradation
	Enabling centralisation, homogenisation	Markets unaware of pastoralists' needs, lack of synchrony between markets and pastoralists	Poor access to markets for pastoral products
<b>Misinterpretation of the role of commons</b>	Allowing privatisation, land grabbing, state appropriation of common lands	Misconception about the importance of common lands	Weak governance, mismanagement
<b>Lack of participation from the early stages</b>	Designing projects that lack necessary capacities	Poor use of pastoralist experience, knowledge and skills, top-down approaches, resource constraints, cultural/language barriers	Maladaptation of the project
<b>Inadequate state action</b>	Closing borders, assigning lands to the state, limiting land and movement rights	States consolidating their power over land, action of state weakening traditional systems	Loss of mobility, insecurity, conflict

States continue to try and control pastoral lands, especially in border or conflict areas, where pastoralists previously moved freely. At the same time, the most substantial investments are aimed at projects and programmes that convert rangelands into large-scale irrigated agriculture, tree plantations, renewable energy projects, and even protected areas. Legal frameworks, development plans, and private investments are driving these land use changes, while land grabs and the free, prior, and informed consent for investment in pastoral areas are often ignored or given only token attention.<sup>116</sup> As a result, pastoralists and other rangeland stakeholders are often excluded, distanced from their land and cultural identity, or forced to abandon their traditional livelihoods.

### 3.2 Learning from the past

The report emphasises two key means to address the shortcomings of the past. The first is that pastoralism and extensive livestock production need to be fully integrated into projects and programmes to improve rangeland health.<sup>117</sup> While pastoralism is not the only human activity on rangelands, it is often the most critical one to consider. Failure to do so can reduce the efficiency and effectiveness of rangeland initiatives that aim to boost their health and productivity,<sup>118</sup> such as those focused on rural development,<sup>119</sup> nature conservation,<sup>120</sup> or ecosystem restoration.<sup>121</sup>

A conventional approach to SRLM and restoration is often inefficient and even counterproductive, such as when a project employs measures to conserve biodiversity without considering livestock production.<sup>122</sup> Strategies that overlook the role of grazing and instead focus on other practices (e.g., exclosures, seeding, beekeeping) are often insufficient to adequately address the degree and extent of rangeland degradation.<sup>123 124 125</sup> It is important to recognise that pastoralism can directly and indirectly accelerate progress towards land and ecosystem restoration targets, such as by enhancing ecological connectivity through the preservation of traditional transhumance routes.

The second key means to address shortcomings is to create synergies between nature/climate goals and integrated management-based approaches that seek to improve food security, livelihoods, and sustainable production in rangelands. These approaches are not only compatible but complementary as they both draw on recognised SRLM and restoration principles and prioritise the participation, rights, and knowledge of indigenous peoples and local communities. A flexible and context-specific management approach can help minimise trade-offs and maximise returns on limited investments.

The potential shortcomings analysed below can help inform rural development and ecosystem management initiatives even though they do not specifically address the multifunctionality of rangelands or pastoralism. A lack of focus on rangelands or pastoralism does not mean that they should be ignored. In some cases, they serve to highlight misguided strategies that could yield more benefit through improved design and implementation.

### 3.3 Project formulation

One means to improve the way rangelands and pastoralist initiatives are formulated is to ensure that a fit-for-purpose conceptual framework is applied at all stages of the project cycle.

A fit-for-purpose conceptual framework offers a starting point to improve project and programme design through a holistic perspective on rangelands and pastoralism – one that is adapted to local realities by ensuring inclusive and meaningful participation as well as the institutional arrangements that support collaboration and cooperation during all phases of the project cycle. Each element of the framework (e.g., land uses, ecosystems, stakeholders, institutions, production systems, cultural norms) can be mapped and acknowledged within the local context to provide a comprehensive baseline assessment.<sup>126</sup> Project design and funding proposals must increasingly recognise the role of pastoralists and their rangeland management practices.

FAO and International Fund for Agricultural Development (IFAD) have developed three strategies to overcome these shortcomings and create a minimum standard for sustainable pastoralism:<sup>127</sup>

- i. develop national development strategies and action plans that recognise and support pastoral systems;
- ii. avoid policies and investments that undermine pastoralism;
- iii. improve land governance and tenure security to enfranchise pastoralist communities while recognising their diversity as a valuable asset.<sup>128</sup>

### 3.4 Rangeland interventions

In addition to conceptual failures, the poor quality of technical interventions is another leading cause of disappointment in many rangeland initiatives. The analysis of common technical flaws has been arranged according to the project life cycle:

- i. conducting baseline assessments;
- ii. design and planning;
- iii. implementation;
- iv. monitoring and evaluation.<sup>129</sup>



### 3.4.1 Baseline assessments

External drivers and pressures are frequently identified as threats to the success of a project, however insufficient knowledge of the status and dynamics of the rangelands targeted for intervention is a significant constraint. A poor baseline assessment can seriously weaken the design of rangeland and pastoralist projects which make them unlikely to be well adapted to the realities on the ground. This may be due to a lack of actionable data (e.g., gender-disaggregated), a disregard of local knowledge when planning new initiatives, or power dynamics that lead to subjective analysis and misinformation that perpetuates biases and narrow interests (Table 4).

**TABLE 4**  
**Baseline analysis-related causes of failure**

Threats	Origin	Causes	Consequences
<b>Incomplete baseline analysis</b>	Lack of data and information	Insufficient information for decision-making, actions led by incomplete data	Unpredictability of results
	Generalisations about the pastoral development environment	Inadequate scale of work, projects developing conventional actions	Lack of compatibility between actions and local conditions
	Vagueness of key parameters: beneficiaries, project scales	Inadequate targets, actions pointing to misguided targets	Inefficiency
	Lack of risk assessment	Risks underestimated, not measured or forecasted, lack of adaptation capacity	High vulnerability of projects to risk
	Lack of inputs from similar projects	Unawareness of potential mistakes and constraints, repeated errors of other projects	Avoidable mistakes: unrealistic options
	Lack of inputs from local stakeholders and pastoralists	Lack of contact with, or awareness of, the reality, actions not aligned with local interests	Ill-defined roles, responsibilities and processes
	Misunderstanding of power balance	Biased information and diagnostics	Favouring particular interests, ill-defined roles, responsibilities and processes, lack of common goals
	Misidentification of stakeholders	Unbalanced outcomes; actions not aligned with common interests	Ill-defined roles, responsibilities and processes

### 3.4.2 Design and planning

Another potential cause of project failure results from poor choices in the design stage which leads to a weak operational plan. Table 5 lists and elaborates upon factors which could be addressed with alternative choices at the start of the project, while others are unavoidable but still need to be considered. One example refers to partner selection. The lack of reliable partners (e.g., local authorities, NGOs/CSOs, private sector) can undermine project success if roles and responsibilities are unclear or there is a lack of critical stakeholder consultations during the design and planning stage.

Another refers to the need for clear project objectives, such as production, performance, and productivity, to guide operational plans and meet the aspirations of rangeland producers and pastoralist communities. The choice of project or programme scale is instrumental to prevent mismatches between biophysical interventions and socioeconomic goals as well as to address resilience trade-offs across scales.<sup>130</sup> In addition, sustained finance, institution building, and developing a solid evidence base need to be fully considered in the design and planning stage.<sup>131</sup>

**TABLE 5 Design and planning causes of failure**

Threats	Origin	Causes	Consequences
<b>Unfavourable policy environments</b>	Legal framework incompatible with the project	Projects trying to succeed under restrictive legal environments, poor legal support	Weakness, lack of recognition, abuse
<b>Unfavourable scenarios</b>	Unplanned influence of external factors	Economic, social and environmental constraints, increasing barriers to actions	Poor results
<b>Unfavourable political relationships</b>	Poor relationship with governments	Projects not integrated into larger programmes, isolated actions	Low impact
<b>Hidden agendas</b>	Intrusion of external goals and agendas	Priority given to external goals instead of project goals, actions unaligned with project goals	Lack of trust and commitment
<b>Political expediency</b>	Intrusion of implicit politics and government interests	Priority given to political goals instead of project goals	Lack of trust towards states and policies
<b>Unsatisfactory partner selection</b>	Partners not suited for their role in the project	Partners unable to fulfil their commitments; lack of capacity, insufficient influence, poor performance Prevalence of opportunity interests; actions not properly developed by responsible partners	Lack of efficiency
<b>Poor strategic planning</b>	Discontinuity between baseline and strategy	Inadequate solutions; use of conventional targets for pastoralist productions	Incapacity to reach goals
	Poorly defined problem	Symptoms addressed rather than causes	Actions unable to introduce changes
	Lack of correlation between target and actions	Incoherent project, inadequate actions	Lack of results
	Lack of flexibility in specific objectives	Low capacity of reaction facing uncertainty, Pursuit of project goals, regardless of other circumstances	Project goals become unreachable or irrelevant
	Lack of contingency plans	Unforeseen difficulties that stress implementation, lack of flexibility	Lack of efficiency
	Lack of reactive capacity	No element(s) of responsiveness, actions insensitive to external conditions	Inability to respond to changing conditions
<b>Lack of project ownership</b>	Lack of participation/consulting	Actions seen as not aligned with beneficiary interests or needs	Low impact/interest Lack of ownership
<b>Bad strategic choices and technical shortcomings</b>	Lack of development-planning skills among project personnel	Weak project-building process, actions uncoordinated	Loss of synergies
	Failure to involve pastoralists in the planning process	Insufficient mapping and incorporation of stakeholders	Unfit field action
	Neglect of institution building/ consolidation/ updating	Lack of facilitation, lack of governance and access to resources	Actions not properly deployed in the field
	Omission of goals related to justice and sustainability	Actions not addressing critical sectors	Imbalance of results
	Faulty, unproven, or inappropriate technology	Inadequate tools to reach goals, limited effectiveness of actions	Goals not fulfilled



### 3.4.3 Implementation

Shortcomings during the implementation stage can significantly reduce the expected benefits of the project or even generate unintended harmful outcomes. Implementation flaws have been detected in many rangeland and pastoralist initiatives. Even well-designed projects and programmes can fail due to a lack of capacity, skills, supervision, or commitment to execute activities in a coherent way. Other key issues associated with the implementation stage that may limit success include:

- i. lack of sustained financial and technical support due to short project cycles;
- ii. insufficient linkages with existing local institutions and attention to socioeconomic conditions;
- iii. forced scaling up/out of untested or immature interventions; and
- iv. biases towards market-based mechanisms and incentives even when they are inappropriate or undermine cultural values (Table 6).

**TABLE 6**  
**Implementation-related causes of failure**

Threats	Origin	Causes	Consequences
<b>Shortcomings in project management</b>	Poor integrity and coordination between actions	Unexpected interactions	Contradictory results
	Weak managerial skills and experience of personnel	Actions poorly managed, weak project implementation	Low impact
	Poor communication on project teams and with stakeholders	Low level of coordination	Reduced impact
	Over-management and bureaucracy	Teams more focused on paperwork than actions, inefficiency	Shortcomings in action implementation, burnout
	Weak structural or systemic capacity of project managers	Weak project implementation, underachieving actions	Low impact
<b>Understaffing, low capacity</b>	Weak economic capacity	Few personnel to implement actions and manage the project, low capacity	Work overload, underachievement
<b>Low commitment from participants</b>	Weak participation processes, lobbying and networking	Lack of support, actions underachieving goals	Lack of efficiency



### 3.4.4 Monitoring and evaluation

The lack of capacity for evaluation and monitoring is often a challenge for many project managers and implementing agencies. Project evaluations frequently highlight deficiencies in understanding the local context as well as the capacity and flexibility of local stakeholders to implement off-the-shelf measures which can involve balancing risk taking and risk aversion. Monitoring and evaluation protocols tend to be ad hoc or have a low profile in the operational plan of many rangeland initiatives. This underscores the importance of research applications to improve information flows that increase the capacity for adaptation through contingency plans and risk management strategies. Participatory approaches to monitoring and evaluation should be explored whenever possible (Table 7).

**TABLE 7**  
**Monitoring and evaluation-related causes of failure**

Threats	Origin	Causes	Consequences
Evaluation shortcoming	Poor monitoring system	Low feedback from the environment, actions unable to be redesigned	Lack of responsiveness and reactive capacity
		Low feedback from working teams, actions unable to be reprogrammed	Lack of responsiveness and reactive capacity
Lack of supervision / review		Low feedback from supervisors, actions unable to feed future projects	Lack of improvement capacity

Many of the shortcomings in rangeland projects and programmes can be addressed systematically by using a checklist developed from the tables above. Most urgent is the need for a coherent conceptual framework to help guide their design, implementation, and monitoring. The next chapter provides brief insights into rangeland and pastoralist initiatives from around the world that can help strengthen that framework. The case studies point to different strategies and approaches that spotlight the diversity of rangelands and pastoralist systems. While many of these projects and programmes are underfunded and rarely acknowledged, their efforts to overcome challenges and constraints are an inspiration and a rich base of evidence to guide other SRLM and restoration initiatives.



# 4. Regional analysis and case studies

Many countries, organisations, and communities are engaged in SRLM and restoration activities that:

- i. recognise the critical role of rangelands and pastoralists in achieving LDN
- ii. help create the enabling conditions and participatory governance systems
- iii. provide technical and financial support.

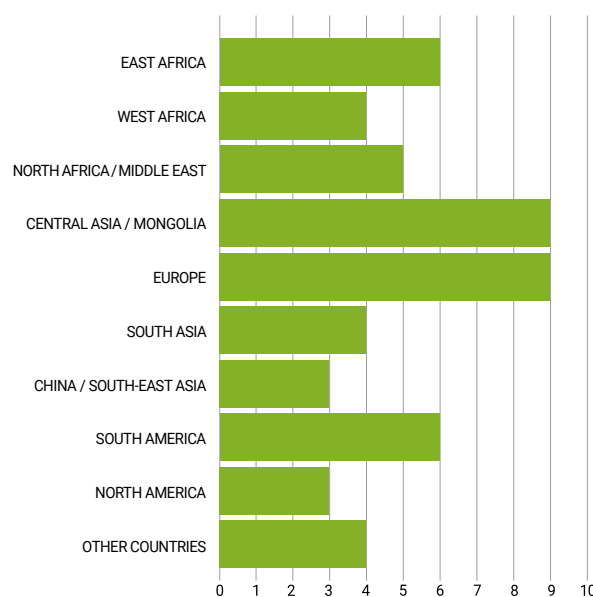
This chapter is divided into 10 sections roughly corresponding to regions of the world. Each section starts with an introduction, followed by a regional analysis supported by national and sub-national case studies. Each section concludes with an overview of rangeland degradation trends and a discussion on the key issues considered most significant in advancing the SRLM and restoration agenda.

## Methodology

This chapter contains case studies submitted by diverse stakeholders (contributors are listed in the acknowledgements) who responded to a request by the UNCCD secretariat to submit their experiences related to rangeland management and pastoralism. The call for contributions was opened to all UNCCD stakeholders, including national focal points, in February 2023 along with a submission template. A total of 65 case studies from 39 countries were received as well as numerous global and regional initiatives (Chapter 5). After an initial review, each contributor was asked to provide additional references, data, and photos or to clarify specific issues. No effort was made to validate, complete, or update the information provided in the submissions. In the end, 55 case studies were selected to provide a representative balance between regions, countries, and approaches. Contributors were also asked to review the final text of their case study.

The case studies are presented here with due respect to the original content and style, offering insights into a wide range of design, implementation, and monitoring approaches. Statistical data and maps displayed were extracted from referenced publications and supported by scientific evidence, fully recognising that this information could be outdated or differ from official sources. While not

**FIGURE 7** Regional distribution of case studies



reflecting the full status or breadth of rangeland policies or interventions in countries or regions, the case studies demonstrate a diversity of strategies and methodologies that address many of the specific drivers, pressures, impacts, and solutions highlighted throughout the report. The report refrains from evaluating their performance, measuring their success, or criticising their approaches. The references provided allow the reader to explore further details and draw their own conclusions.

## 4.1 East Africa

East Africa is characterised by expansive drylands, which occupy nearly 75 per cent of its land surface, ranging from 20 per cent in South Sudan to 99 per cent in Eritrea. Pastoralism is the predominant land use, with these communities representing a significant proportion of their populations. Pastoralism produces almost 90 per cent of the livestock and animal products consumed in the region, contributing to GDP in Ethiopia (19 per cent), Kenya (13 per cent), Uganda (8 per cent)<sup>132</sup> and, on average, 57 per cent of the agricultural GDP in the 8 member states of the Intergovernmental Authority on Development (IGAD).<sup>133</sup> Nevertheless, poverty and forced migration in pastoralist communities are widespread and concerning.<sup>134</sup>

Pastoralist communities constitute a range of culturally and linguistically diverse groups which is reflected in their varied production systems, livestock species and breeds, and the use of natural resources and external inputs. Nonetheless, they share a common livelihood strategy whereby mobile pastoralism relies on extensive common lands, decentralised decision-making that accounts for diverse voices and interests, and often employs opportunistic strategies to cope with scarcity.<sup>135</sup> For example, traditional tenure systems favour communal access and priority of passage to move herds between key resource areas.

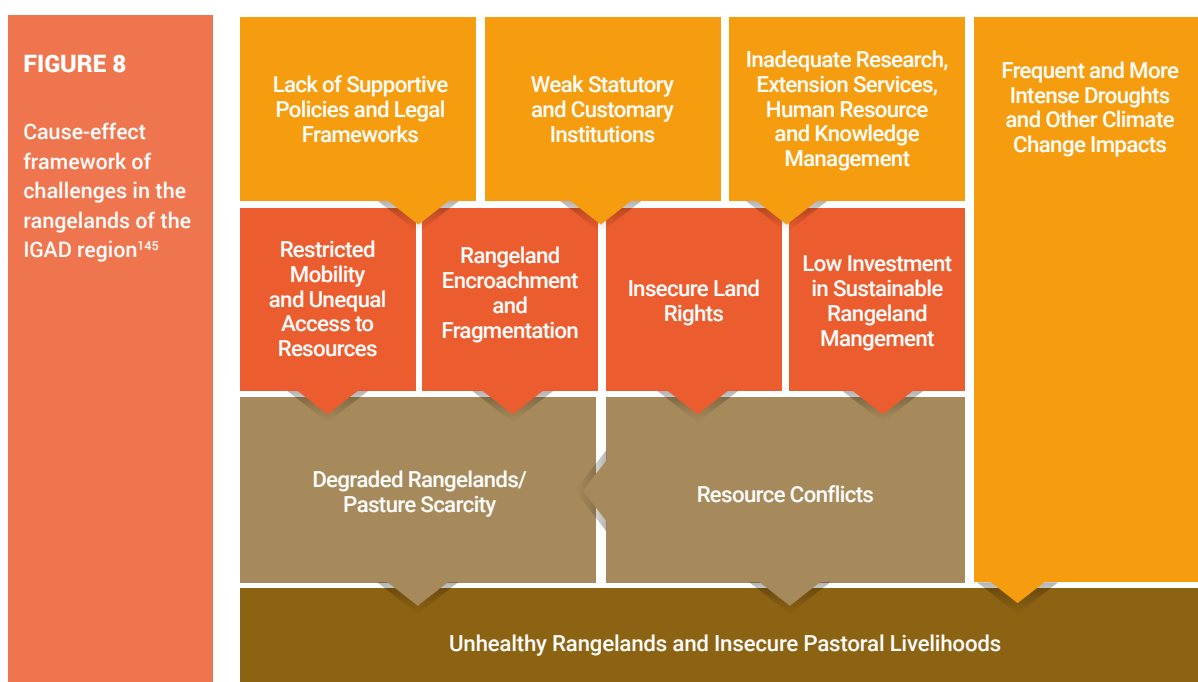
East African rangelands are widely acknowledged for their cultural and biodiversity values. Pastoralists and their livestock have played a large role in shaping the ecology of the rangelands through their grazing, mobility, and fire management practices.<sup>136</sup> <sup>137</sup> These activities influence vegetation and tree cover by controlling shrub encroachment and protecting wildlife habitat. Since pastoralism emerged as a land use system in sub-Saharan Africa more than 5,000 years ago, natural resource management and herding strategies have modified ecosystems to such an extent that, in many cases, the removal of pastoralism would be detrimental to biodiversity conservation efforts. The linkages between biodiversity and pastoralism call for an integrated conservation strategy that fully considers the needs and rights of pastoralists,<sup>138</sup> while recognising that wildlife populations in many rangeland areas are experiencing drastic declines due to land degradation, land use and climate change.<sup>139</sup>

East African rangelands are undergoing a significant shift towards a better recognition of their multiple benefits and values, unleashing demand to acquire, control, and invest in these lands.<sup>140</sup> While this transformation is helping to reverse decades of underinvestment and marginalisation,<sup>141</sup>

governments and investors now see these rangelands as development frontiers with abundant land and resources,<sup>142</sup> with major actors investing in the construction of ports, pipelines, roads, solar/wind farms, and monoculture plantations. These large-scale investments, which are often part of wider commercial and development strategies, can offer opportunities to reduce poverty and increase the resilience of rangeland communities. Unfortunately, many of these investments tend to disrupt traditional management practices and ignore customary land rights.

Pastoralist representation in politics and governance does exist in some countries, such as Ethiopia, Kenya, and Uganda where parliamentary bodies have been established and enjoy different levels of formalisation. However, policies at the national level rarely support mobile pastoralist livelihoods, but instead promote sedentary and “modern” livestock production systems even though many civil society and non-governmental organisations have long been advocating for the interests of traditional mobile pastoralists.<sup>143</sup>

Addressing rangeland challenges in East Africa requires coordinated action to design and sustain finance to implement SRLM and restoration initiatives at regional, national, and local levels (Figure 8). Rangeland productivity and economic diversification can only be addressed by strengthening critical linkages within social-ecological systems. Integrating locally adapted management practices, agricultural technologies, and extension services have the potential to simultaneously target SRLM, food security, and improved livelihoods.<sup>144</sup> For example, ecotourism in rangeland and pastoralist areas can be a driver for economic diversification in East Africa. There have been significant efforts to formulate both regional and national policies (Table 8).



**TABLE 8**

**Rangeland-related national policies and strategies in the IGAD region<sup>146</sup>**

Country	Policy/Strategy/Plan	Status
Uganda	Rangeland Management and Pastoralism Policy, 2017	Draft
Sudan	The Rangelands and Forages Resources Development (Rationalization) Act, 2015	Operational
	Pastoral Strategic Action Plan for Semi Desert Savanna Sudan, 2014–2024	Operational
South Sudan	National Livestock Development Policy	Operational
	MARF, Policy Framework and Strategic Plans, 2012–2016	Operational
Ethiopia	Pastoralist Development Policy and Strategy, 2018	Draft
	National Strategy on Prosopis Juliflora Management, 2017	Finalised
	The Federal Rural Land Administration / Use Proclamation 456/2005	Operational
	Rangelands and Pastoralism Strategic Plan, 2018–2028	Draft
Kenya	Vision 2030 Development Strategy for Northern Kenya and Other Arid Lands, 2012	Operational
	National Policy for the Sustainable Development of Arid and Semi Arid Lands, 2017	Operational
	Agricultural Sector Transformation and Growth Strategy (ASTGS), 2019–2029	Operational
	Community Land Act, 2016	Operational

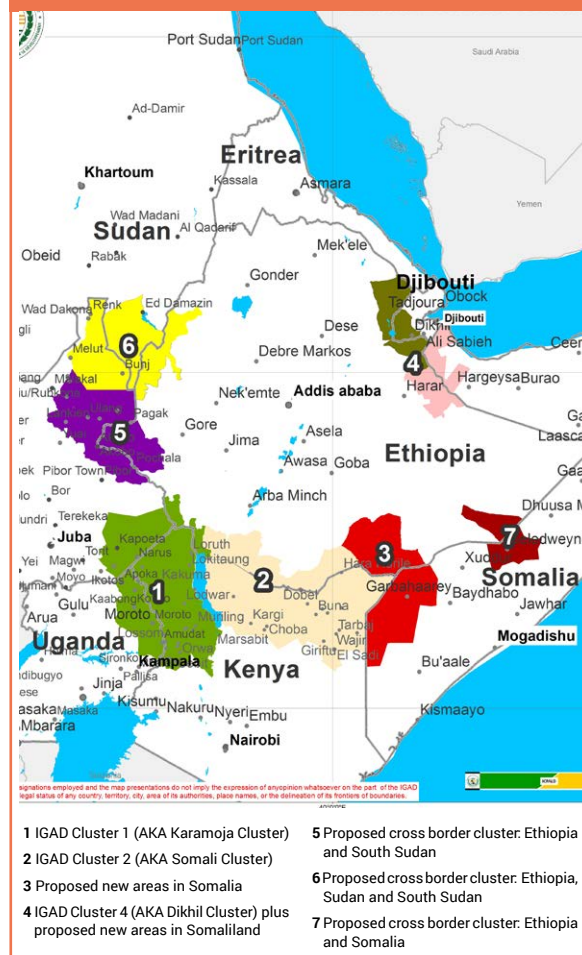
The harmonisation of existing policies and practices and their integration into agricultural and rural development priorities would be a key step, already initiated by some countries, to ensure effective and sustainable management of rangeland resources in the region. It is important to note that cross-border coordination and synergies are generally lacking even though many countries share multiple pastoralist communities (Figure 9).

Silvopastoral and agrosilvopastoral systems are widespread in East Africa. Pastoralism has proven invaluable in the development of agroforestry projects and programmes by combining mobility with the community management of rangeland resources.<sup>147</sup> Silvopastoralism can be an effective strategy to restore East African rangelands and savannahs by increasing the number of trees/shrubs and the services they provide, not only in terms of fodder, but also fruits, fuelwood, gums, and resins.<sup>148</sup> The overarching objective of SRLM is to ensure equitable access to rangeland resources and manage them sustainably (Figure 10).



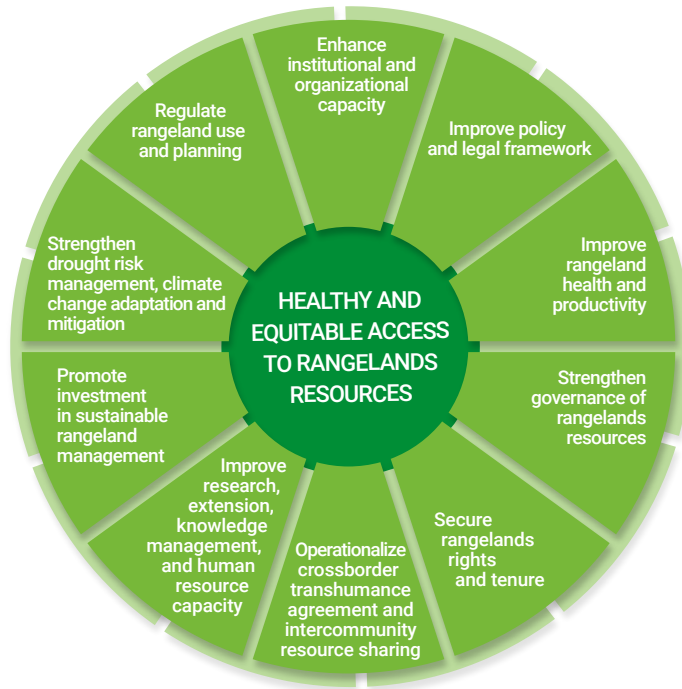
**FIGURE 9**

**Cross-border clusters in the IGAD region<sup>149</sup>**



**FIGURE 10**

Objective tree to achieve sustainable rangelands in East Africa via the harmonisation of policies and practices<sup>150</sup>



## Regional approaches

The rangeland and pastoralism agenda in East Africa has benefitted from regional processes, like the African Union's Policy Framework for Pastoralism<sup>151</sup> and the IGAD transhumance protocol,<sup>152</sup> both of which provide a strong foundation for improved policy and programming. The Pretoria Declaration on Economic, Social and Cultural Rights in Africa,<sup>153</sup> adopted by the African Commission on Human and Peoples' Rights in 2004, recognised the importance of respecting tenure rights and access to land, while the Framework and Guidelines on Land Policy in Africa<sup>154</sup> and other African covenants support the key role that land policy plays in achieving many SDGs. In 2019, the UNCCD published the GLO Thematic Report

on East Africa,<sup>155</sup> presenting several case studies on LDN that specifically address the risks of insecure tenure for financial investments and project implementation. It outlines regional participatory governance initiatives in East Africa and highlights the need for advances in innovative funding mechanisms for rangelands and pastoralism. In 2019, the UNCCD published the GLO Thematic Report on East Africa, presenting several case studies on LDN that specifically address the risks of insecure tenure for financial investments and project implementation. It outlines regional participatory governance initiatives in East Africa and highlights the need for advances in innovative funding mechanisms for rangelands and pastoralism.

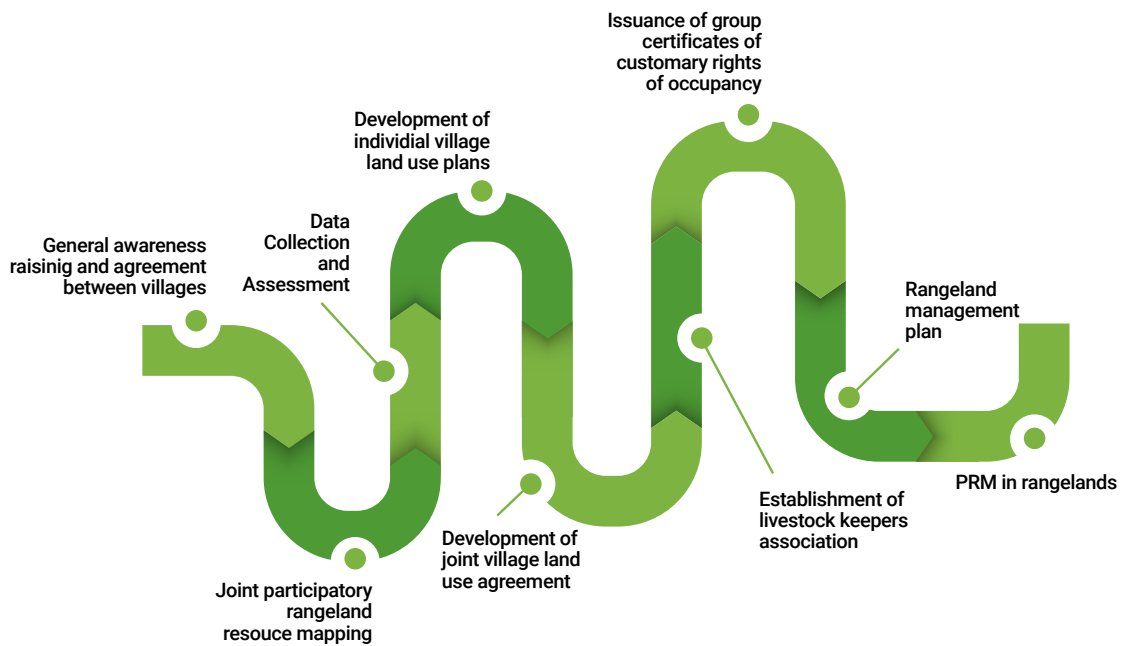
### Participatory Land Use Planning in Pastoral Areas<sup>156</sup>

While pastoral rangelands tend to be collectively managed and governed by customary institutions, land use often transcends administrative boundaries. Pastoral areas may be remote and large, and often "vacant" for long periods. The Participatory Land Use Planning (PLUP) initiative is designed to address cross-boundary planning challenges, keeping rangelands under appropriate management schemes (Figure 11). PLUP agreements strengthen reciprocal relations, collective tenure arrangements, and good governance, helping to prevent and resolve conflicts between land users at different scales – across villages, districts, counties, and even countries. PLUP has developed joint village participatory planning in Tanzania,<sup>157</sup> in one district in Ethiopia,<sup>158</sup> and in pastoral counties in Kenya.<sup>159</sup>

The PLUP processes demand significant resources, capacities, technical support, time and expertise for the analysis and assessment of options. A village-level plan is likely to need detailed soil and vegetation studies which are often mandatory as in Tanzania. PLUP provides skilled facilitators and advanced representation mechanisms, often through grassroots and other social organisations, that engage users at the core of decision making. PLUP typically starts with the participatory mapping of rangeland resources, land uses, management practices, and governance regimes. PLUP offers a flexible way to accommodate the complexities of collective land use (e.g., tenure, shared resources, movement across boundaries, risk mitigation and sharing). All pastoralists (men and women, young and old) are included in PLUP processes, building their capacities as needed.

PLUP in East Africa was developed under supportive legal frameworks and helped to facilitate the development of new policies, such as in Tanzania. It is also co-designed with governments and can readily be applied to pastoralist areas, particularly in complex situations where conventional land use planning may hinder mobility and traditional access to resources. The benefits are numerous, most notably that local pastoralist communities experience increased tenure security and governments have fewer land use conflicts to resolve.

**FIGURE 11** Steps in the joint village land use planning



Another example of a regional approach is provided by the East Africa Rangelands Assessment, which evaluates projects and programmes with a focus on community-based rangeland management. The assessment is the result of a collaboration between the United States Forest Service and the Northern Rangelands Trust in Kenya.

## National approaches

### Ethiopia

Ethiopian rangelands comprise about 62 per cent (767,000 square kilometres) of the country's land area. The central highland mass shapes the country, rising from 1,000 to over 1,700 metres.<sup>160</sup> Almost 75 per cent of the land is categorised as drylands. While low altitude rangelands have sparse vegetation, they still host 26 per cent of the total livestock and produce over 90 per cent of legal exports of live animals.<sup>161</sup> Pastoralism supports the livelihoods of an estimated 20 million people and produces 80 per cent of the total annual milk supply in Ethiopia.<sup>162</sup>

Rangeland livestock production is affected by shrub encroachment, uneven grazing, and drought.<sup>163</sup> While feed shortages are typically compensated for by standing hay, haymaking, and crop residues, rangeland degradation continues to reduce feed and water availability and increase livestock disease and loss.<sup>164</sup> Borana households adapt to this situation by keeping more goats, sheep, and camels instead of cattle. Afar pastoralists are shifting from grazers to browsers, and engaging in initiatives focused on bush clearing, revegetation, and soil and water conservation. Ethiopia is a pioneer in using traditional enclosures as a tool to improve rangeland conditions,<sup>165</sup> and implementing innovative approaches to investments in SRLM and restoration,<sup>166</sup> as evidenced by the Pastoralist Livelihoods Initiative.<sup>167</sup>

### Pastoral and Environmental Network in the Horn of Africa

The Government of Ethiopia Ministry of Agriculture and the Pastoral and Environmental Network in the Horn of Africa (PENHA)<sup>168</sup> have promoted a National Drylands Restoration Strategy to guide development and conservation efforts in the drylands. The scope of the strategy extends beyond the agricultural sector to cover other sectors (e.g., forests, water, mining) with the aim to diversify livelihood options and create off-farm income-generating activities for the growing dryland population.

### Kenya

Pastoralism is the main source of livelihood for millions of people residing in Kenya's drylands, which occupy 80 per cent of the country. Kenya's pastoral sector has an economic value of over USD 1.1 billion<sup>169</sup> and plays a critical role in the nation's food and nutritional security: annual meat consumption was estimated at 553,200 tonnes, of which pastoral meat contributed about 28 per cent.<sup>170</sup> The Government of Kenya has made ambitious commitments to restore rangelands, among other ecosystems and landscapes. In cooperation with national and international non-governmental organisations, they have implemented diverse initiatives and processes to respond to the growing challenges facing rangelands.

The Kenya Rangelands Restoration and Conservation Action Group was formed following the National Landscape Restoration Scaling Conference of 2021 to bring together actors for the protection and restoration of the rangelands. This group conducted a seminar, "Restoring Kenya's Rangelands: the way forward",<sup>171</sup> after which an action group was created to identify key issues that needed to be addressed to support rangeland

conservation and restoration efforts, as well as to compile and share experiences, practices, and solutions. The action group will assess and monitor rangeland health for multiple targets and commitments (e.g., LDN, Bonn Challenge, UN Decade on Ecosystem Restoration) and help catalyse action for enhanced resilience, policy support, diversification, and financing.<sup>172</sup>

Other organisations, such as the Northern Rangelands Trust,<sup>173</sup> are developing rangeland strategies within their conservancies.<sup>174</sup> Their long-term vision is to stabilise and improve the productivity of rangelands that underpin the pastoralist economy, reduce competition for water and grazing resources, and improve forage for livestock and wildlife. Kenya has been a leader in developing Participatory Rangeland Management initiatives.

The collection of Kenyan rangeland initiatives also includes the use of technological approaches, some of which are led by the International Atomic Energy Agency (IAEA), which emphasises the need to continue investing in research and innovation to regenerate rangelands. One IAEA project is assessing the impact of mutated forages on the performance of smallholder dairy cows in drought-prone areas. Using nuclear techniques, they produced two *Brachiaria* grass varieties with higher productivity and tolerance to drought. This can ensure a better supply of forage for livestock, especially in drier periods, while its relatively high nutritional content and digestibility can improve livestock productivity and health. The findings from this project could be shared with other African countries prone to drought conditions.

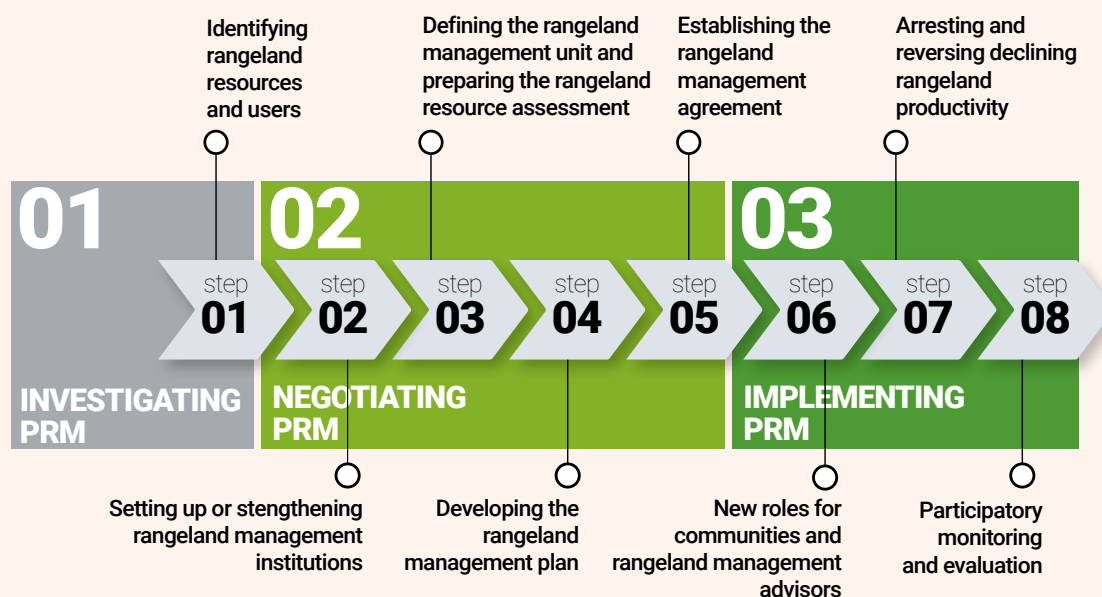
### Participatory Rangeland Management

Participatory Rangeland Management (PRM) is underpinned by the two pillars of participation and planning. The first ensures that all stakeholders are involved in decision making; the second uses this engagement to generate and process information to improve land use and management. As a result, rangelands, pastoralists and their land rights can be protected through a deliberate planning process that involves all types of community members. PRM aims to improve the condition of rangelands and simultaneously engage communities in their governance.

Mapping, which gives a comprehensive picture of resources, users, and management systems, is a key first step in the process.<sup>175</sup> This empowers and inspires community members through a better understanding of the different uses and interests within the same resource base.<sup>176</sup> However, before starting a PRM process, it is important to align with policy and legal frameworks by working closely with local and national governments. The effort continues with the development of the tools and strategy that will guide the process. The participatory stages follow a logical framework which can be adapted to sub-national and local levels (Figure 12).

PRM targets multiple stakeholders, prioritising equality and the full and meaningful participation of women and youth (e.g., by increasing women’s leadership positions).<sup>177</sup> PRM also ascribes to the One Health approach,<sup>178</sup> which can be reproduced in other African countries as explained in two short documentary films.<sup>179 180</sup>

**FIGURE 12: Methodological steps to develop Participatory Rangeland Management instruments**





## Tanzania

Tanzanian rangelands cover one third of the country's surface, about 61 million hectares which are extensively used under pastoralist or agropastoralist systems. Only 3 per cent of the 3.7 million households in Tanzania are pastoralists, and 7 per cent are agropastoralists, representing approximately 370,000 households or 2.2 million people. Rangelands in Tanzania are an important resource for the country's economy, supporting approximately 16 million cattle, 12 million goats, and 3.5 million sheep, and producing an estimated 335,000 tonnes of meat for the domestic market.

Tanzanian rangelands hold significant heritage and cultural values and are widely known for their rich biodiversity and unique ecosystems and habitats for many endemic, rare, or endangered species. These values generate significant revenue for the nation through ecotourism and other investments in nature conservation.<sup>181</sup> Accordingly, there is widespread concern about the loss and degradation of Tanzanian rangelands.<sup>182</sup> Wildlife numbers are falling, and land degradation is considered the main contributor to their decline. The alienation of pastoral lands by state and private interests is also a significant factor.<sup>183</sup> The Government of Tanzania and development and grassroots organisations are devising new initiatives to help the country address these challenges. These include gender responsive projects and programmes where, for example, local organisations provide baseline assessments on gender inclusion and participation.

The Pastoral Women's Council (PWC) is a non-profit membership organisation based in northern Tanzania that promotes gender equality and community development through the empowerment of Maasai women and girls.<sup>184</sup> With over 6,500 members, at least 75 per cent of whom are women and youth, the PWC is inclusive of minority and underprivileged groups (e.g., single mothers, orphans, widows, people with disabilities). The PWC is an active member of FAO's WeCaN community of practice and leads numerous projects to support their rights and voices, economic empowerment, and access to quality social services.

## Livestock and Gender

Livestock production systems in Tanzania are generally shared equally among men and women, although specific tasks and responsibilities vary across communities. Generally, men oversee cattle and goats, while women assume responsibility for animal reproduction, milking, and small livestock, in addition to domestic chores. This division of responsibilities is typical in the Kilwa Masoko district. In contrast, Bukoba men are responsible for stall feeding and milking, while women watch the calves and fertilise crops. In Kilimanjaro, Chagga women and girls assume responsibility for milking and fodder harvesting, and care for sheltered animals. In Maasai communities, women care for calves and sick animals, milk cattle, distribute milk, and process skins, while men manage the herds. In the Tanga and Morogoro regions, women are responsible for agriculture, small livestock, and dairy activities. In the Mvomero, Kongwa, and Lushoto districts, widows can own large livestock, while married women are limited to poultry and smaller livestock.

Gender divisions impact individual wealth and vulnerabilities. Women in many pastoral societies in Tanzania are denied the rights to keep livestock, reducing their income and rendering them economically dependent. Male income from livestock and crops in Sukuma societies exceeds female income obtained from selling milk, chickens, ghee, hides, eggs, fertiliser, and handicrafts. As livestock is a common wedding gift, it is often perceived as a bride price, which can harm women's and girls' rights. Male-headed households often hold more wealth than female-headed ones in Tarangire-Manyara. Women are often assigned additional tasks and responsibilities (e.g., seeking water or pasture in situations of scarcity). Limited access to education and animal health training, information and extension services adversely impacts women more than men in Pwani and other regions. Widespread inequalities in household labour division, resource ownership, and decision making often render women highly vulnerable and disempowered.



Rural pastoralists in the Arusha region depend on rangelands and clean water to sustain their semi-nomadic cattle herding lifestyle. Women often gain supplementary income by selling milk, firewood, produce, and handicrafts. Due to livestock losses and food insecurity, these communities are often faced with difficult choices; men are forced to migrate in search of employment, while women are left behind with little or no means of support. This scenario, found throughout the world, increases women's already vulnerable situation and places greater burdens on them with respect to food production, in addition to their household responsibilities.

The PWC addresses this situation through land restoration and climate action plans at the village level,<sup>185</sup> which engage both communities and local governments, and conduct training and awareness raising campaigns. After training, selected women's groups assume responsibility for the supervision and implementation of the primary activities: creating grass banks, improving grazing schedules, providing food aid during droughts, building dispensaries, fencing water sources, rehabilitating water systems, and protecting and building water points and irrigation systems – reducing the burden on women to provide food and water for their families.

At present, 27 pastoralist villages in Ngorongoro, Monduli and Longido districts of the Arusha region have submitted plans to the district government and have begun to implement them. Following implementation, communities evaluate progress and provide feedback. A Climate Action Committee monitors and holds relevant actors accountable for implementation progress. The PWC has been successful in building social capital by facilitating women's groups and other key stakeholders to meaningfully engage in rangeland restoration. The PWC members also collaborate with the Tanzania Meteorological Agency to forecast the timing and location of rainfall. Over USD 900,000 has been allocated in support of these plans, and many communities have enacted local by-laws for them.

In the Miombo-Mopane rangelands and woodlands, FAO assessed the value of regenerating tree cover within croplands for agroforestry purposes. The aim was to understand the implications of tree cover loss on farmland productivity and assess the potential value of its regeneration. The assessment revealed increases in crop yields and agricultural diversification, including silvopastoralism and beekeeping. Subsequent recommendations suggested that future research and policy actions to promote agroforestry practices would improve food security and inspire investment from public sources, communities, and farmers.<sup>186</sup> Additionally, the Government of Tanzania has developed guidelines for the sustainable management and utilisation of rangelands.<sup>187</sup> International initiatives, such as The Restoration Initiative,<sup>188</sup> have launched rangeland restoration projects that apply integrated management approaches and deliver multiple co-benefits for people, nature, and climate.



### The Sustainable Rangeland Management Project<sup>189</sup>

This project supports SRLM by developing participatory village land use plans and participatory land use management teams, drawing on guidelines from the National Land Use Planning Commission. It is built upon collaboration between public and private bodies, with funds primarily provided by IFAD and international donors. SRLM planning on sites adjacent to four villages has secured 120,000 hectares of grazing land for livestock keepers and an additional 162,880 hectares for approximately 1,000 households.

The SRLM approach used has enabled communities to develop their own land use and management plans. The planning process starts with participatory mapping,<sup>190</sup> offering a leading role to women who often have in-depth spatial knowledge on rangeland resources and their use. Participatory maps are quick to produce, easy to use and reference, and can be incorporated into joint village land use plans. They display a community's historical and cultural association with the land and inform negotiations on resource sharing, such as agreements on the use of forest, water bodies, and rangelands. Planning is completed with the establishment of land users' institutions and the issuance of certificates of customary rights of occupancy that convey secure tenure.

The first-ever group certificates were issued to a livestock keeper's association with the support of joint village land use planning. A commitment of time and investment is necessary to formalise the documents as legally binding by-laws which are approved by the district council and registered by the government. Land dispute resolution often accompanies participatory planning, especially in villages experiencing unresolved conflicts.<sup>191</sup> External facilitation can help balance power and prevent abuse and other risks while providing guidance, empowerment, and compensation.

## Uganda

Rangelands cover 44 per cent of Uganda's total land area, sustaining 80 per cent of the livestock herd and 90 per cent of the cattle. Pastoralism is the dominant activity in Uganda's rangelands, accounting for 4.5 per cent of GDP and contributing to 70 per cent of employment generated by the agricultural sector.<sup>192</sup> Pastoralists represent 35 per cent of the total population, with 64 per cent of them classified as poor.

Many of Uganda's challenges can be traced back to land and economic policies originating in the colonial era, which focused more on performance than on ecological functions and services. Current policies and practices continue to harm rangeland health, specifically those encouraging forced settlement, land conversion, privatisation, and fire exclusion. Investments in SRLM and restoration initiatives will require a national dialogue and roadmap for implementing land reforms that are guided by local participatory frameworks.

### The Right to Food: The Pasture Seed Model<sup>193 194</sup>

This initiative aimed to build the capacity of pastoralists and stakeholders to expand their pastures while advocating for strengthened land rights. Action at the local level is focused on increasing pasture seed production and promoting restoration through community seed banks. In collaboration with communal land associations, it has established demonstration sites as well as Pasture Growing Groups to cultivate pasture gardens, harvest and store seeds, and create seed banks. This empowered these associations at the state level to advocate for pastoralist rights and rangeland corridors that serve both livestock and wildlife. These efforts supported the implementation of the rangeland management and pastoralism policy and helped to establish the Uganda rangeland policy working group and a sub-regional platform for community pasture seed conservation and preservation in Karamoja.

The pasture seed model considers livestock production as an entire food system, targeting both resilience and income diversification for improved livelihoods. As a result, beneficiaries began changing their attitudes and appreciating the additional income gained from selling pasture seeds and improving feed production, often starting their own personal pasture gardens. The primary targets of the project were mobile pastoralists (kraal leaders, youth) and sedentary farmers (mainly women), although it benefited other interested stakeholders. COPACSO built capacities in monitoring and mentorship in collaboration with local and national experts. Research institutions, like the National Agricultural Research Organisation, were also engaged for technical expertise, while Oxfam-Uganda provided most of the funding.<sup>195</sup> This initiative has great potential to be replicated in other drought-prone areas of Karamoja.

## Eritrea

Eritrea's landscape is characterised by a south-to-north chain of high mountains crossing the country, separating the central highlands from the eastern and western lowlands. Pastoral and agropastoral production systems are the major land uses, although the highlands host mixed irrigation and rain-fed crops.<sup>196</sup> Rangelands, encompassing bush and grasslands, account for over 60 per cent of the land surface.<sup>197</sup> Eritreans living in the lowlands depend on livestock, which hold cultural importance as a sign of wealth and social prestige. The country hosts 1.9 million cattle, 6.8 million sheep and goats, 319,000 camels, 518,000 horses, and some 1.1 million poultry. Livestock production is based on the grazing of natural pastures predominantly in the semi-arid rangelands. Pastoral production systems are slowly gaining more recognition with greater investment in pastoral projects since the late 20th century, but with relatively limited success to date.

### Rangeland and Pastoralism Development Initiative

This initiative promotes a bottom-up approach to sustainable livestock management and the restoration of grazing land in Eritrea. It relies on community knowledge and priorities to plan actions for mobile pastoralists and small-scale farmers. It applies a participatory approach involving influential people, administrative officers, religious leaders, and grassroots organisations (with a mandatory representation of 30 per cent women). Placing communities at the centre of implementation creates a sense of ownership and lays the foundation for local institutions to carry on after external support stops. Pastoralists are carefully integrated into the project to capture their firsthand experience with respect to seasonal movements and the differentiated roles and responsibilities of diverse pastoral groups. Activities target households as the basic operational and decision making units and facilitate informal arrangements on resource access and movement among those units. Despite the considerable benefits expected, meaningful involvement in planning, implementation, and monitoring is difficult without strong pastoralist organisations and collaboration with other groups.



## Land degradation in East Africa

Land degradation in East Africa threatens people's livelihoods and rural stability, severely affecting terrestrial ecosystems in Tanzania (51 per cent), Malawi (41 per cent), Ethiopia (23 per cent), and Kenya's (22 per cent).<sup>198</sup> Poor rural communities, who directly depend on agriculture and natural resources, are disproportionately affected. The costs of land degradation are high; in Kenya, the International Monetary Fund estimates that it reduces GDP by around 3 per cent.<sup>199</sup>

The main causes of land degradation in the region point to centralised agricultural growth and rural development policies that are incompatible with the complex dynamics of East African ecosystems, contributing to soil exhaustion, decreased fertility, and increased erosion. Deforestation, overgrazing, and unsustainable land management practices (e.g., land clearing, fuelwood extraction) also contribute to rangeland degradation. Many rural communities find it increasingly difficult to adapt to the internal stress and external shocks and pressures that are impacting local production systems and accelerating degradation.<sup>200</sup>

## Discussion

The case studies from East Africa demonstrate the important role of stakeholder participation, and the need to improve policy frameworks, bridge knowledge gaps, and empower local communities. Participatory, bottom-up

approaches are seen as central to the effectiveness of SRLM and restoration initiatives. Effective participation schemes and multi-actor platforms must first be promoted, accessible, resourced, and given a safe space to operate within appropriate timeframes. Then skilled facilitation can assist communities to plan and effectively implement rangeland actions supported by expert guidance, conflict management mechanisms, and technical support.

East African countries also demonstrate the central role of policy frameworks in developing the enabling environment to better manage and restore rangelands. Several countries are revising their policy and legal frameworks to ensure equitable and impactful pastoral initiatives. Transboundary issues can often occur and should be addressed early in the project cycle and converted into an opportunity for regional sustainable development.

Data and information on pastoralism represents another critical gap which needs to be filled to improve rangeland management in East Africa. This knowledge gap has resulted in many policies and initiatives that lack baseline analysis or are based on generic solutions that are not fit-for-purpose. The case studies point to a need to increase the knowledge pool on rangelands, including basic data on how and when rangelands are used. A collaborative knowledge base co-created by researchers, practitioners, and pastoralist communities would significantly enhance good practices to take full advantage of synergies and minimise the trade-offs among competing land uses while responding to global change and technological advances.



## 4.2 West Africa

The most relevant climate feature of West Africa is the latitudinal rainfall gradient, with the hyper-arid areas of the north Sahel barely receiving 100 millimetres while the humid south coast experiences over 5,000 millimetres of precipitation each year. Between these zones, arid, semi-arid, and sub-humid grasslands and savannahs represent the diversity of West African rangelands.<sup>201</sup> <sup>202</sup> desert, Sahelian savannah, Sudanian savannah, and forest-savannah mosaic.<sup>203</sup> While rainfall is highly variable, especially in the areas of the Sahel with short and irregular rainy seasons and prolonged droughts, temperatures tend to be uniformly high. West African rangelands (excluding deserts) cover around 2.9 million square kilometres or 56 per cent of the Sahel region.<sup>204</sup>

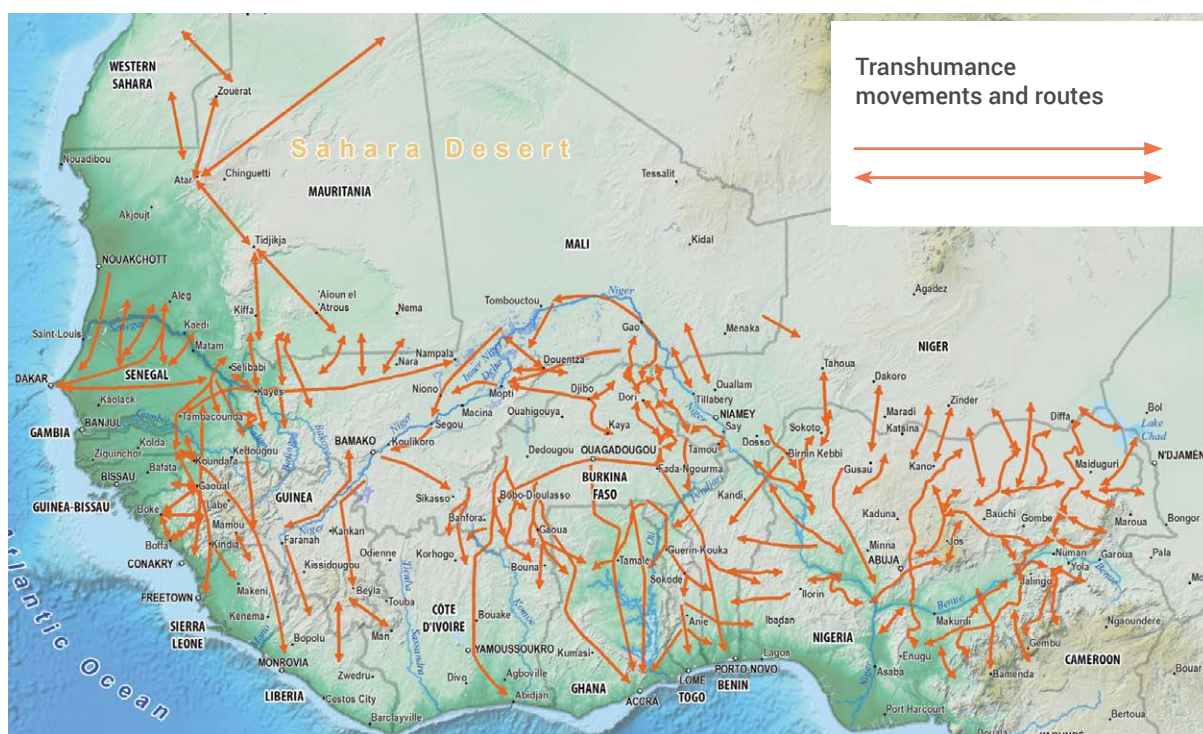
Pastoralism is widespread in West Africa. Mobile pastoralists follow long mobility routes, crossing multiple countries from the edge of the Sahara to the coast. Nomadic and transhumant pastoralists account for approximately 13 per cent of the West African population which include the Tuareg, Fulani, Maures, and other ethnic groups (Figure 13). FAO estimates that there are approximately 73 million cattle, 4.6 million camels, 110 million sheep, and 157 million goats across the Economic Community of West African States (ECOWAS) and Mauritania. The region hosts a variety of pastoral systems, encompassing the whole spectrum of pastoral mobility and integrated agroforestry. The share of animal production in agriculture GDP ranges from 5 per cent in Côte d'Ivoire to 44 per cent in Mali, with an average of nearly 40 per cent in Sahel countries. The contribution to GDP increases to almost 50 per cent for West Africa when the value of animal work and manure are considered. Traditional



marketing channels dealing in animal products generate thousands of secondary jobs; in Burkina Faso, these were assessed to be equivalent to 60,000 full-time jobs.

Rangelands are of great concern as West Africa is particularly vulnerable to climate impacts and socioeconomic transitions.<sup>205</sup> Governments and investors are increasingly interested in rangelands, primarily due to discoveries of oil and minerals and the growing demand for land-based commodities. Large-scale land acquisitions target pastoral areas, especially those with greater accessibility and subsidised infrastructure,<sup>206</sup> generating insecurity and triggering violent conflicts which significantly impact community and rangeland health in West Africa (Table 9).<sup>207</sup>

**FIGURE 13** Transhumance patterns in West Africa <sup>208</sup>



**TABLE 9****Causes and effects underpinning rangeland conflicts in West Africa<sup>209</sup>**

Causes	Effects
Indiscriminate grazing and movement of cattle at night	Transhumant cattle trespass; food-crop yields decline; cattle rustling increases
Scarcity of land	Designated grazing areas are used for cropping
Abusive prices of feed for transhumant herders	Herders resort to reserves for forage in times of scarcity
Discrimination against pastoralism with respect to land rights	Social division and enmity between herders and farmers are promoted
Decentralisation and transfer of natural resource management to rural communities	Privatisation and conversion reduce the extent of grazing lands
Blocking of transhumant tracks and corridors	Blockades are ignored, and former grazing areas are grazed
Insurgency and political instability	Pastoralists are seen as threats irrespective of borders
Transhumance corridors passing through protected areas where grazing is forbidden	Grazed animals stray into protected areas
Unregulated common use of water sources	Community water wells are depleted, and the land around them degraded
Climate change and its impacts	Forage and water are inadequate for pastoral livestock
Spraying of farms with herbicides and insecticides	Animals are poisoned
Sexual violence targeting women and girls on farms	Violence is inflicted on communities; culture and taboos are violated
Language barriers	There is no dialogue or negotiations
Incompatibility between farms and cattle mobility paths	Crops are damaged; some farmers shoot cattle that stray onto their farms
Armed herder groups	Intimidation, tension and mistrust increase, alongside extreme violence and cattle rustling
Uncontrolled burning and wildfires	Wildfires destroy food-crop farms
Cattle rustling and banditry	Fear, tension and mistrust increase, and vigilante groups form



The instability and forced displacement caused by jihadists and other extremist group have forced many herding communities to seek shelter in refugee camps or move to urban areas. Conflict between herders and farmers related to land use have intensified in some countries, especially Nigeria. The COVID-19 pandemic and the closure of borders in transhumance areas exacerbated conflict and worsened tensions.<sup>210</sup> Multiple, consecutive crises over the last 50 years have greatly impacted pastoralism,<sup>211</sup> directly and steadily reducing food, water, and energy security.<sup>212</sup>

### Regional approaches

A sustainable future for rangelands based on the legitimate aspirations of livestock producers demands a sensible regional approach. Several organisations that support pastoralism have emerged, advocating for the rights and interests of these communities.<sup>213</sup> Some, such as the *Réseau Billital Maroobé*,<sup>214</sup> have proposed recommendations to help ensure protection from security forces, and to regulate and control self-defence and paramilitary groups.

ECOWAS<sup>215</sup> and the *Comité permanent Inter-États de Lutte contre la Sécheresse dans le Sahel* (CILSS)<sup>216</sup> have supported the mobility of pastoralists and sustainable management of rangelands at the regional level, as clearly stated in the 2019 Nouakchott Declaration.<sup>217</sup> Mauritania, Mali, Burkina Faso, Senegal, and Niger have developed Pastoral Codes to regulate resource access and mobility. Representatives from regional civil society networks have also participated in global policy processes, such as the Global Agenda for Sustainable Livestock.<sup>218</sup> Several regional networks, such as the *Association pour la Promotion de l'Élevage au Sahel et en Savane*,<sup>219</sup> *Réseau Billital Maroobe*,<sup>220</sup> and Confederation of Traditional Stock Breeders Organizations in Africa,<sup>221</sup> are actively promoting initiatives that facilitate peaceful transhumance between the Sahel and coastal countries. FAO, through the Pastoralist Knowledge Hub (PKH), also supports pastoralism in the area.<sup>222</sup>

### Improving Governance of Pastoral Lands

This initiative is based on the use of the Voluntary Guidelines on the Responsible Governance of Tenure,<sup>223</sup> and its technical guide on Improving Governance of Pastoral Lands.<sup>224</sup> These guidelines provide pathways of action that are linked to accountable decision making, effective and inclusive participation, knowledge recognition, capacity building, conflict management, collaborative learning, and strengthened customary systems and synergies with statutory systems. The initiative promotes better governance in the pastoral lands of Niger<sup>225</sup> and Mali,<sup>226</sup> and guides stakeholders in other countries, such as Chad, Guinea, and Mauritania. It has promoted several multistakeholder platforms, facilitating their development and training members on the Voluntary Guidelines and legitimate land rights.<sup>227</sup> The National Transhumance Committees and agreements with specific ministries are instrumental to making progress at the national level. Additionally, two transboundary agreements between Niger and Nigeria have been signed, providing protection for cross-border transhumant pastoralists from livestock theft and insecurity as well as establishing joint investment programmes and coordination mechanisms between the two states.

Increased attention to SRLM and restoration has increased the demand for information, tools, and guidance on how improved management can be technically supported in the region. The PRAGA project has implemented pilot rangeland assessments in three countries: Kenya, Burkina Faso, and Niger.<sup>228</sup> Similarly, other sub-Saharan countries have developed context-specific technologies and practical approaches to improve rangeland management. The World Overview of Conservation Approaches and Technologies (WOCAT), a global network on SLM, offers a toolbox to effectively manage these rangelands, guiding the acquisition of management capacities and practical skills needed to scale up SRLM in the region.

### Sustainable Rangeland Management in Sub-Saharan Africa: Guidelines to Good Practice<sup>229</sup>

These guidelines illustrate a range of innovative rangeland management practices, grouping them, explaining their characteristics and requirements, and evaluating their impacts on ecosystem services and human wellbeing. They aim to demonstrate the value and potential for investment in rangelands with over 100 case studies and good practices. The guidelines are structured in two parts: the first sets the ground for rangeland uses and management, analyses the main trends, drivers, and potential lines of action, and proposes a way forward in line with recognised principles; the second offers nine sets of case studies, classified according to their technologies and approaches, that highlight good practices consistent with the WOCAT database. These guidelines, developed by WOCAT, in collaboration with Terrafrica, the World Bank, GIZ, and other partners, have benefitted from the input of local and regional rangeland experts and practitioners, as well as other contributions.

West Africa has been actively pursuing the integration of local knowledge and innovative approaches into rangeland management. One example is the use of spatial imagery and participatory mapping developed by barefoot mappers in Chad.<sup>230</sup> The *Association des Femmes Peuples et Peuples Autochtones du Tchad* (AFPAT) and the *Comité de coordination des peuples autochtones d'Afrique* (IPACC) have worked with nomadic and semi-nomadic communities in Chad to create maps using traditional indigenous knowledge that analyse land use, traditional livestock migration routes, ecosystem features, etc. This project also helped to build a multistakeholder dialogue around land use conflicts, and foster community participation in development planning and decision making.<sup>231</sup>

### Capacity Building for Conflict Sensitive Journalism<sup>232</sup>

This initiative focuses on the role of radio and journalism in raising awareness on the agropastoral sector to change the perception and language of community radio journalists regarding pastoral issues. Journalism students participating in this project benefitted from practical training on the production of radio programmes (e.g., interviews, production, broadcasting), and subsequently planned and produced six radio programmes that were uploaded on Radio Agropastorale,<sup>233</sup> a platform established by the initiative. The initiative sensitised journalists and other participants on different aspects of pastoralism as well as information dissemination and communication techniques. Two expert consultants in journalism and pastoralism oversaw the training, which included a week of practical applications in the field. An average of 25-30 students (community radio journalists, farmer and herder leaders) participated in each edition of the training.

## National approaches

### Nigeria

Nigeria, Africa's most populous country, has one of the largest livestock populations on the continent, contributing 9 per cent to the agricultural GDP of the country. The best available data on livestock numbers (2016) estimated that there were 20 million cattle, 42 million sheep, 74 million goats, and 280,000 camels. The pastoralist production system plays a key role in the livestock sector, which involves close to 15 million people.<sup>234</sup> Although most Nigerian pastoralists are Fulani by ethnicity, they are not a homogenous group. There are several Fulani clans, sub-clans, local cultures, and dialects, with significant variations in herding practices.

Nigeria's rangelands are shaped by tension and conflict which coincide with ethno-religious and tribal differences, poor land governance, land grabbing by agri-business and elites, forced displacement, disruption of traditional livestock routes, as well as the presence of Boko Haram and other extremist groups. Large-scale conflict management and improved security are essential to stop the violence, restore the rule of law, and improve relations between pastoralists and farmers.

#### Livestock Productivity and Resilience Support Project<sup>235</sup>

This project introduces policy and economic instruments to encourage adaptive herd management to improve production and commercialisation by:

- i. strengthening national livestock institutions;
- ii. enhancing livestock value chain performance;
- iii. preventing and managing crises, reducing conflict, and building peace.

The mobilisation of stakeholders and advocacy campaigns included targeting policy reforms, better extension services, an alliance on value chain enhancement, and improved access to credit and natural resource management. The project supports a collaborative framework which includes pastoralists, small- and medium-scale crop farmers, and other stakeholders. It is funded by an investment scheme run by the Government of Nigeria, the World Bank, and other institutions and private actors.



### Senegal

The majority or 58 per cent of the Senegalese population are engaged in agriculture and 36 per cent in livestock keeping. Livestock production has been more stable than crop production in recent decades due to persistent drought and locust outbreaks. Livestock generates about 36 per cent of agricultural GDP and 3.7 per cent of total GDP (1994–2000); 68 per cent of households (90 per cent in rural areas) manage livestock herds. Small ruminants dominate the sector, primarily sheep, which are managed under a traditional extensive or mixed farming systems (pastoralist or agropastoralist).<sup>236</sup>

The value of rangelands and livestock to the economy, livelihoods, nutrition, and ecosystem services is likely to continue to increase in the coming decades. Projected trends in rangeland productivity, both in crop farming and livestock systems, can be used to design integrated SRLM and restoration strategies that enhance climate adaptation in the agricultural sector.<sup>237</sup> Senegal is leading on adaptation initiatives based on agroforestry approaches that simultaneously provide for mobile pastoralism and settled agropastoralism, tailoring specific tools that were developed from participatory processes in Fatick and other locations in the Ferlo region.<sup>238</sup>

#### Dundi Ferlo<sup>239 240 241 242 243</sup>

This initiative aims to carry out a large-scale reforestation on up to 10,000 hectares over a 10-year period in the Ferlo region as part of the Great Green Wall initiative. It targets pastoral areas with high levels of livestock movement experiencing strong pressures to reduce forest cover on which the herders depend. Its unique feature lies in the engagement of pastoralist communities in the forest restoration process, allowing them to profit from the management of forest resources. This initiative provides an opportunity to reflect on reforestation efforts over the past 15 years which have seen mixed results and local land use conflicts. Ecological restoration should not exclude pastoralism for conservation reasons; rather, selected trees can be useful for herders as supplementary feed or shade, and healthy rangelands provide valuable habitats for species. Consultation and participation are essential factors that help integrate the interests of all stakeholders in the governance of forest restoration in the region.

## Land Degradation Neutrality in West Africa

West African countries have significant potential to achieve their LDN commitments.<sup>244</sup> The region has advanced knowledge systems and good practices that have been validated at the local level which can help scale up SRLM and restoration initiatives to adapt to climate change. Rangelands, with their water regulation services and potential for renewable energy, can generate additional financial opportunities to support agroforestry and



pastoralist initiatives. West African countries have set achievable LDN targets, but their success will depend on the mobilisation of innovative finance and technical support along with an inclusive green economy approach based on the sustainable value chains and more secure land rights for vulnerable and disenfranchised groups.

## Discussion

The case studies in West Africa have common themes: the remarkable diversity among pastoralist cultures, strategies, and production systems; the unique roles and responsibilities assigned to pastoralists; and the need for conflict management, rule of law, and enforcement mechanisms.

The multiplicity of pastoral systems is at the core of SRLM, and West Africa reveals the capacity of these systems to cope with starkly different social-ecological conditions. West Africa is a region where a variety of ecosystems, multiple interests, and diverse production systems intersect to generate effective strategies to address rangeland challenges in the region (e.g., how to manage open-access lands or coexist with croplands). The fair and equitable designation of stakeholder roles and responsibilities remains an important consideration.

Land degradation is often linked to management activities which often puts the greatest burden on local communities to respond. They have been contending with changing conditions for generations, ensuring their survival and wellbeing from variable resources and managing rangelands under extreme conditions. Baseline assessments often lack an empirical foundation, leading to project or programme design that is not aligned to the reality of West African rangelands.<sup>245</sup> Many SRLM and restoration initiatives fail due to incomplete knowledge or ignorance of adaptation strategies employed by local livestock producers.<sup>246</sup>



As the conceptual framework shows, conflict is a transversal issue affecting rangeland management and governance. Although the situation in West Africa is often viewed simply in terms of herder-farmer conflicts, there are complex social and biophysical factors which make it difficult to apply a single lens when designing and implementing solutions. Some regions have been more successful than others at addressing conflict by combining participation and governance tools in collaboration with state or local authorities. This can involve reverting back to the traditions of mutually beneficial cooperation between pastoralism and crop farming that were practiced for many generations, but which are now hidden beneath the media headlines of violence and conflict.<sup>247</sup>

## 4.3 Middle East and North Africa

The Middle East and North Africa (MENA) region is a vast area of nearly 9 million square kilometres, home to 420 million people from 20 countries across two continents along the Mediterranean Sea, Red Sea, and Persian Gulf. Rangelands cover at least 303 million hectares (excluding deserts) ranging from the Dead Sea depression (417 metres below sea level) to Mount Damavand (5,610 metres above sea level).

The region is predominantly comprised of dryland ecosystems, characterised by Mediterranean arid and semi-arid climates, low and erratic rainfall, and large deserts and hyper-arid zones.<sup>248</sup> It is the most water scarce region in the world and highly vulnerable to drought and other climate change impacts. Dry forests, rangelands, and deserts predominate. Camels are highly adapted to these desert environments and play a crucial role in grazing ecosystems across the Middle East. Their ability to consume thorny bushes and coarse vegetation makes them effective grazers in harsh, arid landscapes. Arable land is scarce and occupies only 5 per cent of the region while rangelands occupy wide areas in most countries.

Livestock economies are strategic assets,<sup>249</sup> representing the primary form of rural savings for households and communities that help increase resilience and reduce vulnerability to external shocks,<sup>250</sup> while providing income for rural communities and for women in both urban and rural areas.<sup>251</sup> Sheep and goats are the most numerous, with over 150 million sheep and around 60 million goats. There are an estimated 22 million cattle, 24 million camels, 4 million buffaloes, 6 million mules and donkeys, and about 633,000 horses. Algeria and Iran have the most sheep (31.4 and 27.8 million, respectively), Iran and Yemen have the most goats (20 and 9 million, respectively), and Egypt and Iran have the most cattle (8.6 and 7 million, respectively). Small ruminants and camels graze the arid and semi-arid rangelands, while cattle are usually found in and around settlements and irrigated farms.<sup>252</sup>

Rangelands are communally or state-owned and normally grazed under prevailing religious and cultural traditions where access rights are often not clearly assigned to communities or tribes. Rangeland governance systems vary across countries, combining state, customary, and religious law with a mixture of private, public, and communal ownership. Historically, property

rights have coupled Islamic principles and customary laws with government commitments to improve tenure security, but a high degree of uncertainty and insecurity remains. Nevertheless, traditional governance mechanisms (e.g., Agdal in Morocco and Tunisia, Qoroq in Iran, Hima in Syria, Jordan, and the Arabian Peninsula) are still prevalent in the MENA region and serve to regulate access to grazing lands with set-asides and seasonal bans. They are among the oldest indigenous institutions related to the conservation and management of rangelands.

### Revival of Traditional Best Practices for Rangeland Restoration under Climate Change<sup>253</sup>

The International Centre for Agricultural Research in the Dry Areas (ICARDA) conducted research on the impact of grazing on rangeland health during favourable years. The analysis concludes with a set of criteria to determine whether a pasture should be opened for grazing or not. ICARDA's recommendation, based on this analysis, was to support high-intensity, short-duration opportunistic grazing. As this approach was closely aligned with the traditional Agdal and Hima systems, it also supported local stakeholders to collaboratively determine the timing, location, and extent of grazing activities based on their skills and knowledge. The findings prompted institutions, like the Office of Livestock and Pastures in Tunisia, to change their approach, shifting from the strict enforcement of livestock exclusion periods to a decentralised decision making process based on the criteria set out. This approach shows considerable promise and could be upscaled to reach around 2.5 million hectares of communal and private rangelands in Tunisia, with significant potential for similar agroecological systems in the MENA region.<sup>254</sup>

Addressing the challenges of rangelands and pastoralism in the MENA region require coordinated actions that are appropriate to the biophysical and socioeconomic contexts for each production system and their specific management practices (Table 10).

Currently, the MENA region lacks coordinated action to address rangeland challenges. However, international initiatives, such as the Great Green Wall,<sup>255</sup> the WeCAN community, and project HERD,<sup>256</sup> are advancing SRLM and restoration activities with financial and technical support. FAO and others are recommending the revival of agroforestry strategies to avoid further degradation and improve land stewardship.<sup>257</sup> Accordingly, several MENA countries have enacted policies and state measures to overcome these challenges by enforcing existing pastoral and rangeland laws, updating governance institutions, and fostering participatory, multistakeholder platforms. The MENA region is leading the recovery of traditional rangeland management systems, such as Hima and Agdal, implementing silvopastoral and agroforestry schemes, promoting diversification and multifunctionality, and employing other pastoralist management tools (e.g., mobility, multi-species herds, improved value chains).<sup>258</sup>

## National approaches

### Morocco

Morocco has 53 million hectares of pastoral land, of which nine million are in forests.<sup>259</sup> The country hosts a variety of terrestrial ecosystems, making it one of the most diverse in the Mediterranean region.<sup>260</sup> Rangelands, the main source of income for pastoralists in arid or semi-arid zones, have been increasingly affected by urban expansion, large-scale plantations, desertification, climate change, and pollution. In the southeast of the High Atlas and throughout the Lesser Atlas Mountain ranges, rangeland degradation has generated tension and conflict.<sup>261</sup>

The government is trying to address this situation through an evolving legal framework targeting silvopastoral sector benefits, drawing on the experience of forestry development and pastoral improvement projects. Morocco's silvopastoral strategy establishes principles and general rules that govern forest and pastoral areas and the mobility and management of grazing livestock.<sup>262</sup> A national consensus on the silvopastoral sector is reflected in state-led coordination and multistakeholder consultations which contributed to the development of the strategy. However, practical applications of the strategy and the development of a legal framework is subject to many social-ecological constraints. Access to forests, which is only permitted to pastoralists under certain circumstances, is one key constraint. "Use-rights holders" is a customary right for tribes and communities linked to forest domains; these special entitlements include the right to graze their domestic livestock but not to cut trees or branches. However, in many cases, these rights are not respected or enforced.



**TABLE 10**  
**Challenges and strategies to improve pastoralism in the MENA region**

Challenges		
Policy, institutions and tenure	Socioecological	Technical and knowledge
Unfair and misguided allocation of land tenure and access rights	Weakening of pastoralists' identity and sense of ownership	Lack of supporting research, extension and technical support
Inappropriate rangeland management units	Limited investment and inequitable access to credit	Lack of reliable data on rangeland and pastoralism
Absence of state action	Inadequate markets, facilities and information	Low productivity and seasonal feed availability
Weakening and disintegration of traditional institutions	Conflict over lands	Lack of integration of indigenous knowledge
Lack of recognition of customary governance and land rights	Absentee livestock owners	Lack of impact assessment of policies and plans on rangelands
Forced and induced sedentarisation	Improper delivery of services to mobile people	Lack of economic research on pastoralism, food security, etc.
Nationalisation of natural resources	Conversion, fragmentation, and degradation of rangelands	Loss of local livestock breeds adapted to climatic hazards/risks
Limited participation of pastoralist communities	Harsh climatic conditions, climate change, and drought	Disease outbreaks

Strategies		
Policy, institutions and tenure	Socioecological	Technical and knowledge
Generate a supportive legal framework	Improve financial and insurance tools	Increase research, extension, and technical support
Secure land tenure and the ensure the allocation of access rights	Adapt markets and value chains	Enhance information and monitoring in the field
Strengthen traditional institutions and governance systems	Solving existing conflicts	Co-construct integrated knowledge and training
Coordinate state action and bodies	Support the participation of communities and stakeholders	Promote best management practices
Provide adapted services	Build social capital	Prevent and address outbreaks and disease
Stop conversion of rangelands	Support adaptation to climate change	Promote the role of local livestock breeds

**Collaboration of the Jmaâ (tribal council), Douar Associations, Local Authorities and Foresters<sup>263 264</sup>**

The Jmaâ, the traditional institution that organises a douar or village of mobile pastoralists, traditionally manages pastoralist use of local rangelands for grazing within specified limits and agreements with other douars. Although the authority of the Jmaâ is usually acknowledged at the local level, the lack of state recognition has often led to the abuse or over exploitation of rangeland resources. In the case of the douar Taouraoute, a village association was created to have a more formal role in the management of local resources and the power to enforce disciplinary actions for malpractice at the local level.

This initiative has promoted close collaboration between the Jmaâ and the douar association while also strengthening their legal status and enforcement capacities. The douar association acts as an interface between the Jmaâ, the local authority, and foresters, ensuring that management decisions are made at the local level. The Jmaâ assembly limits the forest grazing rights of outsiders and absentee owners, and can establish rules, such as banning the cutting of branches to feed livestock. With support from the Ministry of Agriculture, Fisheries, Rural Development, Water and Forests, the douar association is legally authorized to communicate with foresters and local authorities and deputised to issue fines for trespassing or non-compliance.

## Jordan

Jordan is an arid country with 90 per cent of its 90,000 square kilometres covered by rangelands. The country is divided into three geographic zones: the Jordan Valley, the Highlands, and the Badia which receives less than 200 millimetres in annual precipitation and consists primarily of rangelands.

Livestock contributes to about 55 per cent of agricultural production, with sheep and goats the predominant livestock species. The animals are primarily fed by a mix of crop by-products, planted fodder, and barley, as grazing opportunities decline in degraded areas and during extended droughts.<sup>265</sup> Pastoralism is the most common activity in the rangelands, traditionally practiced by the Bedouins. Camel production was dominant until the 1940s, which then shifted rapidly to sheep and goats. Bedouin tribes practice a traditional land management system (Dirah) covering the entire area throughout which a group travelled and employing a grazing system (Hima) which regulates grazing and resting periods.<sup>266</sup> The Government of Jordan began to promote the sedentarisation of Bedouin herders in the 1960s, declaring rangelands as state-owned and permitting open grazing. Border consolidation, diminishing rights, new land uses, and climate impacts have all contributed to land degradation, to the extent that most livestock producers now largely depend on fodder.<sup>267</sup>

The government has been active in promoting the sustainable use and restoration of rangelands. The national rangeland strategy (2013–2014)<sup>268</sup> was developed in cooperation with IUCN and relevant stakeholders, targeting the underlying causes of degradation and promoting SRLM through improved vegetative cover, water management, ecosystem restoration, and pastoralist mobility. This strategy was awarded the Future Policy Bronze Award 2017 by the World Future Council in partnership with the UNCCD.<sup>269</sup> More secure land rights facilitated the creation of producer cooperatives and helped reinstate the tradition of Hima.<sup>270</sup> Recently, the Aligned National Action Plan to Combat Desertification<sup>271</sup> has initiated restoration projects in degraded Badia areas.

### Watershed Rehabilitation to Restore Degraded Rangelands in the Jordanian Badia<sup>272 273</sup>

This project subscribes to an integrated watershed approach to the restoration of Jordanian drylands. The design includes interventions that address the drivers of degradation and reinstate ecological functions to improve the provision of ecosystem goods and services. Key measures include controlling gully erosion, revegetating gully plugs,<sup>274</sup> and creating micro-catchments for water harvesting in the upstream Vallerani System<sup>275</sup> and floodplain Marabs system.<sup>276</sup> Marabs is an advanced technology that creates compartments for flood-irrigated crop farming, transforming eroded gullies into fertile patches of land. These patches increase water retention, reduce soil erosion, and trap nutrient-rich sediments, including soil organic carbon. The project is generating economic benefits with crop farming interventions in the watershed, while slowing land degradation processes and reducing other pressures on the dryland ecosystem. It points to a more sustainable model for vulnerable uplands, which are less fertile and prone to soil erosion. The restoration of these upstream micro-catchments also increases biodiversity through the emergence of dormant seed which can be complemented by adapted seedlings.

## Egypt

Egypt encompasses one million square kilometres of mostly arid and desert land. Its 80 million inhabitants live and work in only 4 per cent of the country, concentrated along the Nile River and its fertile agricultural lands. Arable land is mostly irrigated, with agropastoralism practiced by both small and large farmers along the Nile delta.

Rangelands are typically at the margins of these farmlands and in desert environments used by semi-nomadic and nomadic pastoralists. Egypt raises 8.6 million large ruminants (cattle and buffalo); goats and sheep, of which there are 3 million each, are raised mainly in Upper Egypt, the Nile Delta, and the desert rangelands. Nomadic pastoralists keep camels (1.2 million) under extensive management for milk, meat, and transport.<sup>277</sup> Currently, there are no policies that directly support pastoralism nor are there specific strategies and action plans for SRLM and restoration. However, some pioneering initiatives have been rolled out and continue to deliver positive outcomes.



### Matrouh Resource Management Project<sup>278 279</sup>

The Matrouh Resource Management Project (MRMP) promotes participatory planning and the sustainable management of rangeland resources in the Matrouh Governorate of Egypt. It pilots Grazing Management Units to manage rangelands, improve practices, reduce tillage, lower stock numbers, and fertilise with animal and green manure during seeding. These Units engage mobile herders, agropastoralists, and rural communities to provide their firsthand knowledge to improve rehabilitation efforts. Led by the Danish Refugee Council, with funds from the GEF and World Bank, local Project Coordination Units implement the project which supports indigenous organisations and local communities whose livelihoods are dependent on land resources. A preliminary household survey led to the drafting of community action plans and agreements for three years of implementation. The project demonstrated considerable economic benefits in terms of water harvesting and the increased productivity of oilseeds, vegetables, and barley. Fodder and shrub plantations significantly reduced animal feed costs for about 40 per cent of the beneficiaries. Women implementing small income-generating projects for poultry production generated net benefits of around USD 80 per production cycle of 20 chickens. The Grazing Management Units has been complemented with two additional initiatives: the Healthy Ecosystems for Rangeland Development (HERD) from 2011-2017 and the ongoing project Promoting Resilience in Desert Environments (PRIDE) systems in Matrouh Governorate from 2020-2027, focusing on pastoralist policies, economic support, and recovery of the Hima system.

### Iraq

Iraq has a surface area of 430,000 square kilometres, 90 per cent of which correspond to rangelands which are government owned but managed under customary rules embraced by local communities. In 2011, Iraq had 7.7 million sheep, 1.4 million goats, and 58,000 camels.<sup>280</sup> Pastoralists typically own small flocks (fewer than 100) which are typically moved upland during the wet season. Rangeland degradation is extensive in the country. The Government of Iraq initiated action for SRLM within the Agriculture Reconstruction and Development Program, with the support of the United States Department of Agriculture. This rangeland programme aims to balance the diverse economic, cultural, and social needs with the preservation of Iraq's rangelands.<sup>281</sup>



### Building Capacities for the Sustainable Management of Natural Pastures

This joint initiative between the Government of Muthanna in the Samawah Desert, educational institutions, and other stakeholders aims to promote capacity building and develop skills in rangeland management and rotational grazing. It seeks to restore pastoral ecosystems, provide forage and fodder, improve livelihoods, and protect dryland habitats. The initiative introduces guiding legislation for the protection and development of natural pastures, implements monitoring systems to provide data and information on their status, facilitates research on pastoralist production and genetic resources, promotes multistakeholder platforms, and raises awareness of the broader public. With a total budget of USD 10 million, direct actions (e.g., nurseries to propagate seeds and seedlings, the provision of agricultural machinery) target Bedouin communities, mobile herders, and small farmers as well as consumers, decision makers, politicians, and donors.

Other countries in the MENA region have also promoted strategies and programmes to protect and restore rangelands and promote pastoralism and extensive livestock farming. The Arab Centre for Studies of Arid Zones and Dry Lands (ACSAD) coordinates an initiative on rangeland management that aims to balance grazing animals and the productivity of pastures through a scientific approach, including field measurements and monitoring, the development of appropriate technologies, and the selection of plant species and locations for revegetation and rangeland improvement.<sup>282</sup> Relevant information is being collected and published for the benefit of the MENA region with an integrated vision of pastoralism that can be integrated into agricultural and environmental policies.

### Land Degradation Neutrality in the Middle East and North Africa

More than one half of all land and one quarter of arable land in MENA is considered degraded, with estimates rising from 40 per cent in 1991 to 70 per cent in 2012. In 2012, an estimated 20 per cent of the population lived on degraded lands, mostly in marginal areas with poverty rates of up to 50 per cent.<sup>283</sup>

Although interrelated factors are contributing to rangeland degradation, water scarcity, climate change, and extreme events (e.g., drought, wildfires, landslides, sand and dust storms) are driving the negative trends in rangeland health. Shortsighted land and water management practices, insecure land tenure, weak governance, and violent conflicts come together to fuel degradation and forced migration. Millions of refugees and displaced people have abandoned their lands due to the loss of soil and water resources, causing an exodus with serious economic and political implications that affect the region and the world.

Several MENA countries have highlighted the important role of rangelands in both their LDN targets and Nationally Determined Contributions (NDCs). These commitments include special consideration of silvopastoralism to strengthen the contribution of rangelands to climate adaptation and mitigation. Some countries have successfully rehabilitated large areas of rangeland; however, long-term success will depend on the effective management of limited water resources. In the past two decades, numerous projects and programmes, including multi-country and long-term initiatives (e.g., Great Green Wall) and smaller initiatives (e.g., Acacias for All<sup>284</sup> in Tunisia), have put a spotlight on the urgent need to reduce and reverse land degradation in the MENA region.

## Discussion

The MENA region is one of the most vulnerable to desertification, land degradation, and drought. Many SLRM and restoration initiatives focus on key development issues in the rangelands, from climate change adaptation policies and the impact of migration trends to partnering with traditional institutions, limiting overgrazing, and improving water management. Some countries in the region are at the forefront of state-led action to address rangeland health in the Global South.

Social and demographic trends, specifically forced migration, are putting unprecedented pressure on rangelands and pastoralist communities. Men leave in search of better economic opportunities, while women and youth stay behind often without the legal and financial tools to manage the land or even their households. This lack of agency and heightened vulnerability increases poverty and marginalisation in many already vulnerable population groups. There are a number of traditional institutions sustainably governing and managing rangelands that are making a remarkable contribution to SRLM and restoration outcomes (e.g., Hima, Agdal), but which still require more recognition and support.<sup>285</sup> While cultural identity issues are well recognised, the economic and social value of livestock is often overlooked in MENA region. For example, projects tend to neglect that pastoralists will invest their savings in livestock as it is considered more stable and secure than cash. This is an important understanding that will influence project design and success.

Overgrazing is a major concern in pastoralist initiatives as it is considered a main driver of land degradation in the region. One misconception is that supplementary feed at subsidised prices is a solution to reduce overgrazing. On the contrary, this often leads to overstocking and immobility which is the root cause of land degradation. Overgrazing is typically caused by animals confined to limited patches of land (whether by fences, water availability, shelter, or production needs) and not by mobile grazing animals even if the latter are more numerous. Rotational grazing is one proven technique that can support higher densities of livestock while improving ecological functions and services.<sup>286</sup> Carefully planned investments and innovative financial tools can be employed to support locally adapted, mobile, rotational approaches to safeguard the health and productivity of the rangelands. Finally, integrated water resource management is a critical tool for enhancing SRLM and restoration outcomes. The MENA region has promoted notable projects and programmes targeting water harvesting and use in rangelands, which have the potential to be replicated in other regions and encourage a pastoralist-friendly approach to water management.

## 4.4 Central Asia and Mongolia

The Central Asia and Mongolia (CAM) region hosts some of the most striking rangelands in the world, from great deserts, such as the Gobi, Karakum, and Kyzylkum, to the high mountain ranges of the Altai, Tien Shan, and Pamirs, and the wide steppes, foothill plains, and temperate grasslands.

As rangelands account for 60 per cent of the total area, pastoralism is a fundamental economic activity in the region. Livestock herding accounts for between 10 and 45 per cent of national GDP in CAM countries and supports the livelihoods of nearly one third of the region's population.<sup>287</sup> Over 171 million herds graze these rangelands which are characterised by high temporal and spatial variability of resources that require seasonal livestock mobility. Mobile pastoralism is the only viable agricultural activity in these arid lands,<sup>288</sup> which in some cases, can be complemented by agropastoral systems where conditions allow. Both production systems were historically governed by



customary property rights or more recently collectivised state-managed systems. Today, long-distance mobility and seasonal transhumance are usually only available to wealthy, large-scale producers, while poorer pastoralists adapt by pooling community labour, practicing agropastoralism, or diversifying their income through off-farm work.<sup>289</sup>

The collectivisation process in some CAM countries (especially the former Soviet republics but not Mongolia) challenged the institutional and customary frameworks of pastoralists by promoting sedentarisation or forced settlement. Some pastoralist collectives from Mongolia and other areas have continued to herd in traditional ways, demonstrating that their knowledge and skills can be an effective means to achieve SRLM and restoration outcomes. The fall of the Soviet Union triggered a series of national de-collectivisation processes, transferring livestock ownership and control over rangeland resources to families and private owners as part of a transition to more open economies.

This transition is still underway in most countries, with some shifting their approach to encourage opportunities for investments targeting the rangelands. As the demand for pastoral products increases so do producer incomes from the sale of meat and dairy products as well as value-added and certified sustainable commodities, such as cashmere and wool.<sup>290</sup>

Land governance and tenure security have been key determining factors in the choice of management practices in the CAM region. Traditional common ownership regimes, with semi-governed open access, can often be the most environmentally and socially appropriate governance regime. The accelerating trends in rangeland degradation have forced policymakers to concentrate on formal legislation for the management of grazing lands, yet authorities, donors, and investors still tend to prioritise private rights over collective institutions (Table 11).

**TABLE 11**  
**Summary of legislation regulating pasture access in the CAM region<sup>291</sup>**

Country	Land legislation		Subsequent pasture-specific legislation	
	Law	Provision	Law	Provision
<b>Kazakhstan</b>	Land Code 2003	Leasing for 49 years or purchase	Law on Pastures 2017	Unclear, while by-laws remain undeveloped
<b>Kyrgyzstan</b>	Government Resolution 360 (4 June 2003)	Leasing for up to 49 years by public auction	Law on Pastures 2009	Common property regime
<b>Tajikistan</b>	Land Code 1996 & Law on Dekhan Farms 2009 National Development Strategy (NDS) 2006–2015 Poverty Reduction Strategy 2010–2012 (PRS III)	Leasing or permanent heritable use	Law on Pastures 2013	Common management, individual leasing and privatisation all possible
<b>Uzbekistan</b>			Law on Pastures 2019	
<b>Turkmenistan</b>	Presidential decree June 1995; Land Code 2004	Pasture managed by state enterprises, often unregulated in practice	Law on Pastures 2015	Regulated leasing by individuals or groups
<b>Mongolia</b>	Land Law of Mongolia (1994, 2002)  Law on Environmental Protection (1995) and update (2012)  Forest Law (2007) and update (2012)  Green Development Policy (2014)  Sustainable Vision-2050 (2020)	Herder groups can use winter and spring grazing areas  Herders can form "nukhurlul"  Herders can form forest "nukhurlul" with updated rights  Payment incentives for ecosystem services  Improve legal regulations for rangeland management	Law on Livestock head tax (2021)	Grazing land users are subject to paying fees per livestock head

In this century, there have been major policy adjustments, and several CAM countries are now progressively adopting and implementing rangeland strategies that are more supportive of pastoralists and their livelihoods. Mongolia, championing the IYRP 2026 and its implementation, has made significant advances in the recognition of herder communities and the allocation of communal management contracts. Other countries in the region have appealed to multilateral and bilateral donors and private sector investors to support projects and programmes focused on rangelands and pastoralists.<sup>292</sup>

## Regional approaches

There are several regional projects and programmes on LDN, SRLM, and ecosystem restoration that are active in the CAM rangelands promoting collaborative approaches to natural resource management.

### Resilient Landscapes in Central Asia<sup>293</sup>

Resilient Landscapes in Central Asia (RESILAND CA+) promotes investment and economic activities that target landscape restoration and resilience, especially through green jobs, fair wages, and diversified activities that further ecosystem restoration objectives, including in transboundary areas. The project design includes the creation of a regional framework to finance development initiatives, including baseline analyses, technical support, and investment for landscape-scale implementation. This framework is complemented by a Regional Exchange Platform for high-level dialogues and an online regional database. Together, the framework, platform, and database can inform and support the harmonisation of land policies and planning, particularly on transboundary landscape management. RESILAND CA+ receives technical and financial assistance from the World Bank with support from the GEF, Central Asia Water and Energy Program (CAWEP), The Global Partnership for Sustainable and Resilient Landscapes (PROGREEN), WAVES, and the Program on Forests (PROFOR) multi-donor trust funds.

### Regional Innovations for Diverse Tenure Systems of Pastureland in Central Asia<sup>294 295 296 297</sup>

This initiative collects, tests, implements, and promotes community based management arrangements between pastoralist communities and local governments in the CAM region. In the early 2000s, Mongolia opened the door to recognising and registering rangeland communities (nukhurlul) as part of a national effort to support and enhance community based management. Over 50 herder communities in three Mongolian ecosystems implemented and tested these arrangements, with support from Canada's International Development Research Centre,<sup>298</sup> these were upscaled to other communities with support from the JASIL Association and the International Land Coalition (ILC).<sup>299</sup>

From 2014 to 2020, the initiative expanded and the Central Asia Pastoral Alliance developed adapted tenure systems for rangeland projects and programmes, giving birth to the ILC Asia Rangeland Initiative<sup>300</sup> and the Indigenous and Community Conserved Areas (ICCA) Territories of Life.<sup>301</sup> These new tenure arrangements are based on traditional governance, established upon kinship relationships, and combined with common land sharing through evolving community based rules.<sup>302</sup> This security allows communities to invest in the diversification and expansion of their economic capacity, including engaging with processing, marketing, and enhanced value chains for meat, dairy, sustainable fibre, forest products, ecotourism, etc.<sup>303</sup>

Key results include improved co-managed rangelands, land tenure security, and extensive stakeholder engagement. Over 1,000 Rangeland Agreements have been signed by Pasture User Groups (PUGs) covering 60 million hectares of rangeland. In Mongolia, there are over 1,500 PUGs involving 80,000 herders and 90 cooperatives in the 18 provinces (*aimags*).<sup>304</sup> In Kyrgyzstan, all 454 pastoralist communities and 9 million hectares were involved. In Kazakhstan, herders from 22 areas received recognition from the government for the collective use, lease, and ownership of their pastoral lands. In Tajikistan, over 28 Pasture User Unions (PUUs) developed pastureland use plans. In Uzbekistan, over 20 PUGs and associations participated in the initiative.



## National approaches

### Tajikistan

Tajikistan has 3.3 million square kilometres of mountain pastures, comprising 87 per cent of its total land area.<sup>305</sup> Summer pastures in the uplands are used between June and August; winter pastures are in the valleys; and pastureland in and around villages are used throughout the year.

Agriculture is the main source of livelihood, supporting 50 per cent of the country's population. In the early 1990s, livestock production shifted from an intensive, state-supported system (based on winter feed distributed from centralised sources) to one that solely relies on rangeland resources for animal nutrition.



This radical shift drastically reduced performance and income, triggering increased feed and forage demand, and further disrupting traditional management practices.<sup>306</sup> The latter remains a critical production strategy for poor rural households, with 50 per cent of the population living below the poverty line, up to 78 per cent in the Khatlon region.

### **Livestock and Pasture Development Project<sup>307 308</sup>**

The Livestock and Pasture Development Project (LPDP-II) is financed by IFAD and the Government of Tajikistan. The overall goal is to reduce poverty in the Khatlon region by increasing the nutritional status, climate resilience, and productive capacity of pastures and livestock managed by poor rural households. The project is based on institutional development through the establishment of Pasture User Unions (PUUs) at the local level, Pasture User Associations (PUAs) at the district level, and a Pasture Management Trust at the national level. The pasture law represents the main legal framework for these institutions and its revision is a major achievement of the project, strengthening and securing the legal status of PUUs. PUUs comprise an executive body (Pasture Committee with a minimum of 30 per cent female representation), and an assembly whose decisions require the participation of 80 per cent of the households involved. Each PUU develops their Community Livestock and Pasture Management Plans which help to secure land rights and facilitate common pasture management and rehabilitation. The 197 new PUUs have proven to be a cost-effective way to implement SRLM. Other groups, such as Common Interest Groups and Women's Income Generating Groups, were also established to facilitate additional economic activities.

Project implementation started in 2016 following the completion of the IFAD guidelines. Women and vulnerable female-headed households were prioritised through the provision of training and livestock packages. These benefited 261 women's income-generating groups comprised of 1,559 vulnerable women engaged in beekeeping, turkey breeding, milk processing, and complementary activities. The project improved the nutrition of 18,000 poor households through the increased consumption of meat and dairy products. Training to improve PUUs sustainability included the introduction of windbreaks composed of pistachio trees and other valuable species, the use of Groasis waterboxx,<sup>309</sup> and rotational grazing.<sup>310</sup> The Steering Committee supported implementation through the provision of policy guidance, collaboration, and a dedicated management unit, run by the Ministry of Agriculture and a Food Security Committee. Facilitators oversaw the capacity building of community organisations. Around USD 24 million (IFAD loan of USD 8.7 million and grant of USD 8.7 million, Adaptation for Smallholder Agriculture Program grant of USD 5.0 million, government contribution of USD 0.5 million, and co-financing by beneficiaries of USD 1.4 million) were invested in the project.<sup>311</sup>

## **Kyrgyzstan**

Agriculture in Kyrgyzstan employs 29 per cent of all labour in the country, mostly in small-scale food production. Over 400,000 business units and over 700,000 rural households produce more than 95 per cent of the total agricultural output.<sup>312</sup> The traditional practice of nomadic pastoralism remains. There are 375,000 small family farms in Kyrgyzstan of which about 80 per cent keep animals in small-scale farmsteads, with half directly or indirectly related to nomadic pastoralism. While the government is implementing a national project to support livestock and pasture development, Kyrgyzstan's pastures are usually administered by the producers themselves. The Nomadic Livestock Keepers' Development Fund represents small-scale livestock keepers. The case studies presented here are like other experiences in the region, focusing on local institutions to improve rangeland governance, as demonstrated by the Central Asian Mountain Partnership (CAMP) Alatau in Bazar-Korgon and other districts.

### **District Pasture Commission<sup>313</sup>**

District Pasture Commissions (DPC) are established under the District State Administration to conduct participatory management, protect natural resources at the water basin level, and decide on rangeland management issues. These decisions are mandatory under state authority and executed by Pasture Committees (PCs) at the local level. The DPC coordinates and monitors plans of the different PCs. Rangeland users also benefit from the mobilisation of resources for the construction of infrastructure (e.g., bridges for cattle drives). Annually, the DPC develops a participatory common action plan that establishes the start and end dates of the grazing season and ensures the equitable access and distribution of pasture areas. DPCs also help resolve conflicts and play an important role as multistakeholder platforms disseminating information, coordinating actions, and mobilising financial resources.

Inequities in the allocation of pasture areas can lead to acute feed shortages and force affected local governments to lease additional pastures at high prices, which in turn causes conflicts which are exacerbated by growing livestock stock numbers. DPCs manage these conflicts and balance trade-offs as well as the supply and demand of pastures under a sustainability lens. CAMP-Alatau accompanies and facilitates DPC work until they become self-sustaining typically within 2 to 3 years. This approach was piloted under the project, "Biodiversity conservation and poverty reduction through community-based management of walnut forests and pastures in southern Kyrgyzstan" supported by GIZ.<sup>314</sup> CAMP Alatau, as the implementing partner, provides human resources, experience, and knowledge to support the mapping of pastures,<sup>315</sup> and other technical issues. CAMP Alatau has also developed a mobile application "Monitoring of Pasture",<sup>316</sup> which offers effective pasture monitoring that can help ensure sustainable and equitable management, benefitting both the environment and local communities. Data are collected on key indicators to help inform management decisions and plans by identifying degraded pastureland and appropriate response measures.

### Empowering Vulnerable Communities Living Near Forests to Improve Food Security<sup>317</sup>

This project develops participatory forest initiatives by transferring management functions to local communities. Capacity building and community-based rangeland management institutions facilitate pastoralist and near-forest communities to improve management practices and increase their access to resources, while providing monitoring and feedback for rangelands. The project started with a baseline assessment, analysing access to forest resources, food and nutrition needs, and the potential of agroforestry models. The planning stage includes the design of joint forest action plans and preliminary business plans for community forestry. Pastoralists are engaged in the development of grazing plans and reserves that are managed by local communities. Nomads, other mobile pastoralists, and small-scale farmers are the primary beneficiaries. Financial resources and technical expertise come from government budgets, international organisations, and private donors. This initiative advocates for community forestry and agroforestry as viable options to increase food security and reduce poverty to address the root causes of malnutrition.

### Livestock and Market Development Program II<sup>318 319</sup>

This programme aims to improve livestock productivity and climate resilience, promote equitable benefit sharing, reduce poverty, and enhance the economies of pasture communities. It targets community based rangeland management planning<sup>320</sup> and vulnerability reduction, improved animal health services, market and value chain diversification and improvement, and pastoral resilience<sup>321</sup> through geospatial tools and policy recommendations.<sup>322</sup> IFAD programmes in Kyrgyzstan channel support through government programmes working with PUUs and other stakeholders. Every municipality has a PUU, which holds tenure rights so they can develop land, build infrastructure, and protect water points. They generate income from user fees and leases, and ensure sustainable use by scheduling grazing, regulating stocks, and establishing reserves. The project benefits 190 PUUs, covering approximately 380,000 households in a rural population of about 3 million people. With an investment of over USD 39 million, most goes directly to the beneficiaries in the form of matching grants, training, and technical assistance. Kyrgyzstan has developed this model of governance for community based SRLM because of the 2009 Pasture Law. The PUU model is also supported by IFAD in Tajikistan and Georgia, in collaboration with other partners.

## Mongolia

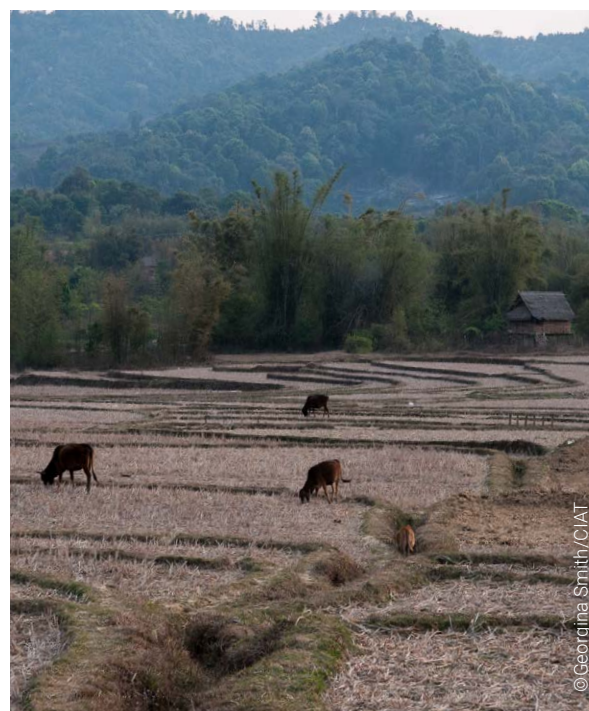
Mongolia spans 1,564 million square kilometres, with an average altitude of 1,580 metres above sea level. Over 70 per cent of the land area is comprised of rangelands,<sup>323</sup> which span ecological zones from high mountains to steppes and deserts. Almost 300,000 herders, approximately 10 per cent of the population, practice pastoralism herding over 71

million livestock, including sheep, goats, cattle, horses, and camels. The livestock sector produces almost 83 per cent of total agricultural output, an important component of the Mongolian economy, both in terms of GDP (13.0 per cent) and employment (25.9 per cent).<sup>324</sup>

Mongolian nomadic pastoralism has evolved in a context of risk and uncertainty, efficiently using scarce resources to produce food, manure, hides, and fibres. Transhumance pastoralists move between regular seasonal camps and distant pastures to better adapt to shock-prone environments (e.g., dzud occurring in 2023/2024 winter with catastrophic rates of animal loss)<sup>325</sup> and overcome climate, market, and disease risks. These risks and recurring hazards (e.g., sand and dust storms, drought) contribute to desertification and pose serious challenges to human and animal health not to mention the devastating loss of livelihoods and stress on the wider social-ecological system.

In Mongolia, rangelands remain state-owned but are primarily managed by community-based organisations, such as pasture user groups, community support groups (nukhurluls), and cooperatives, that guarantee exclusive rights to winter and spring camps. With a three-fold increase in livestock numbers over the past 20 years due to privatisation, rangeland health has suffered with 23 per cent of land experiencing varying degrees of degradation.<sup>326</sup> Mongolia has established a system which to date has produced two national assessments of rangeland health, providing critical insights and transferable lessons for rangeland monitoring throughout the world.

Additional initiatives in the CAM region illustrate other pathways and approaches to SRLM and restoration, such as the Central Asia Desert Initiative, implemented by the University of Greifswald, the Michael Succow Foundation, and FAO in Uzbekistan, which demonstrates the potential of silvopastoral practices to combat rangeland degradation.<sup>327</sup>



### Ensuring Sustainability and Resilience of Green Landscapes<sup>328</sup>

This project aims to improve rangeland management by building systemic capacity at the community level and promoting good practices. It seeks to reduce degradation threats to at least 300,000 hectares of rangeland and generate social and environmental benefits in over 2.4 million hectares of mountain pasture (Sayan and Khangai) and across southern Gobi landscapes by working with 25,600 stakeholders (50 per cent women) in the four target provinces (Aimags). The project supports existing organisations, such as Forest and Pasture User Groups (FUGs and PUGs), to integrate good management practices into their plans and agreements. The initiative promotes sustainable livelihoods and conservation strategies implemented by PUGs and FUGs, removing barriers, restoring rangelands and forests, enhancing the effectiveness of protected areas, and recovering key endangered species, such as snow leopards (*Panthera uncia*) and Argali sheep (*Ovis darwini*).

Implementation is based on participatory planning that supports SRLM practices and the nomadic way of life. The initiative has been funded with a USD 8 million grant from the GEF with an additional USD 39 million from the Government of Mongolia and a co-financing partner. A key achievement of the project is the establishment of the Mongolian Sustainable Cashmere Platform,<sup>329</sup> a multistakeholder and nationwide initiative to improve cashmere production under collaborative leadership. This platform works alongside the government to ensure a strong, coherent legal and institutional framework that promotes sustainable cashmere production and positions Mongolia as a global leader in the field. The Platform has been piloting value chain initiatives to develop and improve practices around sustainable cashmere traceability and certification processes.<sup>330</sup>

### Land Degradation Neutrality in Central Asia and Mongolia

The processes of land degradation in the CAM region are complex and have not yet been fully assessed and understood.<sup>331</sup> Some of the main drivers are related to de-collectivisation and agricultural intensification processes which have weakened land rights, converted rangelands, expanded irrigation schemes (that provide fodder for increasing livestock numbers), and increased grazing pressures, especially near settlements. Water management is a frequently overlooked factor, with issues such as overuse (to increase land productivity), poor water infrastructure, a lack of monitoring, and nominal technical capacity among water users.<sup>332</sup>

Recent attention on the rangelands tends to overlook pastoralist communities and their economies in favour of mining concerns and intensive farming schemes. In Kazakhstan and Turkmenistan, the recent exploitation of oil and gas reserves is reconfiguring national economies and policy agendas. In Tajikistan, Kyrgyzstan, and Uzbekistan, large-scale cotton, wheat, and horticultural projects have attracted increased investments in irrigation and rural settlements.<sup>333</sup> These developments are increasing water scarcity, soil erosion and salinisation while converting and further fragmenting rangelands to the detriment of pastoralist communities.<sup>334</sup>

Kazakhstan, Uzbekistan, and Mongolia have committed to achieving their LDN targets.<sup>335 336</sup> In 2018, under the framework of the Bonn Challenge, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan pledged to bring over 2.5 million hectares into restoration by 2030 and adopted the Astana Resolution to promote regional cooperation in combatting land degradation (Table 12).<sup>337</sup>

**TABLE 12**  
Global Restoration Commitments per country in 2020 in the CAM region<sup>338</sup> (hectares)

Country	LDN	Bonn Challenge	Restoration commitment Low	Restoration commitment Medium	Restoration commitment High
Armenia	73,500	500,000	500,000	536,000	573,000
Kazakhstan	571,429	1,800,000	1,800,000	2,371,429	2,371,429
Kyrgyzstan	120,000	323,200	323,200	463,200	473,200
Tajikistan	-	70,000	70,000	70,000	70,000
Uzbekistan	-	1,000,000	1,000,000	1,000,000	1,000,000
Mongolia	1,825,370	600,000	1,825,370	3,254,410	3,854,410

## Discussion

Currently, CAM is one of the hotspot regions in need of SRLM and restoration activities. The effects of global change drivers in the region were compounded by the fall of the Soviet Union in 1991, which deeply affected rural economies and livestock production systems and accelerated rangeland degradation trends. The CAM case studies show key strategic approaches to address this situation by improving land rights and tenure systems, using locally adapted breeds, synchronising grazing regimes and rangeland life-cycle rhythms, and recognising the role of mobility and the need for tailored investments to reverse current degradation trends.

As demonstrated, a crucial first action is to secure land rights and tenure so that long-term measures can be implemented by the land managers and their outcomes benefit local communities. Projects should aim to strengthen both the capacity and participation of local and traditional institutions in SRLM. Decisions endorsed by state and local authorities can offer clear pathways from planning to implementation. Collaborative and multi-actor platforms help integrate different interests and priorities to better coordinate and monitor rangeland actions.

Concerns about the design and application of rangeland initiatives remain. Addressing overgrazing, overstocking, and rangeland degradation with supplementary fodder may actually increase land conversion and water scarcity to produce fodder crops. Similarly, the promotion of exotic or improved breeds without a proper analysis (of their adaptability, robustness, or mobility aptitude) diverts attention from the need to protect and improve local, well-adapted pastoralist breeds, as recognised by the Sustainable Cashmere Platform.

Another important finding from the region: synchronising the number and rotation of grazing animals with ecological and meteorological cycles in the rangelands can be a key determinant of SRLM and restoration success. Mobile pastoralism and seasonal movements offer a viable approach to better preserve the health and productivity of rangelands. Accordingly, the management practices of nomads and transhumant people should be fully integrated into rangeland initiatives – flexible corridors, open-access rangelands, seasonal pastures, water access and other infrastructure to enhance livestock mobility.

Globally, there is a lack of rangeland-adapted economic tools that encourage sustained investment. The case studies from the CAM region point to several innovations that promote changes in value chains that can support SRLM and restoration activities. These initiatives can significantly improve incomes and need to be encouraged and upscaled, keeping in mind their accessibility to local communities. It is clear that other innovative financing mechanisms will be needed to sustain regenerative rangeland management activities when projects or programmes end.

## 4.5 Europe

European rangelands, as in other parts of the world, are the result of co-evolution between human communities and natural ecosystems. These complex land management systems are often embedded in mosaic landscapes of grasslands, croplands, woodlands, and settlements, which are closely interlinked and managed as social-ecological systems that support the provision of key ecosystem services.<sup>339</sup> Historically, traditional management involved planned grazing calendars and stocking rates, controlled shrub encroachment (using fire, mowing, and grazing), and other activities such as tree planting, hay storage, and built infrastructure. Today, the value of European rangelands and biodiversity habitats still very much depend on these management practices.<sup>340</sup>



European landscapes are undergoing change, reflecting global trends, regional processes, and national priorities.<sup>341</sup> The main drivers of rangeland degradation include urbanisation, land abandonment, shrub encroachment, agricultural expansion, and the development of renewable energy uses.<sup>342 343</sup> These pressures are context-specific and vary across the continent where land abandonment is highest in Eastern Europe, the Mediterranean, and the mountains, while agricultural encroachment is most evident in the lowlands.<sup>344</sup>

Statistics do not disaggregate by specific livestock production systems, a major knowledge gap that results in a lack of recognition and legal differentiation among producers. Animal products in Europe are increasingly supplied through intensive industrial systems which require fodder and supplementary feed. Preventing the further conversion of rangelands and upscaling sustainable use based on grazing and multifunctionality will be key to safeguarding European landscape values. Some have proposed a continent-scale plan to recognise and mainstream extensive livestock systems to help secure the multiple benefits and values in Europe's rangelands.<sup>345</sup>

### Regional approaches

In 2020, European Union (EU) countries used around 157 million hectares of land for agricultural production, 38 per cent of its total land area.<sup>346</sup> Around 34 per cent of this land is permanent pasture, including rangelands categorised as farmland, and 19 per cent is identified as woody pasture.

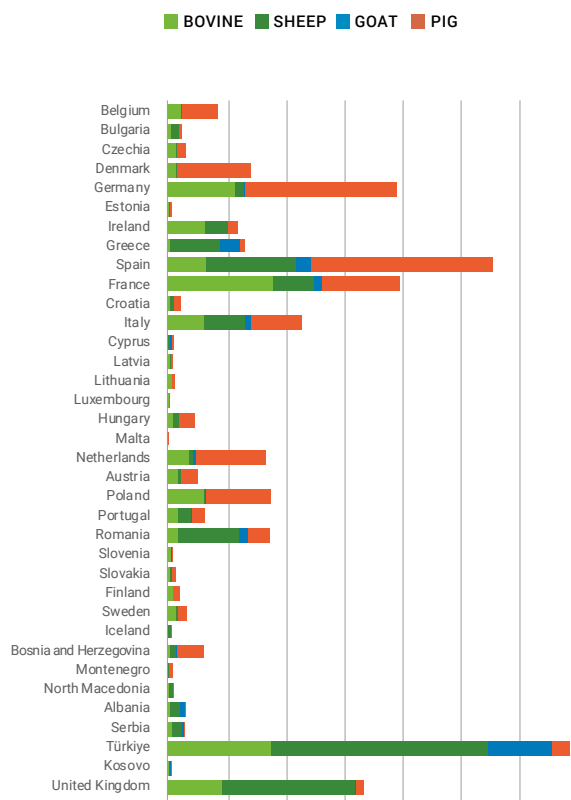
This is a relatively conservative estimate that does not include many woodlands and shrublands that are used in extensive livestock production systems.

The Common Agricultural Policy (CAP) is the legal framework supporting agricultural production and regulating produce markets in the EU. Financial support from the CAP is given to extensive livestock farming and pastoralism, but at levels that are not proportionate to their social and environmental benefits. As a result, pastoralism fails to compete favourably with other farming systems, and extensive livestock systems continue to be abandoned.<sup>347</sup> Currently, the CAP does not recognise pastoralism as a priority for production, rural development, or SRLM and ecosystem restoration.

Certain EU environmental policies provide nominal support for extensive livestock systems by explicitly recognising their role in nature-based solutions and biodiversity conservation. For example, the European Green Deal and "Farm to Fork" strategy focus on reorienting food production towards environmentally and climate-friendly practices, raising expectations for increased support to pastoralism. Likewise, the EU Forestry Strategy emphasises the value of agroforestry and silvopastoralism in afforestation and reforestation activities.<sup>348</sup> Nevertheless, farm economies continue to be driven by markets and the CAP which favour intensification and industrialisation.<sup>349</sup> The link between pastoralism and protected areas (e.g., Natura 2000) still needs to be fully operationalised<sup>350</sup> to formalise the role of pastoralism, its infrastructure and common grazing lands in protected areas and OECMs.<sup>351</sup>

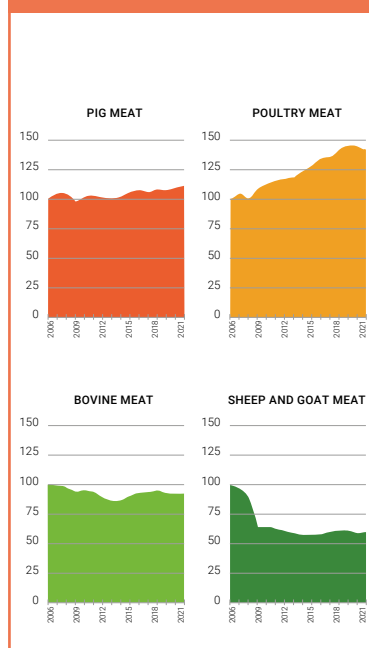
**FIGURE 14**

Livestock census in the EU27 and the United Kingdom<sup>352</sup>



**FIGURE 15**

Development of the quantity of meat production<sup>353</sup>



Support for pastoralism in Europe has increased in recent years. While some national organisations support pastoralism from a multi-actor perspective, regional coordination is still lacking. Initiatives, such as the European Forum on Nature Conservation and Pastoralism<sup>354</sup> and the European Shepherds' Network,<sup>355</sup> have spurred collaborative efforts along with EU programmes that finance pastoralism projects, such as Burren Life,<sup>356</sup> Life Regen-Farming,<sup>357</sup> Life Live-ADAPT,<sup>358</sup> Life Viva Grass,<sup>359</sup> H2020 funded (HNV)-Link,<sup>360</sup> Partnership for Research and Innovation in the Mediterranean Area (PRIMA) financing Pastinnova,<sup>361</sup> and Sustainable Approaches to Land and Water Management in Mediterranean Drylands (SALAM-MED). In 2021, the European Committee of the Regions<sup>362</sup> acknowledged the need for coordinated advocacy work to support extensive livestock farming at the regional level. The Declaration of Transhumance as World Intangible Heritage, and IYRP 2026 with its European Support Group, are helping to advance a regional approach. A more enlightened EU attitude towards pastoralism can have significant influence in raising awareness and reforming policies in European countries that are not members of the EU.

Grasslands account for 6 per cent, one-half of which includes dry grasslands on the islands and along the Alpine and Apennine Mountain ranges. Woody pastures occur in the central Apennines and other areas where traditional silvopastoralism used lopped branches and shrubs as supplementary feed.

Pastoralism and extensive livestock production are still common in some parts of Italy. This includes transhumance patterns characterised by seasonal mobility between lowland pastures and those in the highlands of the Alps or Apennines. Sheep and goats are typically raised in arid grasslands, while cattle are more abundant in the northern and central regions. Animal production has intensified in recent years, drastically reducing long distance livestock movements. Local or short distance transhumance is now more common, with livestock stabled during the winter and moved to mountain pastures in the summer. Truck-based, cross-regional sheep transhumance is still practiced to a limited extent in the northern Alpine, Abruzzo, Molise, and Apulia regions.<sup>366</sup>

### Sustainable Approaches to Land and water Management in Mediterranean Drylands<sup>363 364</sup>

Sustainable Approaches to Land and water Management in Mediterranean Drylands (SALAM-MED) is testing innovative technologies to improve grazing management and preserve ecosystem services in degraded areas of the Mediterranean. SALAM-MED assesses the effectiveness and sustainability of applying rotational grazing schemes in degraded silvopastoral systems by using innovative global positioning system (GPS) collars and virtual fencing technology. This is coupled with remote sensing-based modelling to balance grazing and prevent degradation. Rotational grazing approaches aim to improve efficiency, reduce management costs, and ensure flexibility in managing stocks to quickly respond to environmental changes. The project has facilitated an open dialogue between stakeholders to address sustainability and scalability challenges, define priorities, and promote consensual solutions. The SALAM-MED integrated approach combines a top-down process based on scientific knowledge, water management tools, and a bottom-up process of capacity building through social learning. Funded by PRIMA,<sup>365</sup> with a total budget of almost EUR 3 million, this project includes an awareness raising programme in partnership with FAO.

## National approaches

### Italy

Italy's forest cover encompasses one-third of its total 29 million hectares of land, including open forests and woody rangelands located on mountains and steep slopes. Arable land occupies approximately 47 per cent of the country after a decrease of 5 million hectares between 1961 and 2006. Permanent pastures cover around 28 per cent, primarily a result of cropland abandonment.



### Pasture Vulnerability and Adaptation Strategies in the Alps<sup>367</sup>

Pasture vulnerability and adaptation strategies to climate change impacts in the Alps (PASTORALP) is a programme built upon a multidisciplinary, participatory, and science-based approach. The initiative tested innovative methodologies to map pastoral resources, assess the impacts of climate change, and identify corresponding adaptation strategies.

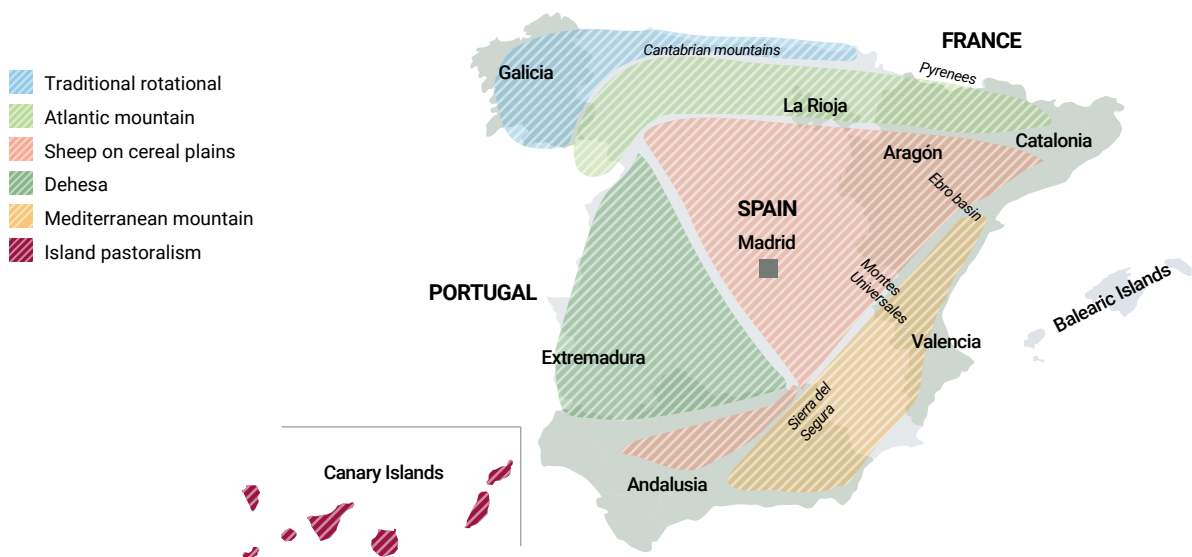
Funded by the LIFE EU programme with a total budget of over EUR 2 million, projects were implemented in two sites: Gran Paradiso National Park and Parc des Ecrins. Around 100 breeders and shepherds were interviewed on the management challenges of mountain livestock farming. Consultative workshops focused on current pastoral practices, including climate resilience and adaptation strategies that target feed production, water resources, and structural adjustments. These strategies were tested in pilot areas under participatory approaches and validated in subsequent workshops. The projects developed policy recommendations to guide innovative approaches to pastoral management, economic impacts, and social perceptions. They also served to strengthen cooperation between beneficiaries and public institutions.<sup>368 369 370</sup>

### Spain

The Iberian Peninsula, shared by Spain and Portugal, is a bright spot for European pastoralism. Spain is one of the most biodiverse countries in Europe and its rangelands reflect this diversity with a wide range of grasslands, woody pastures, open forests, and other potentially grazed landscapes. A significant portion of its territory (~ 44 million hectares) has the potential to be grazed at some time of the year. The dry season in the Mediterranean, coupled with cold temperatures in the winter in the centre and north, can lead to seasonal water scarcity which in turn influences traditional pastoral strategies.<sup>371</sup> The Iberian Peninsula is well-known for its agrosilvopastoral systems: the Dehesa in Spain,<sup>372</sup> the Montado in Portugal,<sup>373</sup> and many others.<sup>374</sup>

Extensive livestock systems in Spain overcome many social, economic, and environmental challenges through long and short transhumance, rotational grazing and herding, agropastoral systems, and robust local breeds (i.e., 146 native livestock breeds, including 46 cattle, 51 sheep, 22 goats, 21 horses, and 6 donkeys), many of which are at risk of extinction. A mix of land rights (e.g., individual, commons, public-dominion, state properties) and a rich cultural heritage are other characteristics which offer a wide range of options for SRLM and restoration initiatives (Figure 16).<sup>375</sup>

**FIGURE 16** Map of the main pastoral systems in Spain



In 2016, total livestock production in Spain reached a value of EUR 16,377 million, approximately 35 per cent of agricultural GDP and 1.7 per cent of total GDP. Livestock production has shown an overall pattern of growth in Spain since 1961. While the numbers of cattle, pigs, and poultry exhibit a constant upward trend, sheep and goats, the main species raised in pastoralist systems, have declined significantly in recent years. There are no official records of extensive livestock farmers or disaggregated farm data on pastoralism in Spain.<sup>376</sup>

Transhumance is still practiced in Spain, mainly by traditional pastoralists. Although there is no official data, the Transhumance in Spain: White Book estimated in 2012 around 30,000 cattle and 50,000 sheep and goats annually perform long transhumance between regions, with significantly higher numbers when short distance movements are included.<sup>377</sup> The Feast of Transhumance has been celebrated annually in Madrid for 30 years, and a consolidated support movement advocates for transhumant farmers. The role of transhumance in Spanish landscapes and culture has been promoted and highlighted; Spain is party to the application to the United Nations Educational, Scientific and Cultural Organization (UNESCO) to recognise transhumance as Intangible Cultural Heritage.<sup>378</sup>

The main asset to facilitate transhumance is the 125,000 kilometres of drove roads, occupying 450,000 hectares of land which have been legally protected since 1995.<sup>379</sup> Old transnational agreements and livestock routes still link Spanish pastures with those in Portugal, France, and Andorra. However, the legal framework needs to be updated to recognise and differentiate these extensive systems and provide for specific support schemes. The growing pastoralism movement has set the foundation to develop a new national strategy, including trademark and certification schemes for products from extensive livestock systems.<sup>380</sup>

### Spanish Platform on Extensive Livestock Farming and Pastoralism<sup>381 382</sup>

Pastoralism, agrosilvopastoralism, and other extensive livestock-based systems are deeply rooted in Spanish culture and history, providing multiple benefits in all three dimensions of sustainable development. The Spanish Platform for Extensive Livestock Systems and Pastoralism is promoting dialogue, knowledge exchange, advocacy, and collaboration. It consists of over 500 individuals and organisations, including farmers, conservationists, researchers, and other stakeholders. Meetings, workshops, and online communication tools connect extensive livestock farmers and their supporters to exchange information and work together. The platform produces technical documents,<sup>383</sup> advocates for pastoral policies, supports pastoralist organisations, and facilitates networking and pastoralist representation in international fora. It was created in 2013 with support from Entretantos,<sup>384</sup> a non-profit organisation that continues to facilitate the activities of the network. Governance of the platform is open and participatory.<sup>385</sup>

### Land Stewardship<sup>386</sup>

This initiative applies the Land Stewardship (*Custòdia Agrària*) approach to making food production compatible with biodiversity conservation. It promotes regenerative pastoralist practices, monitors results in terms of carbon capture and biodiversity, and engages many small farmers, landowners, consumers, and citizens. Land Stewardship usually starts with the participatory mapping of land management systems and farmer practices on the site area, focusing on biodiversity impacts. An agreement, designed collaboratively and adapted to local conditions, is signed between the stewardship organisation and the farmer. At the implementation stage, the organisation provides funds and technical assistance so that farmers can implement their part of the agreement. Farmers are also engaged in a network that monitors outcomes, exchanges experience, meets annually to identify needs, assigns resources, and plans for future actions. Farmers engaged in the programme demonstrate improved economic performance through fair and value-added prices for their products. Land Stewardship is attractive to local and small-scale production systems that are able to take advantage of the training and support offered.

Support to extensive livestock farming in Spain has established a variety of multi-actor alliances. One of the most interesting is Land Stewardship, which brings together farmers and conservationists under mutually supportive contracts to implement measures to conserve biodiversity and ecosystem services in both arable and range lands.





### Women Livestock Farmers Network<sup>387 388</sup>

The Livestock Farmers Network (*Ganaderas en Red* or GER) is a network of female extensive farmers, a first in Spain and Europe. The network strengthens the links between pastoralists and rangelands, acknowledging that the territory sustaining these women is also dependent on them. Most GER women come from small family farms in rural territories. As pastoralist women are often isolated, this network aims to establish a mutual support group where they can share feelings, veterinary issues, natural remedies, and market concerns. Its main objective is to give voice to herder women in a safe space where they are heard and respected. Together, the women manage an operation that has already achieved great advances, such as the convening of meetings with several government ministries, initiating collaboration, and attracting greater media visibility.<sup>389</sup> Their motto – “Invisible Alone, Invincible Together” – embodies a participatory network based on social capital, flexible online tools, shared governance, continuous training, and strong communication and advocacy plans. Annually, the GER operates with a budget of just EUR 40,000, pointing to its potential for replication to empower other pastoralist women, make their work visible, or to develop a network of networks linking territories and pastoralist women.

The application of new tools and technologies in the rangelands has been widely tested in Spain. New projects promote pastoralism to control vegetation under power lines and on renewable energy farms.<sup>390</sup> In many urban areas, pastoralists manage open areas and parks, and even former mining and industrial sites.<sup>391</sup> Numerous initiatives in Spain focus on pastoralism-driven wildfire prevention,<sup>392</sup> High Nature Value farming,<sup>393</sup> biodiversity habitat management,<sup>394</sup> and territorial food systems.<sup>395</sup> The use of GPS to monitor livestock<sup>396</sup> has been the subject of intensive research, including behavioural analysis to detect predators,<sup>397</sup> daily grazing patterns,<sup>398</sup> disease-driven movement alteration,<sup>399</sup> and virtual fencing.<sup>400</sup>

### Portugal

Portugal has a surface area of 89,000 square kilometres located in the southwest part of the Iberian Peninsula. The country has high bioclimatic variability, with a Mediterranean climate that is influenced by both the Atlantic Ocean and the continental mainland. Almost 40 per cent is agricultural land (20 per cent of which are pastures) and 38 per cent is forest land, including Montados and silvopastoral areas.<sup>401</sup>

Portugal has 2.2 million sheep across 52,000 farms, with approximately 80 per cent focused on meat production and 20 per cent on dairy production. There are around 423,000 goats across 32,000 farms, most of which consist of very small flocks.<sup>402</sup> In 2011, cattle were estimated at 1.5 million. There are two extensive cattle systems that still use indigenous breeds and traditional grazing techniques: one based on small herds of suckler cows in the north and centre, the other based in the Montados and large-scale farms in the South.<sup>403</sup>

In the 20th century, the state-run afforestation of common rangelands, wildfire suppression, and agricultural abandonment resulted in a sharp decline in mountain grazing and hay meadows. Rangeland forage productivity also declined with the loss of perennial grasses and the spread of invasive species. The false assumption that rangelands were unproductive and should be afforested pushed many pastoralists into poverty and put local breeds at risk, while dramatically increasing the risk of wildfire. Today, the Portuguese mountain rangelands are in a steady state with a low level of ecosystem service provision.

### LIFE Maronesa<sup>404</sup>

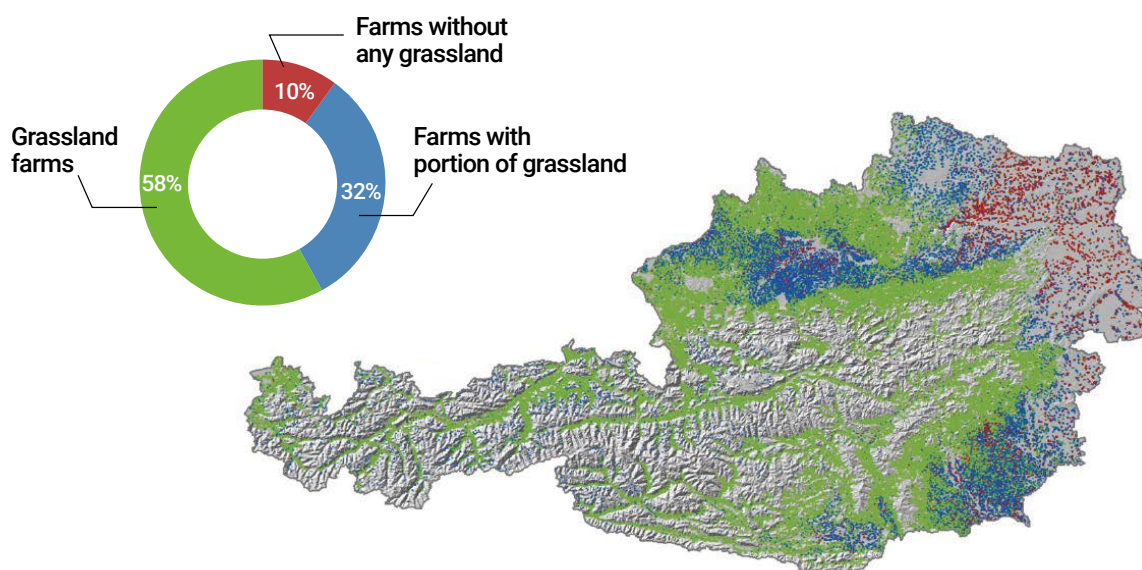
The LIFE Maronesa project aims to restore the productivity and biodiversity of private hay meadows and communal rangelands in the mountains of Portugal through improved plant nutrient cycling, management parameters, and herder incomes, while reducing wildfire risk. Technical improvements consist of acidity correction in hay meadows, restoration of shrub-encroached rangelands, and the use of prescribed fire, new water points, mobile mangers and cattle handling systems, GPS collars to reduce wolf predation, electric fencing, and rotational grazing, among other measures. The project is named after the Maronesa breed, an endangered local cattle breed, and is managed by a local rural development association (AguiarFloresta) with direct and indirect beneficiaries, including producers and common land-owning communities. The EU LIFE programme funds one-half of the total budget of EUR 2 million and partners co-finance the rest.

Science-based proposals are validated by herders. The baseline is carefully analysed and the project updates traditional technologies with the adoption of modern innovations (e.g., Temple Grandin cattle handling, GPS trackers, soil amendments, organic production). The combination of prescribed fire and herbivory pressure tends to increase plant cover and favour perennial grasses that are able to sustain more domestic herbivores.<sup>405</sup> Grass residues produce stable forms of soil organic carbon and are fundamental to the recovery of soil health. These mountain areas are becoming more productive and able to sustain more cattle for a longer period with fewer inputs, increasing herder resilience to market fluctuations. Pastoralists are empowered to manage their landscapes, balancing traditional practices and local knowledge with innovations that they themselves validate. The project has a web platform that allows stakeholders, government, and producers to visit the site virtually.<sup>406</sup>

### Austria

Located at the foot of the Alps, Austria is comprised of 84,000 square kilometres of land. Forests cover 42 per cent of its surface area and are increasing; in certain areas, forests cover up to 90 per cent leading to landscape homogenisation.<sup>407</sup> Farmland amounts to 3.2 million hectares, of which 1.4 million are arable land and 1.7 million are permanent grassland. Cropland in Austria has decreased over the last 50 years by 860,000 hectares while one-third of historical alpine grassland has become forested or converted into residential areas.<sup>408</sup> About 50 per cent of the total permanent grassland is used extensively with low stocking rates and is cut or grazed once or twice a year.<sup>409</sup>

**FIGURE 17** Map of grassland farms of Austria



Since almost 60 per cent of Austria's agricultural area is grassland, meat and milk production are significant activities. There are 1.9 million cattle raised by 55,000 farmers accounting for EUR 765 million in 2020 and representing 21 per cent of livestock production.<sup>410</sup> There are two main cattle farming systems: industrialised beef production, with feedlots in the lowland agricultural regions; and small dairy cattle farming in the mountane grasslands. Austria's Alpine regions host about 70 per cent of the 40,600 dairy farms, most of which depend exclusively on grazing, some under difficult and extreme conditions (Figure 17).

Sheep and goat farming in Austria has become increasingly important. In 2020, there were around 378,000 sheep and 82,700 goats on a total of 23,688 farms, mostly by part-time farmers. This sector is an important source of additional income for small-scale alpine farms.<sup>411</sup> Forest grazing is also an important but controversial activity. While grazing in public forests was a common traditional practice, it has been banned in certain areas to boost tree regeneration.

### Georgia

Natural pastures cover 1.9 million hectares or around 25 per cent of the land surface of Georgia. The pastoral system remains nomadic in some regions, with the use of high pastures in summer and lowlands in winter.<sup>412</sup> Most Georgian pastures are owned by the state and used under a regime of free access. While privatisation is a common trend in arable lands, montane and dry pastures have remained largely untouched by land tenure reforms. More secure tenure for pastoral and communal land has the potential to increase much-needed investments from users, donors, and the state.<sup>413</sup>

### Pasture-Innovations: EIP-Operational Group<sup>414</sup>

The European Innovation Partnership on Agriculture (EIP-Agri) provides a platform and funds Operational Groups to bring together different actors to advance innovation in the agricultural and forestry sectors. The Pasture Innovation Operational Group is dedicated to finding pathways to improve adaptive pasture management which is attracting renewed interest. These pastoralist models are targeted by the "Pasture Innovations" project which focuses on rangelands with difficult operating conditions.<sup>415</sup> It addresses animal management, health, and welfare in mountain environments, especially for small grazing ruminants with a higher incidence of grass-borne parasites.

The Operational Group is comprised of diverse stakeholders who represent different areas of expertise to generate an exchange of knowledge and experience. Collaboration with participating farms is compensated financially along with technical support and equipment. The project was developed after a baseline assessment of the challenges and experimentation with the various solutions identified. Interim results were presented and tested with other stakeholders leading to management recommendations and specialised training. Key project results include special seed mixtures for the regeneration of marginal rangelands, the implementation and monitoring of site-adapted grazing practices, and grazing-based antiparasitic operations which have increased the acceptance of small ruminants and enhanced their production.

### Achieving Land Degradation Neutrality Targets through Restoration and Sustainable Management of Degraded Pasturelands<sup>416</sup>

This project aims to restore and sustainably manage degraded pasturelands in three municipalities in Georgia. Implemented with funding from the GEF for a total budget of USD 1.8 million, the project has established PUUs which represent small farmers and mobile pastoralists, especially women, and support both Municipal Pastureland Management Plans and sustainable land use practices. The project has also produced essential knowledge products, such as publicly accessible maps.<sup>417</sup>

The project follows the “Scientific Conceptual Framework for Land Degradation Neutrality” as well as GEF guidelines that stress the need for responsive policy and legal frameworks, a multistakeholder platform, and integrated land use planning.<sup>418</sup> The National Pastureland Management Policy document was used to draft new legislation with a focus on LDN, and an Inter-Sectoral Coordination Working Group was established to guide the project. The project has a strong focus on land rights and gender equality with specific provisions defined through consultations with women’s groups and a gender analysis of pasture tenure rights. Multistakeholder pasture management working groups developed operational Pasture Restoration Plans for the three Priority Pilot Areas of Village Pastures, helping to ensure that Georgia makes progress towards its LDN targets. This includes the introduction of controlled grazing systems and better access to water resources to maintain pasture quality and increase productivity and stocks of soil organic carbon.

### Russian Federation

The challenge of combatting desertification remains relevant in the arid zones of the Russian Federation (e.g., Kalmykia, Stavropol, Astrakhan, Volgograd, Rostov).<sup>419</sup> The Volgograd region, one of the most affected, requires the adoption of agroforestry measures in an area of 200,000 hectares, including anti-erosion measures (61,896 hectares), sand dune stabilisation (58,227 hectares), protection of arid pastures (69,642 hectares), and riparian interventions (7,816 hectares).<sup>420</sup> The Russian Federation has a long history of field interventions to protect agricultural land, including many ambitious projects implemented since the 1940s.<sup>421</sup>

- Plan of protective forest plantations (1948–1953)
- Black Lands and Kizlyar Pastures desertification combat (1986–1996)<sup>422</sup>
- Activities to combat desertification in the Commonwealth of Independent States (1995–2000)
- Prevention of agricultural lands retirement from agricultural turnover through agroforestry, phytomeliorative and cultural measures (2014–2020)
- Support for the implementation of state programmes in the field of land reclamation (2021–2030)
- Protection and conservation of agricultural lands from wind erosion and desertification and chemical reclamation.

In response to a sharp increase in desertification and land degradation and the impacts of climate change, scientists, producers, civil society, and authorities have shifted their priorities which prompted the Government of the Russian Federation to establish a Centre to Combat Desertification based on the Federal Research Centre for Agroecology of the Russian Academy of Sciences.



### Strategy for the Development of Protective Afforestation<sup>423</sup>

Science and traditional knowledge of crop farming and animal husbandry in forest-steppe, steppe, and semi-desert areas can inform the means to address the negative phenomena of land degradation. This strategy sets out biological and reclamation measures through the development of protective forest plantation (PFP) systems at all levels. By creating new agroforestry landscapes with a high degree of self-regulation and multifunctionality, the ecological situation is stabilised, and sustainable production systems are generated. The positive impact of PFP systems has been central to the state strategy for environmental conservation which aims to improve food security and the quality of the environment. Its impact on extensive livestock farming remains to be seen.

PFP systems involve baseline assessments, silvopastoral practices, technical guidance, resource allocation, and other capacities that support their development. PFPs are promoted on ravines, gullies, sandy areas, and riverbanks to prevent erosion, and along and inside agricultural lands and other territories to provide additional landscape features and functions. Most important to herders is PFP implementation on steppes and arid pastures to increase forage productivity and protect rangelands and livestock shelters from drifts created by snow or sand and dust storms. In the arid zones, pasture-protective strips occupy up to 5 per cent of natural forage lands with tree canopies at around 0.2 per cent. On rangelands with highly degraded vegetative cover, up to 10 per cent of the land is planted with reclamation and feed shrubs designed for periodic grazing and natural regeneration.

The project is implemented with the support of a multistakeholder platform which is created after assessing the potential of local agroforestry to achieve social-ecological targets. A long-term plan is drafted to operationalise the measures, creating a legitimate forest management system supported by the current policy and legal framework and state funding. The project has recorded improvements in the microclimatic situation in forest pasture ecosystems, with a two- to three-fold increase in biodiversity and a three-fold increase in yields. The costs are expected to pay off in about 3 years while the productive longevity is 15-30 years, and the cadastral value of restored rangelands is estimated to increase by 30-50 per cent.

In addition to the case studies presented, most European countries have a long history and culture of pastoralism, transhumance, extensive livestock farming, and montane grasslands. France, for instance, has had a pastoral act in place since 1972; pastoral systems are particularly diverse in Germany,<sup>424</sup> Greece, and Mediterranean countries with silvopastoralist cultures.<sup>425</sup>

### Land Degradation Neutrality in Europe

Europe is increasingly affected by desertification and land degradation. In 2017, 25 per cent of the land (411,000 square kilometres) was declared at high or very high risk of degradation, a 14 per cent increase since 2008. The risk of desertification is most serious in the Mediterranean (notably southern Portugal, Spain, Italy, and southeastern Greece, Malta, and Cyprus), and in the areas bordering the Black Sea in Bulgaria and Romania. The main threats are related to soil erosion, declining soil organic matter and biodiversity, soil contamination, sealing, salinisation, and compaction, with climate change trends exacerbating land degradation.<sup>426</sup>

In 2015, the EU and its Member States committed to achieve LDN by 2030.<sup>427</sup> In May 2022, the 8th Environment Action Program entered into force, as did the EU legally agreed common agenda for environmental policy until 2030. Building on the European Green Deal,<sup>428</sup> and the Biodiversity Strategy for 2030,<sup>429</sup> this programme provides the current policy framework to pursue LDN. The EU soil strategy for 2030<sup>430</sup> sets out a framework and concrete measures to protect and restore soils and ensure they are used sustainably. "A Soil Deal for Europe"<sup>431</sup> establishes 100 living labs and lighthouses to lead the transition towards healthy soils by 2030.<sup>432</sup>

Other non-EU countries have made commitments to LDN. Southeastern and Balkan countries have assessed their status and commitments in the context of FAO's regional action programmes.<sup>433</sup> Research in Russia has shown how the concept of LDN has evolved in the country to embrace the concepts of sustainable land use and rangeland management.<sup>434</sup>



## Discussion

The European case studies show how pastoralism remains important in the developed countries, as part of their heritage, sustainable production, and the preservation of natural and cultural values. They raise important concerns, including the legal status of pastoralists and other shared challenges with the developing countries: the co-creation and application of knowledge, engagement of multiple stakeholders through rangeland initiatives (e.g., Land Stewardship), and the role of developed countries in supporting global efforts to adopt and scale up SRLM and restoration.

European cultural heritage and traditional knowledge constitute valuable assets to combat desertification and land degradation. They have been used to develop multifunctional, multistakeholder approaches, combining pastoralist systems with complex land use schemes that offer a range of solutions. Research and the co-creation of knowledge and their innovative applications point to new development pathways. For example, urban and peri-urban grazing is attracting new attention as part of local and regional food system transformation, as are grazing practices that control vegetation on public lands, renewable energy parks, and abandoned industrial sites.<sup>435</sup>

Several drivers, pressures, and impacts in Europe are shared with rangelands and pastoralists in the developing countries. The most prevalent are rangeland conversion due to urbanisation, agricultural expansion and afforestation, renewable energy production, shrub encroachment, and poor governance. Increasing wildfire risk is another concern, often associated with the abandonment of grazing and other traditional agroforestry activities and fuelled by climate change. Grazing management provides critical tools to control vegetation, reduce fuel loads, and prevent the most severe impacts. Wildfire prevention offers promising investment opportunities to recover and promote extensive livestock farming in high-risk areas.

Clearly, the EU has the ambition and capacity to support other countries through funding, research, and the application of new technologies. Innovative approaches to promote SRLM and restoration by linking rangeland producers with consumers are being explored. EU policies require national commitments, social movements, and the political will to create an enabling environment for pastoralism to thrive.

This includes the need for an overarching policy framework that legally defines and differentiates pastoralism from intensive farming, supports research and innovation in the sector, and promotes participatory governance systems with effective representation of pastoralists and the meaningful integration of their expertise and perspectives.

## 4.6 South Asia

The South Asian sub-continent ranges from humid tropical and semi-arid to temperate and alpine climate types, covering 15 agroecological regions. Indian rangelands occupy about 121 million hectares, from the Thar Desert to the alpine meadows in the Himalayas. The area used for grazing is estimated at around 40 per cent of the total land surface of India, including grasslands (17 per cent), and forests (23 per cent). Around 70 per cent of rangelands are in the temperate region, however, a large share (~100 million hectares) is considered underutilised, including degraded forest lands, land unsuitable for crop production, ravines, and wastelands.<sup>436</sup>

Pastoralists inhabit all parts of India with conservative estimates suggesting that there are 13 million people belonging to 46 communities,<sup>437</sup> with other estimates as high as 35 million.<sup>438</sup> Mobile pastoralists remain important in the country, from mountains to lowlands and deserts, practicing both horizontal movement patterns in the dryland regions and vertical movement patterns in the mountains, and engendering significant diversity in extensive livestock production systems.<sup>439</sup> These include nomadic and semi-nomadic communities, transhumant, agropastoral, and agroforestry systems that help preserve their cultural heritage and sense of responsibility over their animals and the rangelands. Pastoralists generally rely on common lands to graze yaks, buffaloes, cattle, sheep, goats, camels, and pigs; they also use forests, fallow land, stubble and post-harvest fields.

Pastoralists have been widely marginalised in Indian public policies and discourse, often resulting in insecure tenure rights and access to their pool of common resources. Communal rangelands (Common Property Resources) have decreased from 70 million hectares in 1947 to 38 million hectares in 1997 and continue to shrink under privatisation, conversion, and misappropriation. In many



states, pastoralists have been banned from forests and protected areas. Mining and energy projects also restrict their movements, preventing access to critical rangeland resources. The Forest Rights Act of 2006 is helping pastoralist communities to secure their land rights.

### Grazing Rights in the Forest Rights Act 2006<sup>440</sup>

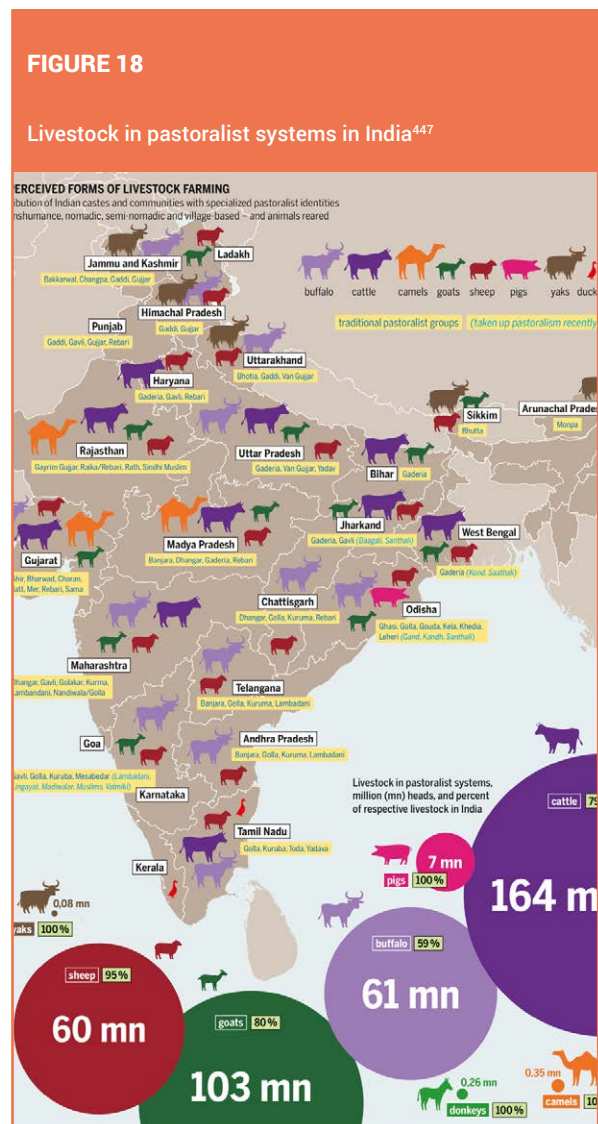
The “Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006”,<sup>441</sup> was seen as a major success for activists in India who created a self-financed platform to lobby the government in favour of this act. Nomads and mobile pastoralists have already benefitted from the long-term advocacy carried out by SEVA and other NGOs, CSOs, and pastoralists. While the implementation of the Forest Rights Act 2006 remains slow, it has already resulted in a surge of community actions whereby pastoralists are able to claim their rights.<sup>442</sup> NGOs support for pastoral communities includes guidelines and technical assistance to help them claim their forest rights, ensure representation, and engage local institutions.<sup>443</sup>

One success is the Van Gujjars community in Rajaji National Park who have claimed grazing rights and received titles for 43 families to graze their buffaloes after a High Court judgement. This access has promoted the planting of indigenous tree species with fodder and medicinal value. Migratory routes and grazing zones have been delineated for pastoralist communities, including 2,000 square kilometres in Lolab, Kupwara and 6,000 in Pulwama; in Jammu and Kashmir this recognition has benefitted local Gujjar and Bakkarwal communities. Other communities are being supporting in increasing their access to rangeland resources, such as in Banni grazing lands for Maldharis in Kutch, Gujarat, and Virudhunagar, and in the Theni district of Tamil Nadu for “Malai madu” cattle herders. These developments have opened new economic opportunities for pastoralists, such as the use of cattle dung to prepare fertilisers for organic farming (*Amirtha karaisal, Panchagavya, Jeevamurutham*). A national consultation on Pastoralism and the Forest Rights Act 2006<sup>444</sup>, organised by the Centre for Pastoralism, was held in Delhi in 2022, involving NGOs/CSOs and pastoral community representatives from 11 states, with the participation of IYRP-supporting NGOs and volunteers.<sup>445</sup>

Livestock is an important sector of the Indian economy, supporting rural livelihoods and contributing 4 per cent of the national GDP and 26 per cent of the agricultural GDP. India hosts 20 per cent of the world’s livestock, including 193 million cattle, 149 million goats, 110 million buffaloes, 74 million sheep, 9 million pigs, 300,000 camels, and 58,000 yaks. Around 77 per cent of these animals are reared in extensive systems, producing about 53 per cent of India’s milk and 74 per cent of its meat. Pastoralists are custodians of 73 out of 200 officially recognised livestock breeds in India, providing opportunities to improve rangeland management, local production, and soil fertility.<sup>446</sup> The future for Indian pastoralists will depend on the recognition of their land and tenure rights and improved access to markets.



Camel herders face a particularly difficult situation, as demand for draft and transport animals has declined and there are relatively few marketing options for their products (Figure 18).



Despite the relative absence of policy and financial support, pastoralism has shown itself to be remarkably resilient in many parts of the country. The movement in support of pastoralists has greatly increased throughout South Asia with domestic political repercussions and a notable international presence. Indian organisations, such as SEVA,<sup>448</sup> the Centre for Pastoralism,<sup>449</sup> and the Desert Resource Centre,<sup>450</sup> are prioritising their work on land rights and advocacy. The Centre for Pastoralism is currently producing an atlas on Indian pastoralism to map traditional grazing routes.<sup>451</sup>

### **Reviving Traditional Pastoral Routes in Rajasthan<sup>452</sup>**

The desert bioregion of India, including Rajasthan, parts of Gujarat and Haryana, is host to a significant number and diversity of animals and pastoralists. The Madhari desert herders are primarily traditional breeders where each group specialises in one species (e.g., camel, sheep, goat, cattle). In recent decades, water diversion for irrigated agriculture has marginalised pastoralists and their practices in certain desert areas. This initiative aims to reverse this trend and support the rights of the Madharis to their lands and livestock routes, protecting them against state appropriation and further marginalisation.

The Desert Resource Centre focuses on pastoral communities as agents of change, more equitable value chains, markets, policies, and the engagement of all stakeholders. Over 70 per cent of community participants are women, contributing to a gender-responsive approach that targets different levels of government, decision makers, extension services, and research institutions. Public and private partners have mobilised over USD 250,000 every year for the last six years to build infrastructure and roll out green technologies for sustainable value chains, including the mentoring of micro-entrepreneurs.

Key successes of the initiative include the pastoral “product and derivative” value chains, which are managed by two social enterprises sponsored by the project. This includes two new lines of pastoral products: dairy from camel, goat, and indigenous cattle, and animal fibre for insulation and industrial sound applications. Community pastoralists, especially marginalised ones, have begun increasing their herds to generate income through milk and fibre sales and to reclaim their lost lands and pastoral routes. The initiative is centred on the belief that pastoralism is a resilient livelihood model for deserts and drylands, notably that of camelid husbandry. Replication has been initiated in collaboration with the Government of Ethiopia, which aims to adopt the model of non-bovine dairy production with technical assistance from the Desert Resource Centre.

International conservation organisations, such as IUCN and the World Wildlife Fund (WWF), have long supported extensive livestock production in India. The concern about the health of grasslands, savannahs, and drylands has boosted interest in preserving and restoring these actively

managed ecosystems. In addition to promoting scientific management-based approaches to restore grasslands,<sup>453</sup> these organisations advocate for pastoralist communities to stop their marginalisation and ensure that their leadership and traditional knowledge are recognised and utilised in SRLM and restoration projects and programmes. Their efforts reinforce a synergetic approach that links pastoralism to biodiversity conservation.

Pastoralist movements have gained attention throughout South Asia. The development of the South Asian Pastoral Alliance<sup>454</sup> is supported by the FAO and the World Alliance of Mobile Indigenous Peoples (WAMIP) with active representation from India, Afghanistan and Nepal, and collaboration with Bangladesh and Bhutan. The alliance is mapping rangeland and pastoral organisations and will use this information to mobilise and connect pastoralist communities with NGOs/CSOs to influence policies and decision-making.

### **Reviving Trans-Himalayan Rangelands: A Community-led Vision for People and Nature<sup>455</sup>**

This initiative, still in its early stages, addresses the degradation of high-altitude rangelands and their impacts on biodiversity and livelihoods. Its objective is to develop a community-led and shared vision of stewardship and co-management of these rangelands. Trans-Himalayan high-altitude rangelands have sustained agropastoralist communities and a rich assemblage of wildlife for centuries. The Changpa people of the Changthang and Brokpas of the Mago-Chu Valley live among wild carnivores and herbivores while rearing pashmina goats, yaks, and sheep. Historically, these regions had livestock-based economies, strong traditional management practices, and an ability to coexist with wildlife. However, the situation has changed dramatically. Herds have increased and become more specialised (e.g., Pashmina goats), intensifying wildlife conflicts. Livestock predation causes significant economic losses, and the retaliatory killing of wolves and snow leopards leads to a decline in wild ungulates.

The initiative recognises the Changpa and Brokpa communities as the primary stakeholders and stewards of rangelands and targets powerful actors (e.g., government departments, district administration, paramilitary forces) with a stake in the rangelands. Institutions (e.g., Centre for Pastoralism) and social enterprises (e.g., All Changthang Pashmina Grower Cooperative, Looms of Ladakh, “Its All Folk”) are also engaged. The aim is to establish Rangeland Councils in each project region to develop a joint vision for the rangelands, promote human-wildlife coexistence, and increase women's income from rangeland products. Around USD 300,000 has been committed and an additional USD 725,000 is expected.

### Extensive Dairy Cattle Management System in Sri Lanka

Pastoral farmers feed their cattle in rice fields during the off-season and move to marginal forest lands during the cultivation season. When mismanaged, this system can degrade forests, reduce income, and increase risk during the crop season. To have a better understanding of the challenges, a survey was performed with 72 livestock/pastoral farmers in the Murunkan region to analyse feed and water provision, animal behaviour, and grazing alternatives. A multistakeholder platform was then established to ensure local farmer and pastoralist participation. The platform helped identify the local knowledge available in this unique dairy cattle farming system, performed a detailed SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis, and made recommendations. The objective was to make the most of the opportunities to increase farmers' income while protecting marginal forest lands. The commitment and funding of the research team were critical in the initial stages, but additional finance and support will be required to apply more robust methodologies and devise innovative practices. The initiative targets farmers from the Tamil community, building on their culture and traditions, although the approach is transferable and is now being applied in the Jaffna local sheep management system.



### Land Degradation Neutrality in South Asia

India has approximately 120 million hectares of degraded land caused by water erosion (82 million hectares), wind erosion (12 million hectares), chemical contamination (25 million hectares), and physical degradation (1 million hectares).<sup>456</sup> Most of the degraded land is considered arable (104 million hectares) and crop losses due to water erosion alone are estimated to be USD 3.5 billion dollars.

India is deeply committed to achieving its targets on LDN and ecosystem restoration. The government has launched or reinvigorated several LDN-related programmes, including the National Afforestation Programme, Green India Mission, and Watershed Development Component.<sup>457</sup> Jointly, these programmes are expected to help restore 26 million hectares.<sup>458</sup> The Desertification and Land Degradation Atlas of India is an important resource to help identify and overcome the many challenges.<sup>459</sup>

Although grasslands are considered threatened ecosystems in India, they have been virtually overlooked in environmental conservation and ecosystem restoration policies in favour of forestry-based interventions, which includes converting natural grasslands into plantation forests or other uses.<sup>460</sup> Less than 5 per cent of India's grasslands fall within protected areas, and the total grassland area declined from 18 to 12 million hectares between 2005 and 2015.<sup>461</sup>

Fortunately, there is a gradual shift towards recognition of the social-ecological role of rangelands and pastoralism, and India has recently taken a more encouraging approach.<sup>462</sup>

In 2022, the Department of Animal Husbandry and Dairying and the Department of Fisheries requested that 12 states focus government schemes on the welfare of pastoralist communities, and provide assistance to pastoralists under the National Livestock Mission, Animal Husbandry Infrastructure Development Fund, and Rashtriya Gokul Mission which focuses on sustainable dairy production.

### Discussion

The South Asian case studies present innovative pathways to improve rangeland management, notably emphasising the role of livestock and multifunctional rangelands in delivering socioeconomic benefits to pastoral communities. The sense of stewardship and responsibility demonstrated by pastoralists around the world, is particularly pronounced in Indian rangeland communities. Animal health and welfare are priorities that are deeply embedded in their cultural and religious heritage, setting an example for other extensive livestock production systems. The One Health approach is a critical step in this direction, with its roots in the pastoralist cultural legacy that links animal, land, and human health.

With respect to enhancing multifunctionality in the rangelands, the need for certified bio-fertilisers in organic farming is increasing the value of animal manure, a natural by-product that can offer additional income for extensive livestock farmers. This helps promote a circular, holistic approach to land management with a key role for mobile livestock in the transfer of fertility between lands to improve food production and the delivery of other ecosystem goods and services.



## 4.7 China and Southeast Asia

This section is primarily devoted to China which hosts that greatest extent of pastoral areas in the world. A case study from Thailand is included to show how pastoralism extends well beyond the northern latitude rangelands into the tropical and sub-tropical regions.

China has approximately 400 million hectares of rangeland, mostly in the drier and high-altitude regions of North and Northwest China, which are inhabited by peoples of various ethnic minorities. Pastoral lands cover approximately 40 per cent of the territory, and pastoralists occupy around 190 million hectares of rangeland in six provinces. Agropastoral lands occupy another 210 million hectares in the transition zone between traditional cropping and grazing areas. China's livestock population tripled between 1980 and 2010, from 142 to 441 million livestock units. Production systems have intensified, partially replacing traditional pastoralist and mixed crop-livestock systems with landless systems and monogastric animals (e.g., pigs, chickens) which increased from 2.6 per cent in the 1980s to 56 per cent in 2010.<sup>463</sup> At the end of 2021, China had around 326 million sheep and goats.<sup>464</sup>

The country has been suffering from accelerating land degradation since the mid-20th century. The degraded area has increased by 15 per cent each decade from the 1960s to the 2000s. A survey completed in 2006 revealed that 90 per cent of the temperate steppe and the temperate desert steppe were degraded to some extent. Cold alpine meadows and steppes and lowland meadows were considered severely or moderately degraded. Rangeland degradation impacts both grassland ecosystems and rural communities, lending to conflict and instability.<sup>465</sup>

Nevertheless, China has made progress in improving the sustainability of rural land use systems through its many national projects and programmes, such as Rangeland Household Contract Policy, Rangeland Ecological Construction Projects, and the Nomad Settlement Policy. While there have been some successes in SLRM and restoration leading to the improvement of rural livelihoods, the government continues to promote investments in the rangelands, drawing on scientific insights and the engagement of non-state actors.<sup>466</sup> Researchers have proposed a land tenure policy that recognises local institutional arrangements, such as nomadic pastoralism, which should be promoted alongside innovative approaches to provide social services and support for mobility.<sup>467</sup>



## China: Grassland Restoration in the Qinghai-Tibetan Plateau<sup>468</sup>

The Qinghai-Tibetan Plateau hosts vital grazing lands for livestock, such as yaks, sheep, and goats.<sup>469</sup> This initiative recognises the negative impacts of rangeland degradation on herders and their communities and helps facilitate collective action. The objective is to set up a co-managed community reserve to explore development pathways for climate adaptation, ecosystem restoration, and alternative livelihoods. In the past two years, 500 herders in four pastoralist communities participated, restoring nearly 85 hectares of degraded lands. Elected herders formed a management team responsible for allocating tasks and scheduling restoration interventions where herding families provided yak dung for fertilisation and labour for reseeded.

The project also helped develop a women's cooperative whereby 12 female herders were engaged in making handicrafts from yak hair and wool, generating a total annual revenue of approximately USD 5,500. The local government is a key supporter of the project and the Shan Shui Conservation Centre provided start-up funding, technical support, skills training, and facilitated dialogues among multiple stakeholders. Financial support was provided to purchase materials, while skilled experts taught restoration and handicraft techniques, product design, and marketing strategies. The project reached consensus through open village assemblies which approved the project specifics and work plan developed by a multistakeholder platform.

## China: Subsidy and Reward Policy for Grassland Ecological Protection

The Government of China has developed consecutive five-year plans to balance grassland protection and use, which commenced in 2011 and is currently in its third period (2021–2025). The central government has invested over USD 21 billion to implement the policy, covering a grassland area of 253 million hectares in 13 provinces. Pastoralists are encouraged to reduce grazing intensity through government subsidies for exclusion areas in heavily degraded grasslands (USD 16 per hectare per year) and stock reduction in lightly degraded grasslands (5 USD per hectare per year) for an average of USD 210 per family per year. The central government formulates the policy and project scope and supplies funds while local governments and departments of grassland are responsible for subsidy allocation and supervision.

## Thailand: Recognizing the Rights of Lua and Karen

This initiative promotes sustainable agriculture practices among the Lua and Karen communities, who are predominantly small-scale farmers. It recognises and protects the rights of indigenous communities to access and manage their natural resources, including pastures.

By supporting seed banks and other community based initiatives, traditional crop varieties are being preserved.<sup>470</sup> Local pastoralists are also involved as they face significant challenges in accessing land and natural resources due to land grabbing, land use change, and natural resource conflicts.

Pastoralists in Thailand are involved through the promotion of policies and programmes that support their land and resource rights, including the demarcation and registration of pastoral lands, recognition of customary tenure systems, and provision of legal support and advocacy services. The process of implementation includes legal recognition of the rights of the Lua and Karen communities to their traditional knowledge and lands. A multistakeholder platform was established to provide a safe space for dialogue and collaboration. At the same time, communities are trained in sustainable agriculture practices, establishing seed banks, and breeding indigenous livestock, as well as building community knowledge and skills, drawing on modern research and promoting exchanges with other communities.

The initiative applies a gender-responsive approach and puts Lua and Karen traditional knowledge at the centre of the effort to secure their rights to access and sustainably use their ancestral lands. This has helped to promote the rights of indigenous communities and traditional land management practices in the region. The success of this initiative highlights the importance of a holistic approach to promoting sustainable agriculture and protecting the rights of indigenous communities.

## Discussion

The China case studies highlight the overarching role of the state and local administrations in promoting, developing, and upscaling SRLM and restoration activities. National policy and legal frameworks and local authorities are often determinant factors in rangeland governance. States, with their different levels, departments, and institutions, can channel investment, provide financial tools, and improve tenure security to support rangeland initiatives. They are also fundamental in raising awareness and giving legitimacy to pastoralist livelihoods. However, top-down measures that lack local participation on state-owned or state-managed lands have often proven ineffective in achieving the expected SRLM and restoration outcomes. Direct interventions to improve rangeland health must be driven by local communities and individual pastoralists to deliver the desired results. Rather than achieving a balance between top-down and bottom-up approaches, the main challenge is realising a clear and fair distribution of responsibilities within the hierarchy of decision making processes involving rangelands and pastoralism, and that local communities receive the funding and technical support they need.

## 4.8 South America

Rangelands cover 33 per cent of the total land area of South America and are distributed across regions with diverse biophysical and socioeconomic conditions. Climatically, they range from arid to sub-humid, with the mean annual precipitation ranging from approximately 150 to 1,500 millimetres.<sup>471</sup> Local conditions, such as soil quality, temperature variations, elevation differences, and topography, present further variability that shapes the vegetation and wildlife in these regions (Figure 19).

Woody plants are important features in South American rangelands, ranging from scattered dwarf shrubs to an open but almost continuous canopy of bush and small trees. The result is a mosaic of different rangelands, including grasslands, shrublands, savannahs, dry open forests, and hot and cold deserts. Savannahs cover around 2.29 million square kilometres in South America, representing between 8 and 10 per cent of their global extent. Rangeland distribution and characteristics today are the result of a complex interplay of ecological conditions, land uses, and disturbance regimes.<sup>472</sup>

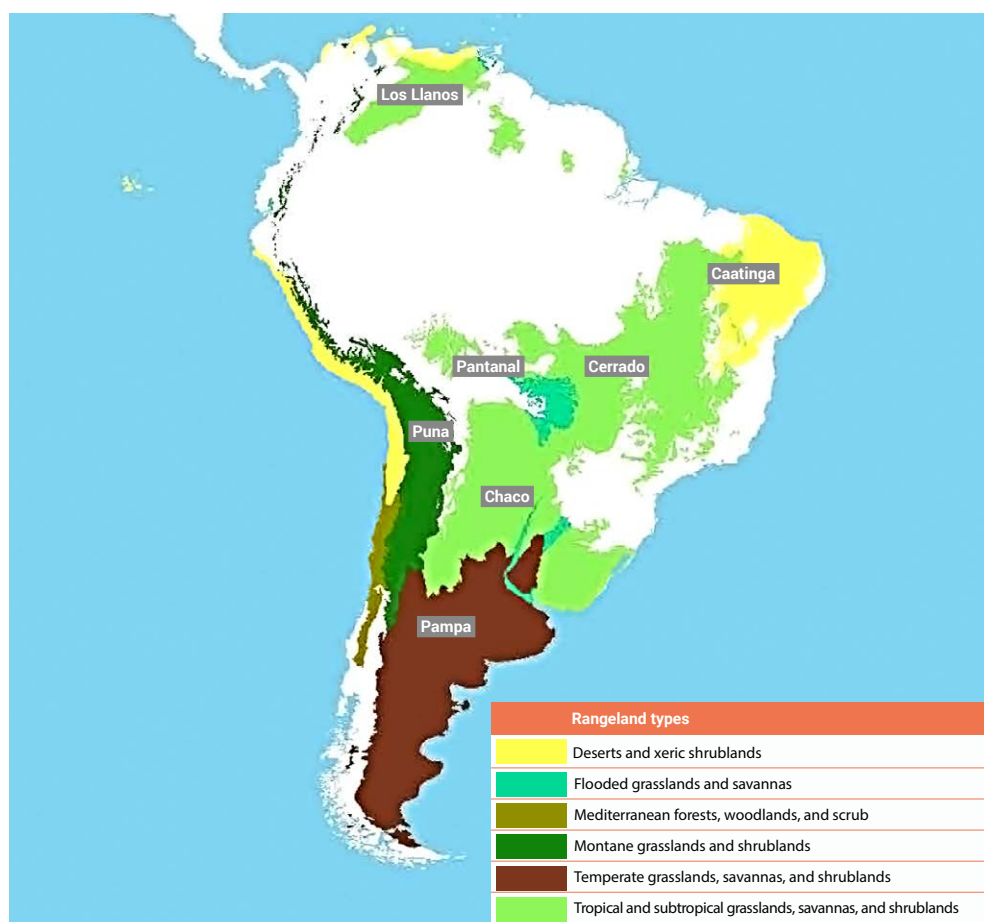
South American rangelands include 605 million hectares of tropical, temperate, montane, desert, and flooded grasslands, savannahs, and shrublands.<sup>473</sup> At altitudes of 3,000-4,500 metres, the high plains of the Andean mountains span Peru, Bolivia, Chile, and Argentina and are

home to the Puna biome and camelid-based pastoralism. East of the Andes, an arid landscape dominated by rangelands extends from the Chaco's northern reaches in Paraguay to Patagonia in southern Argentina through part of Rio Grande do Sul in Brazil, the Campos in Uruguay, and the Pampas of Argentina. Grasslands occupy an area of nearly 70 million hectares and have the greatest diversity of grasses on Earth: around 3,000 vascular plants, of which 450 grasses and 150 legumes, serve as forage for domestic grazing animals. This area also provides feed for 43 million cattle and 14 million sheep reared in intensive production systems.<sup>474</sup> Brazilian rangelands in the northwest include the Cerrado and Caatinga biomes, covering 35 per cent of the Brazilian territory or 2.8 million square kilometres.

South American rangelands support a variety of grazing-based livestock systems, from shearing wild vicuñas, herding llamas and alpacas in the highlands, shepherding sheep and goats in drylands, and rearing cattle in rangelands across the continent. Mobile pastoralism is actively practiced in four countries: Argentina, Bolivia, Chile, and Peru.<sup>475</sup> In Argentina and Chile, pastoralism occurs in marginal areas where communities exploit environmental and economic niches. In Bolivia and Peru, pastoralism is an important economic activity and dominates the cultural landscape. Ranching systems contribute substantially to rural economies in many countries (e.g., Brazil, Argentina, Uruguay) and South America is leading the development of modern silvopastoral systems.<sup>476 477</sup>

**FIGURE 19**

Map of the main South American rangelands<sup>478</sup>



## Consumer demand, deforestation, and land conversion

Historically, South American consumption of animal products (meat and dairy) has been greater than other developing countries and is expected to continue increasing.<sup>479</sup> The livestock industry has experienced a growth of over 30 per cent during the last two decades. There are approximately 570 million livestock units on the continent, and over 80 per cent graze on rangelands. Globally, the region contributes over 25 per cent of the beef supply and 10 per cent of the milk supply.<sup>480</sup>

The relationship between livestock production and environmental degradation in South America has raised serious concerns in recent years. A first concern is the role of livestock and feed crops in the complex patterns of deforestation which have been acute in recent decades. As much as 40 per cent of the South American landmass is estimated to have been deforested in a historical process that continues to date. An intense period of conversion of dry and wet forests occurred from 2000 to 2010 with between 1 and 4 million hectares of net forest loss per year.<sup>481</sup> Eighty per cent of the deforestation has resulted from converting natural forest ecosystems into cropland for soybeans and pastures for extensive cattle production, particularly in the moist and humid areas.<sup>482</sup> Deforestation rates have slowed somewhat over the past 15 years but are still high. Between 2015 and 2020, Latin America and the Caribbean lost almost 3 million hectares of forest per year, the second highest total for any region of the world.<sup>483</sup>

Land conversion, drought and other climate impacts, and socioeconomic transitions are increasing rangeland degradation in South America. Cropland expansion from 2001 to 2013 (44 million hectares) was less than the expansion of pastureland (97 million hectares).<sup>484</sup> Even so, the conversion of forests into pastures remains a serious concern in Brazil, Argentina, Paraguay, Bolivia, and Chile, with similar trends occurring in Central America.<sup>485</sup> The environmental impact of deforestation in South America is concerning in terms of carbon storage<sup>486</sup> and biodiversity loss.<sup>487</sup> In terms of livelihoods, small-scale livestock producers are often displaced or become increasingly dependent on abandoned cropland and marginal soils just a few years after forests are cleared.<sup>488</sup> Few countries monitor deforestation and land degradation drivers in a systematic manner and coordinated action across the region has been limited.

## Regional approaches

Faced with the multifaceted challenges of displacement and rangeland degradation, many pastoralist communities are seeking to empower themselves and reshape the narrative. Most support for pastoralists comes from the communities themselves with some engagement of universities and research institutions. The Red Pastoramericas<sup>489</sup> builds on these community initiatives by bringing together small-scale livestock producers from different countries, participating in the FAO Pastoralist Knowledge Hub, and leading the Southern America Regional Support Group of the IYRP.

Related initiatives, such as REDD+, are supporting country efforts to prevent deforestation and forest degradation while others at the regional level are often led by academic institutions and conservation organisations that have adopted multi-country approaches.

### Restoring a Free-Flowing Pantanal<sup>490</sup>

The Pantanal comprises flood-prone savannah and wetland areas located in the Upper Paraguay River Basin. Headwaters in Bolivia, Paraguay, and Brazil drain from the eco-regions of Chaco, Cerrado, and Chiquitania, and provide the water needed to sustain large areas of crop and grazing lands. The Pantanal initiative comprises an eco-regional plan that is supported by actions at the national, sub-national, and local levels, including the participation of local communities. Grasslands and savannahs are the targeted ecosystems, especially to halt their degradation and conversion. The main conservation work is aimed at freshwater tropical wetlands with savannah vegetation while targeting the health of other landscapes that are hydrologically connected.

The Pantanal initiative aims to deliver significant biodiversity conservation impacts through an integrated landscape approach. The current strategy has four pillars: (i) Free Flowing Pantanal with a focus on sustainable basin-scale energy planning to keep the rivers flowing; (ii) Deforestation and Conversion Free Pantanal aiming to implement sustainable agriculture and cattle ranching and promote deforestation and conversion free commitments; (iii) Climate Resilient Pantanal, focused on connectivity, protected areas, indigenous management, resilience and nature-based solutions; and (iv) Engaging, Mobilising and Influencing for a sustainable Pantanal.

WWF has supported dialogue processes and technical capacity building at the national and sub-national levels in three countries to drive investment towards a common, long-term conservation agenda with the participation of local communities. A major milestone was reached with the trilateral signing of the Pantanal Declaration for Conservation and Sustainable Development in 2018.<sup>491</sup> There are also efforts to help strengthen the Zicosur Platform to improve trade, logistics, and ecosystem services at the sub-national level.<sup>492</sup>

Methodological work is being undertaken at different levels, including the GEF-funded basin-wide Transboundary Diagnostic and Strategic Action Plan to be agreed with the three governments while, at the local level, building the capacity of relevant stakeholders. The engagement of the three governments in basin planning and governance aims to provide an enabling framework to achieve the stated objectives. This initiative is the result of coordination among three WWF country offices, financially supported by other WWF country offices and other agencies (e.g., GEF, International Climate Initiative [IKI], EU, United States Agency for International Development [USAID]).

## National approaches

### Argentina

Rangelands account for two-thirds of Argentina's land area and significantly contribute to its agricultural production, biodiversity, and cultural identity. The effects of mountain ranges and regional air mass movements create varied climates and a diverse array of rangeland and forest biomes, with arid and semi-arid drylands comprising around 69 per cent of the rangelands (Table 13).

Pastoralism in Argentina, especially in the Gran Chaco region, descends from the traditional practices of indigenous groups that were later adopted by settlers from Europe. It is now largely practiced by indigenous communities and Criollo people of mixed descent. They keep llamas, sheep, goats, cattle, and horses to produce meat, dairy, wool, cashmere, and handicrafts. According to the Chaco Network, based on the 2018 national census, 30,000–35,000 of the indigenous and Criollo people are pastoralists, mainly in the regions of the Puna altiplano, Gran Chaco, and Northern Patagonia. Pastoralist activity, in its wider sense, is also practiced by some families in provinces like La Rioja and San Juan, as well as in the western provinces near the Andes Mountain range (Figure 20).

Pastoralists play a significant role in Argentine agriculture and society,<sup>493</sup> contributing up to about 0.6 per cent of the GDP, increasing to 1.4 per cent when subsistence values are included. It represents an important economic activity that is critical to the food security and livelihoods of millions of small-scale producer households.<sup>494</sup> Argentina has

FIGURE 20

Rangelands in Argentina<sup>496</sup>



and researchers focused on its rangelands and pastoralist activities which is not matched by government policies and financial support. New initiatives, such as the rangeland alliance (*Alianza del pastizal*) are exploring collaborative ways to advance the preservation of these landscapes.<sup>495</sup>

TABLE 13

Rangeland types in Argentina<sup>497</sup>

Rangeland type	Location and description	Area (Mha)	Mean rainfall (mm/yr)	Plant communities
Arid and semi-arid grasslands, shrublands, and wood lands	Patagonia (cold deserts and semi-deserts)	60	300	Shrub steppes, grass steppes and meadows
	Monte (hot and cold deserts and semi-deserts)	46	80–300	Shrub steppes
	Caldenal (semi-arid woodlands)	2.3	300–350	Woodlands
	Western Chaco (dry woodlands and savannahs)	65	320–800	Mid- to low forests and savannahs
	Puna (cold deserts and semi-deserts)	9	200	Shrub steppes
Subtropical humid forests and savannahs	Eastern Chaco (subhumid forests and savannahs)	25	800	Forests and savannahs
	Espinal (forests, woodlands, savannahs)	3	1,000–1,200	Forests and savannahs
Temperate grasslands	Pampas (temperate grasslands and steppes)	50	700–900	Grasslands
Sub-Antarctic forests	Nothofagus temperate semi-deciduous forests	2	≥ 1,000	Forests and savannahs

### Grass Cultivation in *Deschampado* Understory Patches

This initiative uses native resources to improve the forage supply while protecting the Chaco Forest and its ecosystem services. Together, researchers and Creole peasants have designed and implemented a technological alternative to pasture revegetation. The *Deschampado* technique entails lightly pruning the low branches that hinder animal movements and removing non-forage small shrubs. Utilising the shade created, pastures are then sown to prevent bush encroachment. This silvopastoral technique does not impede the regeneration of trees and promotes higher biodiversity leading to the increased provision of ecosystem services. This design and approach are based on the Creole Technological Space that was formulated during a participatory process following a logic framework that includes community monitoring. A workshop<sup>498</sup> conducted in 2022 assessed and validated the adoption of the *Deschampado* technology.<sup>499</sup>

This innovative technique is intended to replace the mechanical clearing of forests that is typical of commercial livestock farming in the region. Mechanical clearing entails using heavy machinery to clear the overgrowth of thorny woody shrubs which also impedes tree regeneration and compacts the soil. Creole communities, who practice extensive cattle-raising in open forests, have led this collective action while a research team at the National University of Salta provided financial support and helped integrate empirical and scientific knowledge. This initiative resulted in the development of a local technology to integrate a pastoralist culture within forests, generating valuable benefits to the local population.



The National Observatory of Land Degradation and Desertification was created in 2012 by a conglomerate of academic and government institutions to establish a national network for biophysical and socioeconomic assessment and monitoring of land degradation.<sup>500 501</sup> Currently, 23 pilot sites and almost 200 experts are monitoring land degradation, helping to implement participatory SLM practices, publishing the results, and issuing recommendations for policymakers.<sup>502</sup> The observatory is currently supported by specific projects and a collaboration among the public and scientific-technological sectors. It aims to offer a better understanding of the link between producers, livestock, and the land, and to promote tenure security and sustainable practices among local producers, small nomadic herders, and large companies. Through participatory processes, the co-construction of knowledge, and the engagement of local stakeholders, the projects adapt research methodologies to the local context, and specifically address gender inequality, farm size, and power dynamics.

### The Puna Pastoralist Landscape in the Central Andes<sup>503 504</sup>

The Puna ecosystem supports one of the most long-lived and culturally distinct social-ecological systems in the world. Andean pastoralism is based on llamas, alpacas, sheep, and wild vicuñas. Like other pastoral systems, it is under threat from external drivers and pressures. This project has developed a framework to gain critical insights into the Puna pastoral systems and to collaboratively plan for a sustainable future. In addition to carrying out basic studies and analysing trends, the VICAM research team dedicates much of its energy to support community demands via a bottom-up approach. Together, they have built a participatory environmental calendar through dialogues on critical issues, such as carrying capacity,<sup>505</sup> sustainable markets for llama fibre, handicrafts, wild vicuña *chaku* (capture, shearing, and release back to nature), among others. Action is being taken to support community claims to land rights and access to resources. An annual spinning contest, the Pushkaj Runakuna,<sup>506</sup> engages young people, empowers women and girls, and demonstrates the importance of sustainable value chains and youth engagement.

The initiative has brought together local stakeholders in Santa Catalina, including the Cooperative of Santa Catalina Livestock Producers, Community Council (e.g., indigenous communities of Aucapiña Chambi, Atu Saphis, Peña Colorada), local schools and authorities, and producers linked to scientific institutions (e.g., VICAM research group, CONICET, National Universities of Jujuy and Lujan), as well as donors (e.g., Midori Prize, Satoyama Initiative, Williams Foundation). The concept of "nature's contribution to people" has framed the development and implementation of the project and guides the dissemination of its outcomes. This includes scientific articles on critical issues, such as the Puna pastoralist system,<sup>507</sup> the management of vicuñas' wild populations and other camelids,<sup>508</sup> pastoralist production systems,<sup>509</sup> and the ecology of the Puna system.<sup>510</sup>

## Brazil

Pasture areas are the main land use type in Brazil. Grassland ecosystems, including savannahs, are prevalent in all biomes.<sup>511</sup> They are the dominant vegetation type in the Cerrado, Pampa, and Pantanal, and occur as enclaves in the Caatinga, Atlantic Forest, and Amazon. Overall, grasslands cover approximately 27 per cent of the territory. They are mega biodiverse regions that are considered among the most endangered ecoregions due to high rates of conversion and the lack of protected areas.<sup>512</sup> These grassland ecosystems receive little public attention and are often undervalued even by conservation initiatives (Figure 21).<sup>513</sup>

Brazil produces 16 per cent of the world's beef valued at around USD 7.6 billion in 2019. One-third of the agribusiness GDP (USD 81 billion) is generated by cattle, a sector that employs 3 million people in rural areas.<sup>514</sup> There are a total of 264 million cattle and 17.4 million sheep, accounting for 1.4 per cent of world production.<sup>515</sup> In the last 35 years, around 45 million hectares of new pastures were added to Brazil's portfolio of agricultural lands. During the same period, an estimated 64 million hectares were deforested, while 18 million hectares of native pastures were converted to arable farming and forestry or lost to hydrological projects. Currently, 70 per cent (37 million hectares) of pastureland in the Amazon is the result of deforestation.<sup>516</sup> One-third of the current pasturelands in the Cerrado and Atlantic Forest biomes are attributed to deforestation processes. Since 2010, 10 million hectares of pastures and 4 million hectares of croplands have replaced natural vegetation and ecosystems, with cattle ranching encroaching on indigenous territories and protected areas.<sup>517</sup>

The economic valuation of drylands in the Cerrado shows that the costs of climate impacts may be as high as USD 133 billion by 2050, and losses to agricultural productivity are estimated at USD 105 billion by 2050.<sup>518</sup> This analysis points to policy and market failures on valuing and protecting rangelands, the insufficiency of carbon and other finance schemes, and the need for innovative market-based instruments and opportunities to halt rangeland transformation and ensure the provision of ecosystem services, including through the reform of land ownership.

### Cerrado Alive Initiative<sup>519</sup>

The Cerrado is the second largest biome in South America, with over 2 million square kilometres (24 per cent of Brazil's territory), encompassing lands from 11 states. The traditional communities of the Cerrado retain vital knowledge of their landscape, including the nutritional, medicinal, and commercial value of non-timber forest products. Over 150 species of edible fruit, nuts, and seeds are currently being collected and marketed under community based production chains which can add significant value to the local economy. The Cerrado Alive Initiative builds local capacity through small agro-extractive activities, SLM, and improved governance led by local or traditional communities.

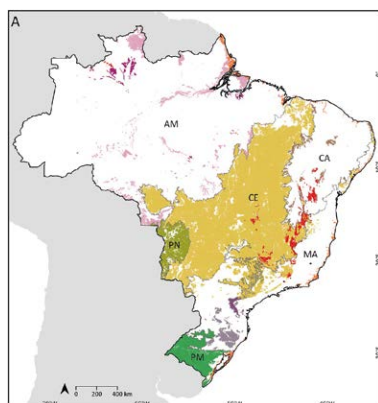
With USD 6.6 million committed, Cerrado Alive has a 10-year strategy to influence policy, attract finance, engage with new markets, and strengthen governance while enhancing research, knowledge, management, and communication. The project supports community based organisations of smallholder farmers engaged in the harvesting of baru, pequi, and buriti fruits, as well as golden grass production chains. Other traditional communities and stakeholders, such as the babassu coconut breakers, are also engaged.

Using a rights-based approach, the initiative engages with public attorneys and the Brazilian legal system. A key result of the initiative is the Statement of Support of the Cerrado Manifesto,<sup>520</sup> developed by WWF and signed by 175 organisations, calling on international market stakeholders to act in defence of the Cerrado. Other results include the Salmon Deforestation and Conversion Free benchmark for soy and the partnership with the Central do Cerrado Cooperative, comprising 35 associations and over 12,000 families promoting sustainable value chains for native products.

Other partnerships have been formed to provide technical support, resource mobilisation, and access to markets to the 38 community enterprises that process 1,885 tonnes of native fruits collected by 2,600 families. A programme for improved access to credit has a value of USD 230,000 to six enterprises and helped mobilise USD 1 billion of rural credit under the Low Carbon Agriculture Program. The initiative has also helped create the Araticum Network and the Cerrado Knowledge Platform,<sup>521</sup> undertaken investigative studies, and collaborated with other regions (e.g., WWF in the Pantanal).

**FIGURE 21**

Major grassy ecosystems of Brazil<sup>522</sup>



#### MAJOR GRASSY ECOSYSTEMS:

- Savannas in the Amazon
- Amazonian white sand grasslands and shrublands
- Savannas in the Cerrado
- Savannas in the Caatinga
- Hyperseasonal savannas and grasslands in the Pantanal
- Grassy ecosystems in coastal regions
- Campo rupestre
- Highland grasslands
- Campos Gerais
- South Brazilian highland grasslands
- Pampa grasslands

Brazil's National Determined Contribution (NDC) recognises that restoring forests and recovering degraded pasturelands are core strategies for climate change mitigation. Accordingly, the NDC has committed to recover 15 million hectares of degraded pasturelands, restore 12 million hectares of native vegetation, and create 5 million hectares of integrated agrosilvopastoral systems by 2030.<sup>523</sup>

A large body of evidence points to the importance of sustainable livestock management for maintaining high levels of biodiversity and other ecosystem services. Research is currently assessing how SRLM and restoration approaches, which consider both grazing and fire as valuable management tools, can boost key ecosystem services such as carbon storage.<sup>524</sup>

### Land Degradation Neutrality in South America

There are many parallels in land degradation processes across South American countries. Degraded areas constitute a significant percentage of each country's territory with deforestation as the main driver while declining soil carbon stocks and biological productivity are also prevalent in all biomes (Table 14).

The expansion of crop and pastureland remains a primary cause of forest loss across South America, with drylands experiencing the highest rates of deforestation. The direct drivers include infrastructure and agricultural expansion, intensive cattle ranching, forestry, aquaculture, drought, wildfires, and mining. The indirect drivers include population growth, socioeconomic transitions (i.e., consumer demand, markets, prices, subsidies), and shortsighted policies and programmes.

Rangeland degradation is a widespread threat in South America. With high conversion rates in recent decades, it was estimated in 2008 that around 15 per cent of the grasslands have been lost or fragmented.<sup>525</sup> Livestock production systems

have been steadily intensifying due to the augmented use of fodder in feedlots and increased stocking rates. Land use change is also contributing to the intensification of livestock systems throughout South America, with Brazil's Cerrado and Caatinga and the Rio de la Plata basin most affected.<sup>526</sup>

South American countries have promoted action to address this challenge via national and sub-regional projects and programmes. International cooperation is often key to their success, with organisations, such as GEF, the EU (Zona de Integración del Centro Oeste de América del Sur [ZICOSUR]), the World Resources Institute, and IUCN, contributing to conservation and restoration initiatives (e.g., Ecosystem-based Adaptation, Bonn Challenge Initiative 20x20). To date, most of these initiatives have focused on forests and deforestation, pointing to the need for more attention to rangelands when designing and implementing LDN, SRLM, and restoration activities.



**TABLE 14**  
**Extent of land degradation in South American countries<sup>527</sup>**

Country	Total area (km <sup>2</sup> )	Degradation estimates (% of land)			Main degradation factors
		PRAIS	WAD data	Other sources	
Brazil	8,515,770	26	36	61	Deforestation, productivity loss, low soil carbon content
Argentina	2,780,400	38	40	87	Productivity loss, aridity, low soil carbon content, vegetation cover change
Paraguay	406,752	52	62	30	Deforestation, productivity loss, land cover change, aridity
Peru	1,285,220		58	54	Deforestation, aridity, water stress, low soil carbon content
Ecuador	25,637	29	50		Deforestation, low soil carbon content, vegetation cover change



## Discussion

Several critical issues arise in the context of rangeland degradation in South America, including the relationship between pastoralism and deforestation, resource conflicts between ranching and mobile pastoralism, and the untapped potential of agroforestry and silvopastoral approaches. Forest loss resulting from land conversion to cropland is significant in the region,<sup>528</sup> but the role of livestock and grazing in deforestation requires greater scrutiny at the local level. Cattle ranching for export has been a direct driver of forest clearing while the expansion of soy production on pastureland is an indirect driver that can force herders to move towards forest land.<sup>529</sup>

As regards the tension between ranching and mobile pastoralism, the latter is often perceived to generate conflicts as free-range livestock can sometimes damage crops, seedlings, infrastructure, restoration areas, etc. But, at the same time, pastoralism suffers the most when their routes, grazing reserves, and infrastructure are encroached upon. Mobile pastoralism, livestock ranching, agropastoralism, and agroforestry schemes can coexist, share resources, and be mutually synergistic if planning and governance structures are effectively supported by the state and all relevant stakeholders are meaningfully engaged.

The design of initiatives aiming to improve rangeland health must address these complex relationships and ensure coexistence and coherence between legitimate activities. Integrated land use planning, participatory governance, and the provision of tenure security must be both flexible and pragmatic to effectively scale SRLM and restoration projects and programmes. Pastoral mobility should always be considered as a critical management feature to help balance grazing pressures in rangelands, particularly when

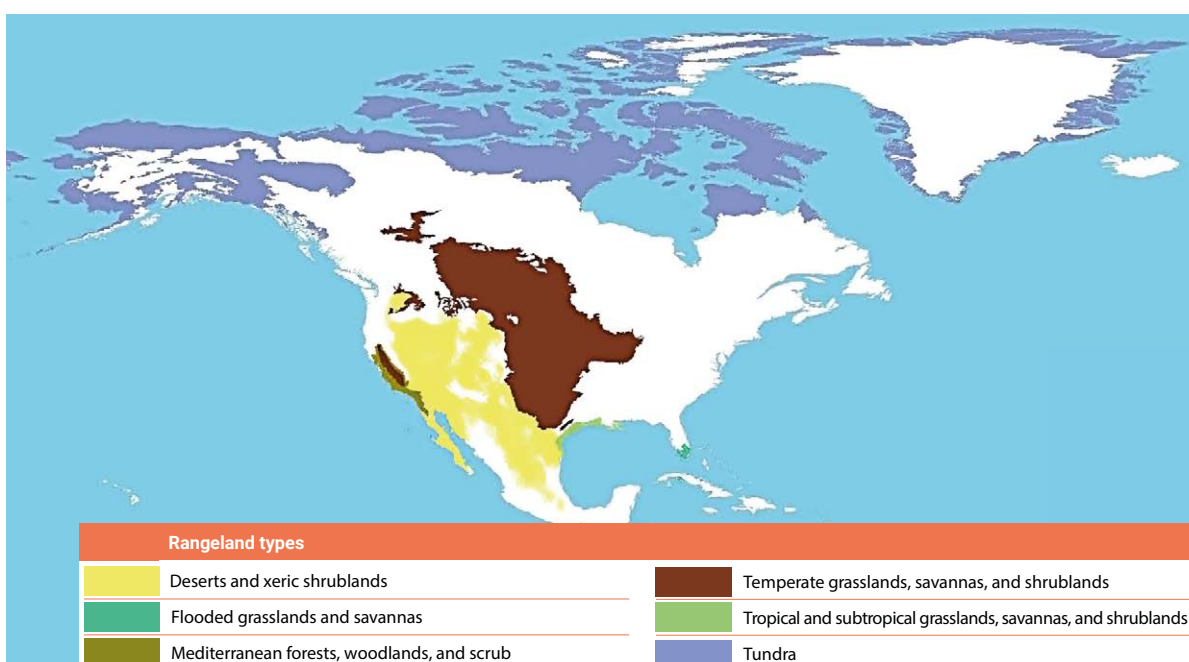
overstocking is a permanent or seasonal problem. Mobility guarantees that set asides and resting periods can be enforced and that rangelands have the capacity to recover from external pressures, such as climate change.

Adaptation to climate change is a key concern of many pastoralist communities, which have forced some of them to migrate or significantly alter grazing regimes. Policy frameworks and pastoral strategies targeting small-scale producers, rural development, and rangeland health can help ensure food security, secure legitimate land rights, and promote the adoption of SRLM practices. More equitable legal, regulatory, and implementation frameworks would enhance collaboration between the different rangeland stakeholders and create the space to address conflict and plan for the long-term. Some South American rangeland initiatives are showing promise by expanding agroforestry schemes, restoring indigenous and traditional management systems, or designing and implementing innovative hybrids such as silvopastoralism.<sup>530</sup>

## 4.9 North America

Rangelands are a recognisable feature of the North American landscape. Open landscapes dominate vast regions of the continent, from the polar regions in Alaska and Canada to the grasslands of the central United States and arid deserts of Mexico. They include different grassland ecosystems: tundra in the North; shortgrass, mixed-grass, and tallgrass prairies in the West; saltbush communities in the Great Basin; and communities dominated by cacti and dry shrublands in the southwestern United States and Mexico with extreme temperature ranges and low precipitation (Figure 22).<sup>531</sup>

**FIGURE 22** North American rangelands<sup>532</sup>



As in other parts of the world, the scientific paradigm in North America has been shifting towards the recognition of rangelands as complex social-ecological systems. This allows for a better understanding of their ecological dynamics to inform management practices, although complex social factors still tend to be neglected.<sup>533</sup> The integration of social sciences to improve the holistic understanding of rangelands is both a challenge and an opportunity welcomed by the North American rangeland scientific community.

There is a shared commitment to adopt and scale SRLM and restoration practices in North America. Invasive species are a major challenge to all New World rangelands, and sustainable grazing is one cost-effective mechanism to control their proliferation. The increased competition for water resources also influences rangeland use, especially in the desert and dryland regions, often resulting in tension or conflict. Despite these challenges, academics and practitioners are drawing more attention to rangelands with the goal of improving grazing practices and creating new opportunities for SRLM.

At the country level, Mexico's priorities are focused on improving tenure security, reducing fragmentation in common use rangelands, promoting participatory governance, better access to markets, and adapting to climate change impacts, such as persistent and intense drought.<sup>534</sup> In contrast, land conversion is of most concern in the United States and Canada, alongside invasive species and frequent drought. Nature conservation projects are also addressing rangeland challenges by reevaluating their approaches and interventions.<sup>535</sup> For example, there are efforts to reintroduce bison, the largest native herbivore almost eradicated in the late 1800s, as an important asset to rangeland management, food sovereignty, and the cultural identity of indigenous peoples in the United States and Canada.<sup>536</sup> Currently, there are about 420,000 bison grazing public, private, and tribal lands in the United States helping to recover the health of old-growth rangelands.<sup>537</sup>

## National approaches

### Canada

Canada hosts around 13.2 million hectares of grazed lands, including those in forests. The Canadian prairies stretch for about 1,800 kilometres from southeastern Manitoba to northwestern Alberta. Currently, there are around 11.4 million hectares of grasslands, most of which is still considered natural. Historically, grasslands covered area of 61 million hectares before being converted to oilseed and grain crops. Many of these grasslands can be managed by extensive grazing systems, although they are confronted with significant challenges, such as growing food and feed demand, shrub encroachment, irregular grazing, and mining and infrastructure development.<sup>538</sup>

In Canada, there are approximately 3.7 million beef cattle and 1 million dairy cattle, distributed among approximately 40,000 and 9,000 farms, respectively. In 2021, there were 1.1

million sheep distributed across 3,600 farms.<sup>539</sup> About 1.9 million hectares of Canada's rangelands are Crown lands or managed by the Prairie Farm Rehabilitation Administration which was dissolved in 2009 when its programmes were merged with the Agri-Environment Services Branch.<sup>540</sup> Crown land is managed by departments within each province and there is no national extension service.

Canada's Living Labs Program seeks to promote nature-based solutions to rangeland production challenges.<sup>541</sup> Each Living Lab across Canada is comprised of a scientific advisory team and a suite of private ranches and farms. Each producer has baseline data collected which informs any change in management practices (e.g., rotational/seasonal grazing, innovative water use system) that are monitored over the long term. This is in effect a national extension program using private operators and lands as the research sites which then employs peer-to-peer learning as an effective tool for upscaling SRLM. Living labs could be an example for the rest of the world.

### Rangeland Sustainability Program<sup>542</sup>

The Rangeland Sustainability Program aims to promote the conservation and long-term sustainability of Alberta's rangelands and the ecosystem services these working landscapes provide to communities. Rangeland stewardship is incentivised through education initiatives and tool development; research programs that increase knowledge and understanding of rangeland management; and the removal of barriers to support economic, social, and environmental outcomes. Funding for the program comes from a portion of the revenue collected from grazing disposition rental fees (e.g., grazing leases, licenses, permits). Eligible projects must target rangeland restoration or reclamation, multiple use conflicts or integration, wildfire and climate-related resilience or adaptation, ecological goods and services, education or extension activities, and applied research.

The Rangeland Sustainability Program is small compared to others that are currently active in Canada, including the On Farm Climate Action Fund (administered by Results Driven Agricultural Research in Alberta and the Canadian Forage and Grassland Association in other provinces), the Resilient Agricultural Landscape Program, and the Alternative Land Use Systems (a private funded conservation program funded by the Weston Foundation to promote conservation and nature-based farming and ranching).<sup>543</sup>

### United States

In the United States, rangelands comprise about 308 million hectares, 31 per cent of the total land area. Over half of the rangelands are found in the 19 states west of the Mississippi river. They offer a variety of goods and services, with food and fibre production as the predominant economic uses of the 20th century.<sup>544</sup> The conversion to croplands is the primary threat to the central grasslands, along with shrub encroachment. In one year (2020), approximately 730,000 hectares of rangelands were converted to croplands in the Great Plains.<sup>545</sup>

In 2020, the United States had 5.2 million sheep, including 3.8 million breeding sheep distributed across more than 100,000 farms. There were 2.6 million goats, and over 93 million beef and 9.4 million dairy cattle across 700,000 farms, ranches, and feedlots.<sup>546</sup> Cattle graze over 248 million hectares, representing 27 per cent of the total land.<sup>547</sup> Rangelands in the contiguous United States are mostly privately owned (~55 per cent), with public lands (~40 per cent) and a small fraction (~5 per cent) under Native American tribal jurisdiction. Public lands are managed at the national level by federal agencies (e.g., Bureau of Land Management, Forest Service), while technical assistance to private lands is provided by the Natural Resource Conservation Service. The Society for Rangeland Management<sup>548</sup> and the government<sup>549</sup> have made significant efforts in recent years to support improved management and monitoring in the rangelands (Figure 23).

There are many community based and collaborative rangeland management initiatives across the western United States (e.g., Malpai Borderlands Group, Altar Valley Conservation Alliance). These have contributed to significant advances in adaptive rangeland management with knowledge co-creation efforts that engage ranchers, conservationists, land management agencies, and researchers in co-designing and co-implementing innovative grazing practices.<sup>551 552</sup>

Much of the support for pastoralism in North America is provided through extension services as well as research and academic institutions working directly with producers and grassroots organisations. The three countries support national research organisations and have a well-developed system of colleges and universities with rangeland management and related disciplines. People from both Mexico and the United States, representing universities and grassroots organisations, have been actively involved in the global movement to support rangelands and pastoralism.<sup>553</sup>

### Sustainable Ranching Initiative<sup>554 555</sup>

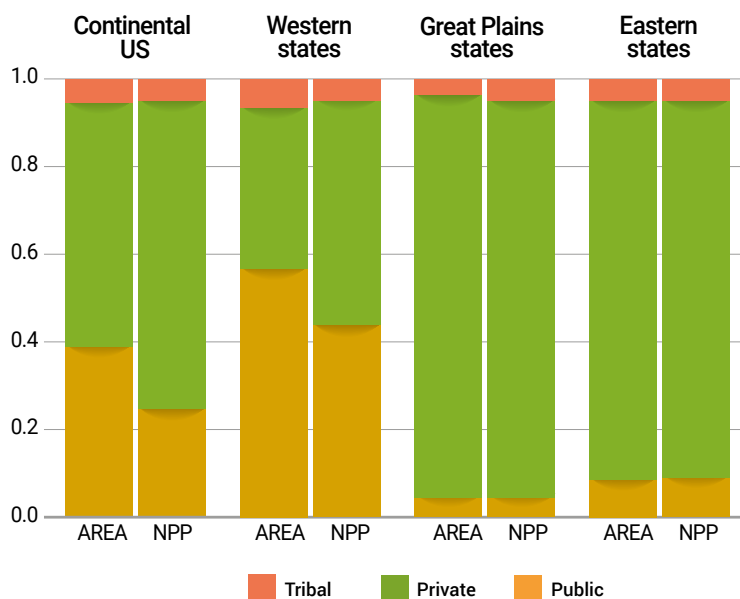
In the northern Great Plains, over 70 per cent of native grasslands are privately owned, with most managed by cattle ranchers. Currently, ranch viability is threatened by narrow profit margins and fluctuating markets which are driving livestock producers to transition to crop production.<sup>556</sup> At the same time, more ranchers are selling their operations to large commercial interests, leading to declining local populations and public services in rangeland communities. Grassland wildlife has also suffered due to habitat loss and fragmentation.

The Sustainability Ranching Initiative (SRI) aims to overcome these challenges by supporting ranchers who steward much of the remaining grasslands in the northern Great Plains. The Ranch Systems and Viability Planning<sup>557</sup> network provides technical assistance, training, monitoring, and other tools to prevent the further conversion of rangelands, and to improve water services, soil health, and biodiversity values while supporting communities and family ranches. Ranchers on private and tribal lands, especially women, youth, and new ranchers, are the primary targets of the SRI. The initiative recognises that each producer is unique and has different goals for their land, family, and community.

SRI offers flexible and context-specific solutions to help ranchers meet their goals via a holistic, long-term approach to rangeland health. This can involve helping farmers transition to regenerative management systems and providing support for native grassland restoration. The SRI has mobilised around USD 11 million to assist ranchers. Currently, there are 83 ranches enrolled, covering over 310,000 hectares. As local partners are the backbone of the support system for ranchers, WWF provides funding to ensure their active involvement. The initiative could be scaled up by building more extensive peer networks of learning and exchange to support the transition to sustainable rangeland management.

**FIGURE 23**

Ownership and productivity of the contiguous United States<sup>558</sup>



There are many community based and collaborative rangeland management initiatives across the western United States (e.g., Malpai Borderlands Group, Altar Valley Conservation Alliance). These have contributed to significant advances in adaptive rangeland management with knowledge co-creation efforts that engage ranchers, conservationists, land management agencies, and researchers in co-designing and co-implementing innovative grazing practices.<sup>559 560</sup>

Much of the support for pastoralism in North America is provided through extension services as well as research and academic institutions working directly with producers and grassroots organisations. The three countries support national research organisations and have a well-developed system of colleges and universities with rangeland management and related disciplines. People from both Mexico and the United States, representing universities and grassroots organisations, have been actively involved in the global movement to support rangelands and pastoralism.<sup>561</sup>

### Drylands Participatory Observatories<sup>562 563</sup>

The RISZA network developed the Drylands Participatory Observatories (DPOs), or living laboratories in the field, where pathways of action are explored via participatory methodologies.<sup>564</sup> DPOs co-generate collaborative learning communities that produce actionable information for decision making on land management, rangeland health, drought impact mitigation, income diversification, etc. This information is stored, shared, and made accessible through the participatory desert repository.<sup>565</sup> The DPOs aim to develop multistakeholder platforms and action plans that foster social innovations and facilitate local hubs for SRLM and restoration that support gender and intergenerational equality. They recognise pastoralists and other rural stakeholders as key players and decision makers at the local level, with their potential to influence policymaking and long-term rangeland stewardship. The Mexican Government (National Council of Science and Technology) has provided funding for DPOs through five grants to co-design, via a participatory multistakeholder process, the second phase of the project.



## Mexico

Grasslands and shrubs of the arid and semi-arid zones of central and northern Mexico encompass approximately 25 per cent of the national territory, with rangelands in other parts of the country covering another 25 per cent.<sup>566</sup> Mexico hosts many natural grasslands, distributed from the north to the southeast, with extensive montane grasslands in Central Mexico, semi-arid grasslands extending from Sonora and Chihuahua to Guanajuato, and arid shrublands from Baja California to Oaxaca. The rangelands in the Chihuahua, Sonora, Baja California, and Tehuacán Deserts are covered by dry scrub corresponding to desert shortgrass steppes. Mexican rangelands have shrunk by 14 per cent (grasslands) and 26 per cent (shrublands) in the last 50 years, mainly due to cropland conversion, overgrazing, and climate change.<sup>567</sup>

Mexico has up to 33.3 million beef cattle,<sup>568</sup> alongside 2.6 million dairy cattle.<sup>569</sup> According to 2021 data, the sheep herd was stable at around 8.7 million,<sup>570</sup> with a similar number of goats.<sup>571</sup> Sheep are raised in 50,000 production units, representing the only source of income for about 34 per cent of producers.<sup>572</sup> In Mexico, a large share of livestock production and rangeland use is for subsistence, with more diverse breeds and production systems than in the United States or Canada. Yet, many rural households remain impoverished without access to credit, technology, or the resources needed to diversify incomes and improve their livelihoods which are solely reliant on grazing, crop farming, and manual labour.<sup>573</sup>

### Organic Livestock in the Chihuahuan Desert

This initiative supports a group of small-scale farmers to produce certified organic meat in the municipalities of Janos, Casas Grandes, and Ascensión in the Mexican desert of Chihuahua. Following the guidelines of the Conservation Program for Sustainable Development, the government supported the initial phase to engage farmers in management, monitoring, and evaluation processes related to organic meat production. Participants established a channel of communication with government entities and NGOs/CSOs interested in supporting the project (e.g., National Commission of Protected Natural Areas, Janos Biosphere Reserve). This helped create the necessary incentives to establish an organic meat processing centre and develop a fair marketing strategy to support the sustainability of small-scale livestock production.

One key achievement has been to enhance the social links between producers and organisations, including a wide range of grassroots and community institutions, producers' associations, the United Nations Development Programme, certifying companies (e.g., Mexican Certifier of Ecological Products and Processes [CERTIMEX]), Tonkawa Consulting, the Mexican Fund for Nature Conservation), government bodies, and research institutes. Results show significant positive impacts in the north of Chihuahua, where grasslands cover extensive regions and have notable potential for SRLM and restoration. This initiative could be shared with ranchers from other regions of Mexico to scale up both organic meat production and grassland restoration.

Mexico has an intricate land tenure system with historical bonds between communal lands and a combination of public and private ownership.<sup>574</sup> The *ejidos* are common lands outside human settlements or towns used for cattle grazing or orchards. There are almost 32,000 *ejidos* and local communities, with over 5.6 million *ejidatarios* (co-owners) that manage over one-half of the country's land. Another 15 per cent are privately owned and managed, and the remaining 5 per cent is owned by the government. About 66 per cent of them graze cattle on pastures and, to a lesser degree, sheep and goats under extensive and free-range systems which have been associated with land degradation.<sup>575</sup> The *ejido* system was transformed into private ownership in the 1990s, increasing fragmentation and over exploitation of pastures. The current situation demands farsighted policies and practical tools to improve the management of common grazing lands.<sup>576</sup>

### Women of the Desert and Eagle Warriors<sup>577</sup>

This initiative provides specialist advice on regenerative grassland management and organic meat production to improve sustainability and promote restoration activities. The underlying objective is to create a network of public and private protected areas in which to implement sustainable livestock management plans along with conservation measures, such as the translocation of white-tailed deer and monitoring of migratory birds. With a focus on empowering community leaders, this initiative coordinates the engagement of leaders through local brigades (Women of the Desert and Eagle Warriors), which provide a liaison function between protected area managers and key stakeholders at each site. The project trains and equips these brigades to identify and monitor golden eagle breeding territories as well as manage local conflicts (e.g., destructive fires, clandestine dumps), mortality events (e.g., poaching, poisoning, collisions), and water sources for wildlife.

The Women of the Desert brigade promotes income diversifying activities (e.g., mesquite honey production, living pharmacy gardens, maintenance of water sources). As pillars of the community, the brigades reinvigorate the pride, identity, and relevance of livestock producers who depend on the desert rangelands for their livelihoods. Regenerative Livestock Management Plans are collectively monitored and assessed for the relevant *ejidos*. This gender responsive approach and its focus on the golden eagle has been effective in engaging new generations in traditional livestock farming while preserving the Chihuahuan Desert culture and way of life.

### Land Degradation Neutrality in North America

In Mexico, official sources recognise that at least 12 per cent of its territory is experiencing severe or extreme soil degradation,<sup>578</sup> and 59 per cent is affected by some degree of degradation due to land use change, deforestation, grazing pressures, climate change, and poor soil management. Unprecedented human migration is leading to the development of “urban belts of poverty” in the city suburbs and to regional transboundary movements that are generating social and political conflicts.<sup>579</sup>

The National Forestry Commission conducted the first national study utilising indicators of land degradation and desertification.<sup>580</sup> Mexico has embraced participatory approaches that have a strong emphasis on the involvement of civil society, particularly the rights of indigenous peoples and local communities. The Program for Sustainable Rural Development 2020–2024 includes commitments to reverse land degradation and incentivise sustainable agricultural practices for small-scale farmers.<sup>581</sup>

In the United States, land use change during the last 50 years was driven by multiple social and economic factors – population growth and demographic shifts – that are increasing the demand for “frontier land” and shaping their management practices. Between 1982 and 2012, over 17 million hectares were converted from their natural state; cropland increased by nearly 1.6 million hectares while at the same time land designated in the Conservation Reserve Program decreased by over 3.2 million hectares.<sup>582</sup> Nevertheless, the soil health movement is working to restore soil organic matter in all production landscapes and the ecosystem restoration agenda has generated considerable research and efforts to slow and reverse land degradation trends.<sup>583</sup>

### Discussion

SRLM and restoration initiatives to preserve and recover old-growth ecosystems is a priority in North America, especially native grasslands and deserts. Common rangeland challenges, such as conversion, transformation, and homogenisation, are being addressed through regenerative livestock farming, rotational grazing, and other pastoralist schemes which benefit local producers and rangeland health. Nature conservation approaches in Mexico and the United States have adopted SRLM to achieve biodiversity goals through the engagement of livestock producers.

As sustainable and resilient food systems is becoming a priority and a lever for transforming rangeland policies and programmes, initiatives led by research institutions, extension systems, and livestock producers in the United States and Canada are seeking to reconnect food production to the intrinsic value of nature and its contribution to people. The recognition of rangelands as sources of sustainable, healthy, and nutritious food is a first step to influencing urban and global consumer demand in ways that promote the sustainable value chains linked to rangeland management practices.



Responsible and inclusive governance of communal rangelands, as with the Mexican *ejidos*, contributes to the success of many rangeland and pastoralist initiatives around the world. The quest is on to find socioeconomic pathways that facilitate secure tenure rights, collaborative management, and adaptive investments to ensure the long-term viability of rangeland resources. Traditional pastoralist systems offer a valuable source of ideas, tools, and implementation mechanisms to improve the way common lands are managed worldwide.

## 4.10 Southern Africa and Australia

This section provides three case studies from Southern African countries and one from Australia to highlight some rangeland issues that have not yet been fully addressed in the report.

### Angola: Traditional Pastoral Management Forums

Transhumant pastoralist communities of southern Angola traditionally held gatherings of chieftains and community leaders to discuss the management of commonly held pastoral resources. These traditional management systems centred around retaining livestock in remote mountainous areas during the rainy season (to allow for local crop farming) and bring them back to the lowlands during the dry season (to allow rangelands to recover). In recent times, resource conflict and mismanagement (e.g., livestock intrusion into croplands during the growing season) have led to the breakdown of this management model and its governance arrangements.<sup>584</sup>

The *Jango Pastoril* approach, underpinned by the Green Negotiated Territorial Development Methodology,<sup>585</sup> consists of reviving traditional pastoral forums to encourage SRLM and improve local livelihoods. The process of restoring these forums began with consultative meetings and trainings, followed by the reconstitution of five pastoral forums (*Jango Pastoril*). With administrative and

community support, each *Jango Pastoril* produced SRLM plans which included the creation of grazing reserves. The five plans were then combined into a comprehensive plan to safeguard the main transhumance routes served by the RETESA project.<sup>586</sup>

FAO and government specialists supported the planning process and provided technical support, monitoring, and feedback. Municipal and communal administrations co-ordinate the organisation and logistics of the *Jango Pastoril* and endorse their decisions. The *Jango Pastoril* is seen as trusted institution which positively impacts the daily lives of people in these communities. Another objective is to produce communal management plans for the rehabilitation of rangelands that engages relevant stakeholder in design and implementation activities – from species selection, seed collection, and the establishment of nurseries to identifying and executing revegetation projects as well as their maintenance and monitoring. By entering into communal agreements and producing management plans that improve access to local resources, these communities have shown a unified front against the conversion and privatisation of rangelands.

### Zambia: Forest Land Use Restoration

The Forestry Land-use Restoration (FLR) Project is part of the WWF initiative, “KAZA arise”, which aims to reverse land degradation in the Kavango-Zambezi Transfrontier Conservation Area of southern Zambia by promoting farmer-led regenerative practices in the rangelands.<sup>587</sup> This initiative engages small-scale farmers and traditional leaders and challenges the assumption that protected areas will naturally regenerate with nominal protection. It focuses on nature-based solutions for climate change mitigation and adaptation through the development of long-term finance for protected areas, specifically indigenous and community conservation areas. The aim is to encourage private sector investment in positive action for people and nature by regenerating land and forest resources. Between 2020 and 2023, a total of around USD 12 million was invested in the FLR Project.



The FLR Project developed integrated General Management Plans for protected areas in Zambia. The first was developed in Kafue Flats, which includes Blue Lagoon and Lochnivar National Parks, followed by three others for the Sichifulo, Mufunta, and Mulobezi Game Management Areas. These plans were produced under Community based Natural Resource Management (CBNRM) structures and guidelines, targeting alternative livelihoods, anti-poaching measures, habitat loss and fragmentation, environmental degradation, human-wildlife conflicts, and governance systems. They include the mapping of 20 wildlife corridors for land restoration to enhance connectivity between the Kavango-Zambezi Transfrontier Conservation Area and the Kafue and Sioma Ngwezi. WWF and other stakeholders in Zambia have proposed including wildlife corridor protection in the Zambia Wildlife Act.

### South Africa: Champion Pastoralists

South Africa is seriously challenged by the degradation of private and communal rangelands, which is being exacerbated by climate change impacts. During the 2015–2019 multi-year drought,<sup>588</sup> most pastoralists lost their animals due to feed shortages or forced destocking. This programme supports livestock farmers in understanding the impacts of climate and environmental change and the management options to enhance resilience in their communities and rangelands. Grassroots organisations and the Department of Agriculture consulted in the nine provinces and identified pastoralists best able to mitigate and adapt to drought impacts and analysed their management strategies: 100 pastoralists were selected to be “champion farmers”, representing different tenure regimes ranging from private, state-owned, community-owned, traditional authority, and land reform farms (with and without title).<sup>589</sup>

Funded by the Department of Agriculture, Land Reform and Rural Development, 12 research staff and 30 postgraduate students, assisted by two administrative staff, implemented the programme with only USD 300,000. The ecological and business knowledge of the champion pastoralists was documented,<sup>590</sup> their strategies and practices to protect rangeland health even in times of drought were validated in diverse contexts. These management strategies will be used as a benchmark to assist other pastoralists, mostly those farming livestock and wildlife who are facing similar conditions. Both commercial and small-scale farming systems were targeted across different rangeland biomes: savannah, grassland, Nama-Karoo, succulent Karoo, and Albany Thicket. Key lessons learned were integrated into South Africa’s National Veld (Rangeland) Management Strategy and used to support land reform programmes that are inspiring a new generation of pastoralists.

### Northern Australia Climate Programme

The Northern Australia Climate Program (NACP) delivers innovative research, development, and extension services

to improve the capacity of the red meat industry to better manage drought and climate risks across northern Australia.<sup>591</sup> The NACP aims to improve existing climate models and forecast tools, develop new products, and build the capacity of rangeland producers to manage the challenges posed by drought and climate variability.<sup>592</sup> It targets the entire red meat supply chain, (from producers to processing and export) to improve weather and climate awareness, knowledge, skills, and practical experience to reduce climate risk and drive positive outcomes.

A web-based Australian Drought Monitor<sup>593</sup> was developed to address inefficiencies in subjective assessments and conduct data analyses on drought. Regional forecasting tools were improved and used throughout a region that supports 15 million cattle. Continuing research is enhancing the accuracy of multi-week, seasonal, and multi-year forecasts of flash and multi-year droughts. It also serves to tailor weather and climate products, such as a Climate Profitable Grazing System Self Learning Package,<sup>594</sup> that provide support beyond the lifetime of the programme. Since 2017, the NACP has assisted the pastoral grazing industry to better manage drought risk and climate variability. NACP funding is sourced from the beef cattle industry, government, and academia, representing a broad range of interests and target beneficiaries. The programme also funds scientists in the United Kingdom and Australia, leading to notable scientific outcomes.<sup>595</sup> In addition, the benefits to producers from using the NACP products and extension services to make better climate decisions is estimated to be worth an average USD 16.5 million per year.

### Discussion

This last set of case studies show the importance of understanding risks and vulnerabilities, and how to design and finance appropriate response measures on threatened rangelands while ensuring sustained benefits for pastoralists and livestock producers.

Successful rangeland initiatives must be based upon inclusive participatory processes before, during, and after implementation – from planning and design to monitoring and evaluation. Rangeland projects and programmes must set clearly defined socioeconomic objectives so as not to inadvertently raise expectations regarding income generation or agricultural performance. Innovative financial approaches to scale up SRLM and restoration initiatives must account for the trade-offs and compensate for the risks taken by pastoralists and rangeland communities.

Rangeland and pastoralist projects and programmes have evolved considerably since the late 20th century. The case studies presented in this chapter show clear advances in responsible and inclusive governance and the application of community based approaches. In South African countries, traditional management outcomes have informed policy decisions, attracted private investment, and revived customary rangeland institutions.

# 5. Global support for rangelands and pastoralism

This chapter describes some of the high-profile organisations, institutions, and networks that support the conservation, sustainable management, and restoration of rangelands, particularly those focused on the cultural, social, and economic aspects of nomadic, transhumant, and other mobile pastoralists as well as agropastoralists, silvopastoralists, and other grazing communities.

## 5.1 Global and regional frameworks

Global processes and commitments are critical to build momentum and assist countries in creating the enabling environments for SRLM and restoration activities in the pursuit of multiple co-benefits, including improved livelihoods, climate change mitigation and adaptation, and biodiversity conservation (Table 15).

LDN commitments can help bridge the gap between environmental and socioeconomic approaches to rangeland management and restoration. The UNCCD secretariat and the Global Mechanism established the **LDN Target Setting Programme** to assist countries with baseline assessments and response measures needed to achieve LDN by 2030. Over 130 countries have committed to set their LDN targets with the aim of mobilising resources and political will for implementing transformative projects and programmes. The UNCCD and its partners provide strategic guidance, practical tools, and capacity building to enhance national efforts to avoid, reduce, and reverse land degradation, including through SRLM and restoration practices.<sup>596</sup>

Other global institutions, such as FAO and IUCN, have adopted the LDN approach and its response hierarchy (avoid/reduce/reverse land degradation) while promoting participatory methodologies for monitoring and assessing rangeland health.<sup>597</sup> The **Participatory Rangeland and Grassland Assessment Methodology (PRAGA)**<sup>598</sup> can be used to assess the health and status of rangelands and identify cost-effective options to strengthen the capacity of local and national actors. FAO and its partners have developed the **Framework for Ecosystem Restoration Monitoring (FERM)**,<sup>599</sup> a geospatial monitoring platform for tracking global restoration progress (with indicators specific to rangelands) and disseminating good practices in support of the objectives of the UN Decade on Ecosystem Restoration. The **Livestock Environmental**

**Assessment and Performance Partnership (LEAP)**<sup>600</sup> is a multistakeholder initiative that seeks to improve the environmental sustainability of the livestock sector via harmonised methods, metrics, indicators, and data.

The **Global Agenda on Sustainable Livestock** is a partnership of stakeholders committed to the sustainable development of the livestock sector.<sup>601</sup> The CBD and other United Nations bodies have also contributed to building coherent policy and action frameworks for rangelands and pastoralism.<sup>602</sup> Despite these efforts, there are still relatively few examples of how these global frameworks can transform national commitments into action on the ground. At the continental level, the African Union offers a framework to implement transboundary and coordinated policies that can support rangelands and pastoralism.

### Policy Framework for Pastoralism in Africa<sup>603</sup>

Acknowledging a continent-wide need for a framework that recognises the rights of pastoralists, including equal access to services, the African Union introduced a Policy Framework for Pastoralism in Africa. The framework aims to: (i) secure, protect, and improve the lives, livelihoods, and rights of pastoralist communities; (ii) contribute to food security and sustainable production through greater efficiencies and the meaningful participation of pastoralists; and (iii) enhance commitments to the political, social, and economic development of rangeland and pastoralist communities and areas.

The framework specifies the need to strengthen the roles and rights of pastoralist women, legitimise indigenous and traditional pastoral institutions and management practices, and support pastoralist access to rangelands through the reform of land tenure policy and legislation and the application of participatory land use planning. It also addresses other major issues related to rangelands and pastoralism: (i) pastoral mobility within and between states; (ii) animal and human health systems; (iii) the institutionalisation of risk-based drought management systems; (iv) marketing and value chains; (v) credit and financial services for pastoralists; (vi) recognition of genetic and cultural heritage; and (vii) support for research, extension services, and the promotion of indigenous knowledge.



**TABLE 15**
**Global and regional support for rangelands and sustainable pastoralism**

Approach	Objective	Initiatives
<b>5.1 Global and regional frameworks</b>	Guidance, tools, and capacity building	LDN Target Setting Programme and Transformative Projects and Programmes (UNCCD and partners)
	Assessment, monitoring, and evaluation	Participatory Rangeland and Grassland Assessment Methodology (PRAGA); Framework for Ecosystem Restoration Monitoring (FERM) Platform; Livestock Environmental Assessment and Performance Partnership (LEAP); Global Agenda on Sustainable Livestock (FAO, UNEP, IUCN)
	Integrate pastoralism in policy frameworks	Policy Framework for Pastoralism in Africa (AU); Working Group on Dryland Forests and Agrosilvopastoral Systems (FAO); The PASTRES Programme (ERC)
<b>5.2 Tenure security</b>	Secure land access and resources rights	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (FAO); Technical Guide on VGGT and LDN (FAO/UNCCD); Rangelands Initiative (ILC)
<b>5.3 Pastoralist voices</b>	Platforms and networks for pastoralist communities	League for Pastoral Peoples; The Global Pastoralists' Gatherings; World Alliance of Pastoralist Communities and Mobile Indigenous Peoples (WAMIP); FAO Pastoralist Knowledge Hub (PKH); Coalition of European Lobbies for Eastern African Pastoralism (CELEP); Arabian Pastoralist Communities (APCN) Network; South Asia Pastoralist Alliance; International Network for Drylands Sustainability
<b>5.4 Cultural values and heritage</b>	Recognise the value and diversity of pastoralism	UNESCO World Heritage Sites (mobile pastoral systems and global strategy to support agropastoral cultural landscapes); FAO Globally Important Agricultural Heritage Systems (GIAHS); Terre Rurale d'Europa (TRE) programme; The Perspectives on Pastoralism Film Festival (CELEP)
<b>5.5 A gender responsive lens</b>	Amplify the experiences and concerns of female pastoralists	IYRP Working Group on Gender and Pastoralism (position paper); Global Gathering of Women Pastoralists (Maldhari Rural Action Group)
<b>5.6 Nature conservation</b>	Conserve biodiversity in rangelands	WWF's Global Grasslands and Savannas Initiative (GGSI) and GrassBank; FAO's Sustainable Forest Management Impact Program on Dryland Sustainable Landscapes
<b>5.7 Co-creation of knowledge</b>	Advance a greater understanding of rangeland ecology and associated social-ecological issues	The Joint International Grassland and International Rangeland Virtual Congress; The Rangelands Partnership; The Rangelands Gateway; Local and Indigenous Knowledge Systems (LINKS); The Rangelands Atlas; Global Rangelands Monitoring tool; Global Pasture Watch; The Global Rangeland Simulation Tool; Quantification of intake and diet selection of ruminants; The Global Database on Sustainable Land Management (UNESCO, ILRI, WWF, ILC, FAO, UNEP, Rangelands Initiative, CSIRO, WRI, CSU, IAEA, IUCN, WOCAT)
	Community of practice	FAO's WeCaN Nurturing Community of Knowledge Practice for Women in dryland forests and agrosilvopastoral systems
	Capacity development	Massive open online course (MOOC) on Pastoralism in development; Pastoralist Field Schools (IIED, FAO, ILRI, Vétérinaires Sans Frontières)
<b>5.8 Resource mobilisation</b>	Develop best practices for investments in pastoralism	Standard for development banks to determine good investments in pastoralism; Sustainable Investments for Large-Scale Rangeland Restoration (STELARR); DRIVE project (IUCN, IFAD, GEF, ILRI, ILRI-CGIAR, World Bank, USAID, UKAid)
	Assess the value of pastoralism	Economics of pastoralism in Argentina, Chad and Mongolia; Economics of Land Degradation Initiative; Global Review of the Economics of Pastoralism (FAO, GIZ, IUCN)
<b>5.9 Inclusive governance</b>	Support participatory processes	Rangelands and Pastoralism: Towards a Global Initiative for Pastoralists' Territories of Life (ICCA Consortium FAO, IUCN)
<b>5.10 A transversal approach</b>	Raise awareness on rangelands and pastoralism	International Year for Rangeland and Pastoralism (IYRP), the International Support Group (ISG-IYRP) and its 11 regional support groups

A global policy approach that integrates rangelands and forestry is being promoted by FAO's Committee on Forestry **Working Group on Dryland Forests and Agrosilvopastoral Systems**.<sup>604</sup> This statutory body is focused on mainstreaming agroforestry as a key tool for sustainably managing drylands and promoting initiatives, such as the Summer School, that are aligned with the IYRP, SRLM, food security, and ecosystem restoration agendas. One initiative solely dedicated to sustainable pastoralism, the **PASTRES Programme**,<sup>605</sup> has produced reports on policy frameworks in Europe,<sup>606</sup> sub-Saharan Africa,<sup>607</sup> West Asia and North Africa,<sup>608</sup> and Asia.<sup>609</sup> They published a book on pastoralism and development,<sup>610</sup> which strongly advocates for the adoption of a new policy narrative on pastoralist systems as critical global infrastructure.<sup>611</sup>

## 5.2 Land rights and tenure security

National authorities generally determine who has the right to use and access rangeland resources. In many countries, commonly owned or managed rangelands – including those controlled by states and local authorities or customarily managed by indigenous peoples – constitute the most powerful means to safeguard pastoralist livelihoods.

The United Nations and international organisations have promoted diverse and complementary initiatives to help improve tenure security in rangeland and pastoralist environments.<sup>612</sup> In 2012, the FAO Committee on World Food Security endorsed the **Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests**.<sup>613</sup> The FAO supports the operationalisation of these guidelines and helps to establish multistakeholder platforms<sup>614</sup> at national and sub-national levels, including in countries with sizeable rangelands, such as Mongolia, Kenya, Tanzania, and Mauritania.

Improving tenure security is seen as a critical step to achieve LDN in many parts of the world.<sup>615</sup> In 2022, the UNCCD and FAO jointly produced the **Technical Guide on the Integration of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context**

**of National Food Security into the Implementation of the United Nations Convention to Combat Desertification and Land Degradation Neutrality**.<sup>616</sup> The Parties to the UNCCD recognise that more secure land tenure for pastoralists is an important contributing factor to the success of LDN, SRLM and restoration initiatives.<sup>617 618 619</sup>

### The Rangelands Initiative

The ILC<sup>620</sup> has been promoting the Rangelands Initiative<sup>621</sup> to build a global network and work programme to increase tenure security for local rangeland users through the improved implementation of enabling policies and legislation. The initiative includes a global and three regional components, each bringing together organisations and creating networks of diverse stakeholders and experts.<sup>622</sup>

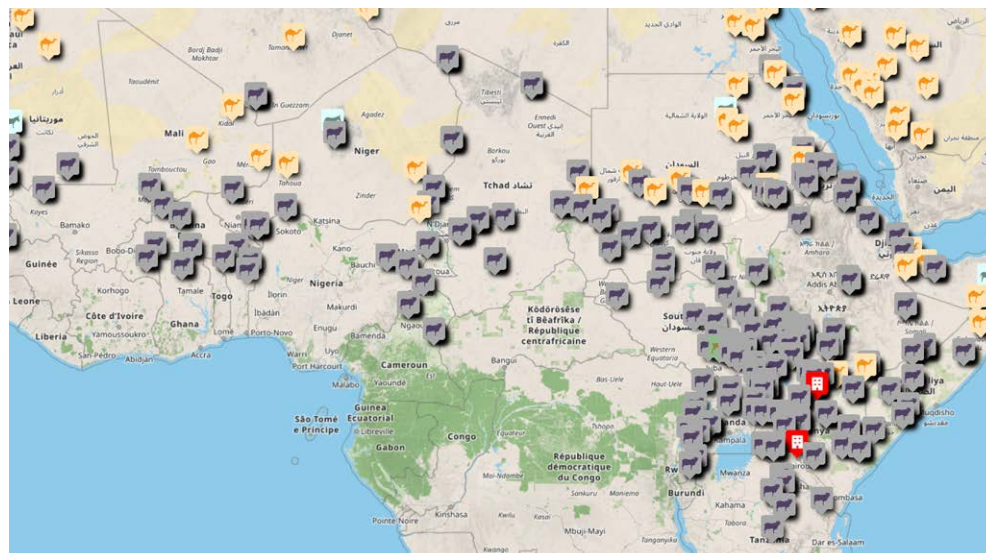
## 5.3 Grassroots organisations and pastoralist voices

Rangelands are best understood as social-ecological systems which require cultural sensitivities in each specific context to harness synergies, balance different interests, and negotiate equitable trade-offs.

The **League for Pastoral Peoples**<sup>623</sup> was founded in 1992 to provide relief to Raika camel pastoralists in India during an acute crisis where herd numbers declined drastically in response to grazing bans. The League currently supports pastoralist societies and other small-scale livestock keepers around the world through research, technical support, advisory services, and advocacy. It has published a series of informative studies, "Accounting for Pastoralists", that analyse the socioeconomic condition of pastoralists in different countries,<sup>624</sup> including Mozambique,<sup>625</sup> Spain,<sup>626</sup> Iran,<sup>627</sup> Uganda,<sup>628</sup> Kenya,<sup>629</sup> India,<sup>630</sup> Germany,<sup>631</sup> and Argentina.<sup>632</sup> An interactive pastoralist map depicts over 800 pastoralist groups worldwide offering easy access to basic knowledge on pastoral ways of life (Figure 24).<sup>633</sup>

FIGURE 24

A fragment of the pastoralist map by the League for Pastoral People<sup>634</sup>



Although there is a growing global movement to support pastoralism, the inclusive and meaningful participation of pastoralists in decision making processes remains a challenge. The engagement of mobile pastoralists is an especially difficult barrier to overcome given that the practices of nomads and transhumant communities are often not aligned with conventional participatory methodologies.<sup>635</sup> The **Global Pastoralists' Gatherings** at Turmi, Ethiopia (2005) and Segovia, Spain (2007), the **Dana Declaration** (2002)<sup>636</sup> and the **Dana+20 Manifesto on Mobile Peoples** (2022),<sup>637</sup> have allowed mobile pastoralists to gain access to global spaces where they can forge common identities to advocate for their rights.<sup>638</sup>



### World Alliance of Pastoralist Communities and Mobile Indigenous Peoples

The World Alliance of Pastoralist Communities and Mobile Indigenous Peoples (WAMIP) is a global grassroots organisation created by pastoralists to provide a common space dedicated to preserving their traditions, livelihoods, and cultural identity.<sup>639</sup> The WAMIP provide capacity development to help pastoralist communities manage common property resources sustainably, secure full recognition and respect for their rights, and ensure their active presence in different international fora, such as the IFAD Indigenous Peoples' Forum<sup>640</sup> or FAO's LEAP.<sup>641</sup>

Grassroots organisations are instrumental in amplifying the voices of pastoralists. IFAD has developed a toolkit for engaging with pastoralists,<sup>642</sup> and the **Coalition of European Lobbies for Eastern African Pastoralism** (CELEP)<sup>643</sup> brings together grassroots organisations to lobby for pastoralism in East Africa. FAO's **Pastoralist Knowledge Hub** (PKH) is a multistakeholder platform for pastoralist organisations and international partners to ensure that their voices are prominent in global policy dialogues and knowledge-sharing fora.<sup>644</sup> FAO provides technical and logistical support and dedicated staff to the more than 50 international organisations actively engaged as PKH partners (Figure 25).<sup>645</sup>

Other networks and alliances have emerged to address specific rangeland issues or geographies. They are usually positioned close to their origins and rely on wider networks for a global presence as is the case of the **Arabian Pastoralist Communities Network** (APCN)<sup>647</sup> and the **South Asia Pastoralist Alliance**.<sup>648</sup> Some are being promoted by research institutions with close links to rangelands and pastoralism, such as the **International Network for Drylands Sustainability** (RISZA) in Mexico.<sup>649</sup> Launched in 2017, RISZA has over 500 members that engage in transdisciplinary and participatory research on social-ecological systems, intercultural dialogue, and local governance structures.

## 5.4 Cultural values and heritage

The interdependence between humans, land resources, and biodiversity in rangelands and pastoralist environments has created a diverse cultural landscape with unique values and identities.<sup>650</sup>

UNESCO recognises many pastoral landscapes as World Heritage sites.<sup>651</sup> The current list of **UNESCO World Heritage Sites** includes mobile pastoral systems in Europe, the Middle East, Central Asia, the Himalayas, and the Sahel, as well as southern Africa, celebrating the value and diversity of cultures and livestock systems around the world.<sup>652</sup> UNESCO also acknowledges the importance of these systems through the development of a global strategy to support agropastoral cultural landscapes.<sup>653</sup>

**FIGURE 25** Workflow of the Pastoralist Knowledge Hub<sup>646</sup>



The FAO has recognised certain pastoralist systems as **Globally Important Agricultural Heritage Systems** (GIAHS),<sup>654</sup> where communities are intricately entwined with their territorial, cultural, and agricultural landscapes. Some examples highlight the links between pastoralists and crop farmers, such as in Morocco's eastern territories, the Thale Noi Wetland Buffalo Pastoral Agro-Ecosystem in Thailand, and the agrosilvopastoral system of the mountains of León in Spain. The FAO has designated 74 heritage systems in 24 countries with a significant presence of pastoralism, including agrosilvopastoral systems.<sup>655</sup>

### Terre Rurali d'Europa

The *Terre Rurali d'Europa* (TRE) programme includes a transhumance-safeguarding plan in all European countries within the framework of UNESCO's Intangible Cultural Heritage.<sup>656</sup> It aims to create opportunities to finance both national and international actions with EU grants. Public and private sector bodies in European countries with UNESCO nominations manage TRE, and the Rural Centre for Multiservice Assistance guides its implementation. Following the first UNESCO nomination, a working group of experts was set up within Italy, Albania, Austria, Greece, France, and Spain to coordinate and undertake actions within the framework of EU programming. TRE contributes to the recovery of the historical, cultural, and environmental heritage of the agrosilvopastoral traditions, produce, and crafts while celebrating transhumance in countries with or seeking UNESCO recognition. An alliance of European groups in the six countries received EUR 2.5 million from Italy in response to an open call for a national safeguarding plan. This secures programme funding with human resources pooled from pastoral networks, universities, research institutions, and grassroots organisations.

Some organisations and institutions are using traditional and social media to celebrate the rich cultural heritage of rangelands and disseminate information on pastoralist issues and movements. The **Perspectives on Pastoralism Film Festival**,<sup>657</sup> promoted by CELEP, aims to increase global awareness of pastoralist livelihoods and sustainability challenges in the rangelands through film and the arts.<sup>658</sup>

## 5.5 A gender responsive lens

Gender is an important aspect of the pastoralist movement highlighted by the **IYRP Working Group on Gender and Pastoralism** in its first position paper.<sup>659</sup> Various international organisations have made advances in integrating gender-responsive perspectives and approaches into rangeland and pastoralist initiatives,<sup>660 661</sup> and into related research being conducted throughout the world.<sup>662 663</sup>

Several global initiatives specifically support women pastoralists networks and gender responsive approaches to LDN, SRLM, and restoration projects and programmes.<sup>664</sup> The **Global Gathering of Women Pastoralists**,<sup>665</sup> held in Mera (Gujarat), India and hosted by the **Maldhari**

**Rural Action Group**,<sup>666</sup> brought together over 100 women from herding communities in 32 countries and issued the **Mera Declaration**.<sup>667</sup> This communique offers guidance on the application of a gender lens to project interventions, encouraging the formal education of pastoralist girls and discouraging their engagement in unpaid manual labour.<sup>668</sup>

## 5.6 Nature conservation

As the understanding of rangeland ecology continues to grow so has the awareness of the need for biodiversity conservation to safeguard the multiple benefits provided by healthy and productive rangelands, grasslands, and savannahs around the world.

The WWF and its partners have spearheaded a multi-actor initiative, the **Global Grasslands and Savannahs Initiative** (GGSI),<sup>669</sup> to seek consensus on the human, biological, and economic importance of these ecosystems. It seeks to convene influencers and experts, advocate for and share information on good management practices, and has produced guidelines to spur action to protect, sustainably manage, and restore grasslands (Table 16). The GGSI is developing **GrassBank**, a global database of information on grasslands and savannahs across WWF's network of expertise and knowledge, systematising and making it available to improve the GGSI strategy and global action plan to conserve and restore grassland ecosystems.

The **Sustainable Forest Management Impact Program on Dryland Sustainable Landscapes**,<sup>670</sup> focuses on enhancing the global environmental benefits through an agroecosystem-focused landscape perspective. Funded by the GEF in the amount of USD 104 million, with over USD 800 million in co-financing, this programme is assisting 11 countries across Africa and Asia to promote ecosystem restoration and rehabilitation, fostering the enhanced resilience of food production systems, and improving landscape-dependent livelihoods.

## 5.7 Co-creation of knowledge

Knowledge gained through practice, experience, tradition, scientific data, and/or research is critical for informed decision making on SRLM and restoration projects and programmes. Knowledge should be co-created and shared in a way that is accessible and has practical applications for

**TABLE 16**

**Activities to protect, manage, and restore grasslands and savannahs at the landscape level**

PROTECT = AVOID	MANAGE = REDUCE	RESTORE = REVERSE
Protect for long-term	Improve sustainable production (close yield gaps to prevent new conversion)	Restore ecological functions (for biodiversity, water, carbon, and people)
Ensure zero new conversion	Support land use planning	Build capacity of farmers and local communities
Create and improve protected area status (public and private)	Incentivise good conservation practices	Use business cases to incentivise change
Support both communities and economic uses	Facilitate conflict reduction and resolution	

a broad range of policymakers and stakeholders. Scientists can work directly and collaboratively with other members of society to co-generate knowledge, learn together, and then experiment with implementing that new knowledge in on-the-ground action.<sup>671</sup>

Rangeland research has been slow to incorporate traditional pastoralist knowledge, even though indigenous strategies and practices have been used for generations to sustainably manage rangelands.<sup>672</sup> Geo-referenced data (e.g., spatially explicit land use maps based on field data) are scarce and often difficult to disaggregate by specific production systems, especially extensive livestock grazing. The monitoring of key indicators to assess rangeland management and pastoralism (e.g., seasonal grazing pressures, livestock species, rotation periods, land-based production activities) is hindered by a lack of data or access to it. Numerous collaborative partnerships are beginning to transform how knowledge is produced and shared.<sup>673</sup>

Academic and research institutions are actively developing knowledge with practical applications that are fit-for-purpose. The use of transdisciplinary perspectives (including non-academic) that combine different types of knowledge systems has matured in recent years. The **Joint International Grassland and International Rangeland Virtual Congress** held in 2021 facilitated a greater understanding of rangeland ecology and associated governance and social issues.<sup>674</sup>

The **Rangelands Partnership** is an academic initiative to bridge the gap between researchers and field practitioners by providing timely and reliable information on rangelands. Originally based in North American universities and institutions, it has expanded into a global partnership. Its flagship project, **The Rangelands Gateway**,<sup>675</sup> is a global repository of information on rangeland ecology and management, which offers communications and training tools as well as a decision support toolbox with 50 instruments to support SRLM and restoration.

### The Rangelands Atlas

The Rangelands Atlas was developed by a consortium of international organisations (International Livestock Research Institute [ILRI], WWF, ILC, FAO, United Nations Environment Programme [UNEP], Rangelands Initiative) to map and document the extent of rangelands worldwide and to raise awareness of their environmental, economic, and social values. The Atlas contains maps and case studies which draw attention to climate change impacts on rangelands, land tenure and land use change, investments, and other direct and indirect drivers of degradation. It shows how global partnerships are filling knowledge gaps and inspiring future initiatives.<sup>676</sup>

UNESCO's **Local and Indigenous Knowledge Systems (LINKS)**<sup>677</sup> promotes local and indigenous knowledge of pastoralists and its inclusion in global climate science and policy processes. LINKS has been influential in ensuring

that local and indigenous communities and their knowledge are included in contemporary science-policy-practice fora including biodiversity (e.g., CBD, IPBES), climate change (e.g., UNFCCC, IPCC), disaster risk reduction (e.g., UNDRR, ISDR), and sustainable development (e.g., SDGs, HLPF, Future Earth).

New initiatives are working to fill the gap in actionable data to track progress. The **Global Rangelands Monitoring** and the **Rangeland and Pasture Productivity Map (RaPP)**,<sup>678</sup> hosted by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), offers a free online tool to monitor the condition of the world's rangelands in support of sustainable land use and animal production. **Global Pasture Watch**<sup>679</sup> is a research consortium, led by the World Resources Institute's Land and Carbon Lab, that maps and monitors the extent, management, and condition of global grasslands and pastures. The goal is to provide data for decision making on relevant issues like carbon storage and rangeland conversion.

The ILRI hosts the **Global Rangeland Simulation Tool (G-Range)**,<sup>680</sup> developed in collaboration with Colorado State University, a simulation model used for global analyses of the evolution of native rangelands. The IAEA supports the **Quantification of intake and diet selection of ruminants**,<sup>681</sup> which utilises stable isotopes to develop a practical method to predict pasture intake of ruminants grazing on heterogeneous rangelands. This allows farmers to assess the nutritional value of forage and design effective feed supplementation strategies to optimise livestock production.

There are numerous sources of knowledge-based guidance for community based conservation activities, in which many rangeland and pastoralist communities are involved, including the **Community Conservation Research Network**<sup>682</sup> and resources compiled by the IUCN.<sup>683</sup>

### Management and practice

The traditional ecological knowledge and cultural heritage of pastoralist communities represent an important share of the evidence base on rangelands. In addition to local and traditional knowledge, it is important to consider the role and importance of local norms, values, and visions. In the Australian context, important Aboriginal values (e.g., kinship, country, lore, dreaming) have been incorporated into land management practices that promote resilient social-ecological systems.<sup>684</sup>

Taking advantage of all forms of knowledge can help support bottom-up initiatives and improve the way rangelands are managed, as well as inform the design of more effective policies and investment strategies for the rangelands.<sup>685</sup> One challenge is to find the most appropriate methods to generate and transmit knowledge so that it improves practitioner competence and confers new skills. With this aim, educational exchanges and peer-to-peer learning among pastoralists from around the world could contribute to the co-creation of tools that address shared challenges and help collect and systematise SRLM and restoration good practices.

### Global Database on Sustainable Land Management

The Global Database on Sustainable Land Management (SLM)<sup>686</sup> was developed by WOCAT and its partners and hosts the most comprehensive repository of current SLM (including SRLM) and restoration practices. The database offers a framework and set of tools for documentation, monitoring, evaluation, and dissemination of SLM knowledge. Data are first collected through reviewed questionnaires, then the practices identified are included in the database. A land degradation and mapping questionnaire, developed in collaboration with the FAO Land Degradation Assessment in Drylands project, helps to assess the spatial coverage of land degradation, support evidence-based decision-making, and scale up identified good SLM practices.

Some global initiatives bring together pastoralists and rangeland managers from different regions and provide opportunities to exchange practical knowledge and expand the vision of practitioners, as demonstrated by the PKH and other collaborations. Hosted by FAO, the **WeCaN Nurturing Community of Knowledge Practice for Women in dryland forests and agrosilvopastoral systems**<sup>687</sup> is a platform for women's empowerment in dryland regions – offering them a safe space to connect, share best practices, have their voices heard, and engage in knowledge-sharing events and trainings, while developing advocacy and gender-mainstreaming skills. WeCaN members are focal points from grassroots and women's organisations, NGOs/CSOs, and other stakeholder groups committed to gender-responsive approaches in dryland areas. The platform also links national and regional networks to share knowledge and experiences via South-South cooperation.

### MOOC on Pastoralism in Development

The first edition of the global massive open online course (MOOC) on Pastoralism in Development<sup>688</sup> was organised by the International Institute for Environment and Development in January 2023 with the enrolment of over 1,000 students. The course targets individuals working on pastoralism from different disciplines, as well as professionals seeking additional training. The methodology is consistent with the pedagogical approach of a MOOC, supporting substantive learning via a broad range of media and highlighting the latest advances in research and theory. A self-study version of the course became available in October 2023.<sup>689</sup> Other institutions use MOOCs as a vehicle for global training with content related to rangelands, such as FAO's e-learning course on "Transforming dryland forests and agrosilvopastoral systems".<sup>690</sup>

### Education and training

Education and training are another important way to disseminate knowledge gained from rangeland projects and programmes. While conventional education offers a wide range of opportunities, innovative approaches for training

rangeland managers and implementing agencies outside the formal academic context are becoming more common. Several international organisations have provided free and open training opportunities that cover a variety of rangeland and pastoralism topics, including the ILC learning hub<sup>691</sup> and the Rangeland Gateway.<sup>692</sup>

One concern with new training initiatives is that they often apply out-dated learning methodologies that overlook the knowledge and experience of the trainees themselves. For example, pastoralist mobility requires tailored educational initiatives with their design, delivery, and training methodology adapted to these communities.<sup>693</sup> <sup>694</sup> FAO promotes **Pastoralist Field Schools**,<sup>695</sup> a variation on the Farmer Field Schools methodology,<sup>696</sup> in partnership with ILRI and *Vétérinaires Sans Frontières*. These schools have been piloted in Kenya and are being replicated in other African countries. Pastoralist Field Schools usually involve a group of pastoralists (e.g., elders, men, women, youth) and a well-trained local facilitator who meet regularly over a defined period to share experiences in a peer-to-peer learning process. The Pastoralist Field Schools encompass the entire annual rangeland cycle, enabling participants to share adaptation strategies at each period. A guide for facilitators was subsequently developed and published by FAO and *Vétérinaires Sans Frontières*.<sup>697</sup>



## 5.8 Resource mobilisation

Rangeland and pastoralist communities across the world share many of the same socioeconomic and financial challenges. While global funding mechanisms, such as the Green Climate Fund (GCF) and GEF, can support rangeland restoration and sustainable pastoralism projects,<sup>698</sup> the lack of strong project proposals and robust evaluation protocols can limit financing opportunities. The proportion of funds directed to rangelands remains quite small in comparison to other ecosystems. In 2012, the IUCN commissioned IFAD to create a standard that development banks and other financial mechanisms could use to determine good investments in pastoralism.<sup>699</sup>

While the report provides guidance and clear pathways to improve rangeland health, there remains a need for improved standards and accountability for rangeland investments. Funding needs to be more flexible as economic data is often limited and tends to undervalue the real contribution of rangelands and pastoralism to livestock production, overall agricultural output, and rural development. This data gap means that economic decisions on rangelands (e.g., conversion to other land uses) are made under assumptions that may be neither rational nor efficient.<sup>700</sup> Economic assessments of pastoral production systems, such as the FAO study on the **Economics of pastoralism in Argentina, Chad and Mongolia**,<sup>701</sup> the GIZ **Economics of Land Degradation Initiative**,<sup>702</sup> and the IUCN **Global Review of the Economics of Pastoralism**<sup>703</sup> clearly demonstrate that pastoralism has a broad array of tangible and intangible values that should not be ignored.

The production and marketing practices of pastoralists warrant unconventional financial tools. Cash is not the only form of currency used by pastoralists, who often view livestock as a measure of wealth. Production is not steady or predictable as it is influenced by environmental and climate risks and by mobility and distance to markets.<sup>704</sup> Pastoralists have adapted their economies accordingly and follow alternative models that rely on few external inputs and tend to capitalise on opportunities which are often linked to social activities (e.g., proximity to markets, annual celebrations, religious festivals). These communities also invest heavily in social capital to build mutual support networks that offer safety nets to cope with extreme conditions or events.

Multifunctionality, diversified and value-added products, and sustainable management practices have great potential to scale concurrently with the development of stronger and more resilient supply chains.<sup>705</sup> In this regard, targeted investments can contribute by: (i) strengthening and expanding value chains for rangeland products based on their quality, demand, and small environmental footprint; (ii) incentivising the protection and delivery of essential ecosystem services (e.g., payments for soil, water, biodiversity, carbon); and (iii) promoting tailored insurance and risk management schemes.<sup>706</sup>

### Sustainable Investments for Large-Scale Rangeland Restoration<sup>707</sup>

In 2023, the IUCN began implementing the Sustainable Investments for Large-Scale Rangeland Restoration (STELARR) project with funding from the GEF and executed by the ILRI. The project works with pastoralists and other livestock value-chain actors, including the commercial sector, to make those value chains more sustainable and climate-friendly. STELARR aims to ensure investment is made in the rangelands to sustainably raise their productivity and restore ecological integrity, where needed. It will support governments and other rangeland stakeholders to fulfil their commitments to advance sustainable use and rangeland restoration in the context of the GBF, LDN, the UN Decade on Ecosystem Restoration, and the IYRP to be celebrated in 2026.

Increased investment in rangelands and pastoralism will require financial tools and instruments that economically empower pastoralists while respecting their culture, land rights, and management practices. Targeted financial flows can start by enhancing human and social capital (e.g., boosting health, education, infrastructure) and connecting pastoral people and rangeland services with value chains and markets. Some investment opportunities for SRLM and restoration include: (i) information technology for extensive livestock production; (ii) rangeland-adapted infrastructure (e.g., mobile abattoirs, collective processing facilities) and livestock health services; (iii) sustainable value chains for food and fibre; and (iv) insurance and risk-prevention mechanisms.<sup>708</sup> As rangelands provide critical ecosystem services, investments can also be linked to direct payments, carbon and biodiversity markets, wildfire prevention contracts, vegetation control in protected habitats, management area leases, etc.<sup>709</sup>

Some donors consider pastoralism a priority for direct investment, such as projects targeting financial resilience in African pastoralist communities funded by bilateral donors and multilateral development institutions (e.g., ILRI-CGIAR, World Bank, USAID, UKAid). United Nations entities, such as the UNCCD and FAO, have intensified their capacity building work in support of sustainable pastoralism to explore new sources of funding for transformative projects and programmes. The World Bank is mobilising funds in the Horn of Africa,<sup>710</sup> through the **DRIVE project**,<sup>711</sup> with USD 572 million in private capital to help pastoralists acquire drought insurance, increase savings, access digital accounts, and attract additional investment in pastoral areas. Many of these initiatives are still being designed, tested, and piloted, pointing to the need to accelerate efforts to increase investments in SRLM and restoration.

## 5.9 Inclusive and responsible governance

In many rangeland contexts, inclusive and responsible governance is the ultimate enabler by which land degradation can be avoided, reduced, and reversed, and by which SRLM and restoration activities can be sustained in the long term. Improving rangeland governance entails strengthening the decision making capacity of local communities and enhancing their social capital to work together as a group to achieve common objectives.

### Territories of Life<sup>712</sup>

In November 2022, the ICCA Consortium organised a workshop to create a global initiative to support pastoralists' territories in implementing their self-determined priorities and plans.<sup>713</sup> The workshop, "Rangelands and Pastoralism: Towards a Global Initiative for Pastoralists' Territories of Life", provided a platform for pastoralist communities and their supporting organisations to share perspectives on, and experiences with, conserving, sustaining, and defending rangelands, and to establish a framework for this global initiative. Territories of Life recognises and respects the central role of indigenous people in land stewardship through their deep cultural and spiritual relationships and traditional governance systems. This initiative also helps pastoralist communities secure collective land rights and self-governance systems, uphold human rights in all processes that affect local communities, and advocate for the development of human rights-based financing tools.

The adoption of responsible and inclusive land governance and respect for intellectual property rights constitutes an aspiration for many initiatives targeting rangelands and pastoralism. International organisations, such as FAO<sup>714</sup> and IUCN,<sup>715</sup> have promoted participatory models of rangeland management that can shape a new future for the governance of these territories. These models prioritise meaningful stakeholder participation to help secure pastoralist land rights, incorporate gender and equity considerations, manage natural resource conflicts, and prevent encroachment and abuse.

## 5.10 Global recognition of a transversal approach

In 2022, the United Nations General Assembly declared 2026 the **International Year for Rangeland and Pastoralism (IYRP)**,<sup>716</sup> based on a proposal by the Government of Mongolia. The IYRP aims to connect heterogeneous elements and reinforce the many commitments and actions taken by organisations and institutions to support rangelands and pastoralist communities. The declaration of the IYRP elicited a wave of enthusiasm across the world, including strong support by more than 100 governments and 240 organisations.<sup>717</sup>

The IYRP is leading an unprecedented collective effort to coordinate global action on behalf of rangelands and pastoralist communities, highlighting their role in responding to global change and achieving sustainable development and ecosystem restoration goals. While FAO will take the lead on implementation of the IYRP,<sup>718</sup> a network of governments, civil society, research organisations, and international institutions has already been organised to begin work (Figure 26).

FIGURE 26

The 12 themes of the IYRP defining global priority issues<sup>719</sup>





### IYRP International Support Group

The collective effort to promote the IYRP is being assembled through a wide coalition of partners structured around the International Support Group (ISG-IYRP). The ISG-IYRP is a network of individuals and organisations that supports the roll out of the IYRP, including its website and archives, and implements different activities, working groups, and promotional events. The ISG-IYRP is governed by two co-chairs, a global coordination group, and thematic working groups (e.g., land degradation, afforestation, biodiversity, gender, mountains, water). The ISG-IYRP is decentralised with 11 regional support groups, a communications team, and a mailing list for the dissemination of information and activities.<sup>720</sup>

Educational, creative, and cultural activities are also a priority for the IYRP. A presentation video<sup>721</sup> and a collection of images and stories from pastoralists worldwide are posted on the IYRP website. The website also centralises and disseminates all forms of information around the IYRP celebration, including news, events, knowledge resources, videos, and communications materials.<sup>722</sup> The Rangelands Gateway stores the information and resources generated by the IYRP activities.<sup>723</sup>

The IYRP is inspired by a vision that fully recognises the heterogeneity, diverse needs and aspirations of rangeland communities and advocates for capacity building and responsible investment in the pastoral livestock sector. Pastoralist communities and grassroots organisations are the real champions of the declaration and will play a leading role in the design and implementation of the IYRP programme of activities being organised across the 12 themes or priority issues, each to be highlighted monthly throughout 2026.

Beyond the celebration of rangelands and pastoralism, beyond the emergence of global and regional initiatives, beyond raising awareness of the value of pastoralists and their homelands – the IYRP offers a unique opportunity to reach a global consensus on the pathways of action by which rangelands should be protected, managed, and restored. The declaration of the IYRP has already spurred numerous alliances and networks, new dialogue spaces and multistakeholder platforms, and collective actions to advance SRLM and restoration initiatives as a cost-effective contribution to all three dimensions of sustainable development.



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# 6. Conclusion

**The conversion and loss of rangelands is done in silence and attracts little public attention.** Often marginalised or considered outsiders, many pastoralist and rangeland communities are unable to influence the policies and programmes that directly impact their food security, livelihoods, and cultural identity. They are voiceless and powerless and represent a small minority in the political and administrative machinery that governs development and investment decisions in the rangelands.

**Pastoralist livelihoods and cultures around the world are under threat from shortsighted policies, weak governance, and economic incentives that undermine their production systems.** Pastoralists are broadly defined as extensive livestock farmers, herders, and ranchers – whether indigenous or not – whose way of life is closely linked to the health and productivity of rangelands. Up to 500 million people across the world practise this form of animal husbandry. Yet, in many regions, they have little recourse to address the conversion, fragmentation, and degradation of rangelands.

**Rangelands operate as complex social-ecological systems with critical values, processes, goods, and services.** They are diverse, multifunctional, and encompass a wide variety of ecosystems (e.g., drylands, grasslands, savannahs) that have co-evolved with human communities. Covering over 50 per cent of the Earth's land surface, rangelands are comprised of grasses, herbaceous plants, and shrubs that are grazed by livestock and/or wildlife. In addition to meat, dairy, fibre, and other animal products, rangelands and their biodiversity underpin critical ecosystem services from local to global scales (e.g., nutrient/water cycling, carbon sequestration, animal/human health).

**Despite the extraordinary diversity and intrinsic value of rangelands and pastoralist systems, they rarely feature in global policy discussions or national development priorities.** Rangelands provide important environmental, social, and economic benefits that are often taken for granted, in part due to the lack of understanding of their extent, condition, use, value, and diversity. While there are many threats to rangeland health, one is the imbalance in the supply and demand for animal forage which leads to overgrazing, invasive species, and bush encroachment as well as the increased risk of drought and wildfires.

**Pastoralism and extensive livestock production systems are deeply rooted in the rangelands and often the most effective means to protect, sustainably manage, and restore rangelands.** Appreciating that food and fibre production is the most common economic use of rangelands, sustainable grazing is a proven, cost-effective management approach to enhancing their health, productivity, and resilience. Traditional and regenerative grazing practices can often mimic natural processes that build soil organic matter, increase water retention, sequester carbon, conserve biodiversity, and reduce the spread of invasive species.

**Greater political attention and informed investments are urgently needed to safeguard and improve the health and productivity of the rangelands and their inhabitants.** This report offers insights and guidance on the policy and operational frameworks and other enabling factors for attracting greater attention and investments in sustainable rangeland management projects and programmes. Illustrated with case studies and good practices from around the world, it highlights the critical role of pastoralist communities in the planning and implementation of rangeland initiatives that deliver benefits in all three dimensions of sustainable development.

**FIGURE 27** The integrated dimensions of sustainability



One of the key findings of the report is that the health of rangelands and pastoral communities are co-dependent, and that integrated response measures to combat degradation are needed across all three dimensions of sustainable development. Figure 27 adapts the Stockholm Resilience Centre's "SDG wedding cake illustration" to frame the report's key pathways of action.

## Sustainability framework

National and sub-national authorities can design and implement legal and operational frameworks that align rangeland management and pastoralist livelihoods with the Sustainable Development Goals (SDGs), fully considering the environmental, social, and economic dimensions, and support efforts to:

- **Endorse and enact national laws and regulations** that are aligned with international treaties, obligations, and commitments that support the diversity, resilience, and multiple values of extensive livestock systems and rangeland ecosystem services.
- **Recognise and enforce legitimate land rights**, respect the unique circumstances and needs of rangeland communities (e.g., mobility, transhumance, communal governance), and nurture their participatory role in the conservation, sustainable management, and restoration of rangelands.
- **Facilitate multistakeholder platforms and networks** for research and learning, knowledge co-creation and exchange, and monitoring and evaluation – and to create accessible databases and repositories that collect and disseminate information on rangelands and pastoralist systems.

*Additional guidance:* Give rangelands and pastoralists their due priority in regional and national policies, legislation, strategies, and investment plans so that they can assume their rightful place in governance and land use planning for the future. Prioritise integrated agriculture, forestry, biodiversity, and climate change strategies by utilising agroforestry, silvopastoral, and other multifunctional approaches that boost rangeland health and productivity. Strive to optimise a mosaic of different but compatible land uses in the rangelands by preserving the critical role of herbivores and extensive livestock production while taking advantage of synergies with forestry, beekeeping, herb collection, hunting, ecotourism, renewable energy, nature conservation, and climate mitigation and adaptation.

## Environmental dimension

National and sub-national authorities can take measures to support the ecological integrity, connectivity, and functioning of rangelands through conservation, sustainable use, and restoration activities that safeguard and enhance the multiple benefits they provide to societies and economies, and support efforts to:

- **Reduce and avoid rangeland conversion** resulting from inappropriate land uses (e.g., crop monocultures, tree plantations, afforestation) that diminish the diversity and multifunctionality of rangelands, especially on indigenous, pastoral, and communal lands.
- **Adopt and support pastoralism-based strategies** that directly address the natural and human-induced drivers of rangeland degradation, such as biodiversity loss, climate change, overgrazing, soil erosion, invasive species, drought, and wildfires.
- **Design and implement nature conservation measures** that reduce and halt biodiversity loss (above and below ground) by harnessing synergies with pastoralist practices and extensive livestock production systems that boost rangeland health, productivity, and resilience.
- **Integrate climate change mitigation and adaptation measures** into sustainable rangeland management plans and programmes (or vice versa) to increase carbon sequestration and storage while enhancing the adaptive capacity of rangelands and their communities.

*Additional guidance:* Optimise livestock mobility, herd size and composition, rotational grazing, and other adaptive management tools targeting SRLM to balance production and consumption under regenerative landscape approaches. Address the sources of wildlife conflict and promote coexistence by managing livestock and wildlife interactions and devising mutually beneficial solutions for rangeland communities and wild animals. Adopt pastoralism-based strategies and practices to reduce the risks and impacts associated with drought, wildfires, sand and dust storms, overgrazing, and invasive species. Avoid large-scale tree-planting projects and programmes on natural grasslands and savannahs that have the potential of disrupting or destroying intact ecosystems.

## Social dimension

National and sub-national authorities can take measures to build social capital in rangeland communities through participatory governance and adaptive management approaches that promote gender equality, social cohesion, and trusted institutions to foster collective action, and support efforts to:

- **Provide capacity building, skills training, and technical support** to build the human and social capital needed for collective action that safeguards rangeland health and livelihoods, with particular attention to mobility, gender-responsiveness, and social inclusion.
- **Support rangeland and pastoralist associations and networks** that celebrate and defend their cultural heritage and values, increase connectivity and social services, and ensure the provision of human resources and expertise needed for responsible and inclusive rangeland governance.
- **Facilitate women-led, women-driven, and women-only initiatives**, groups, and institutions (along with mixed gender ones) to ensure that women's voices are heard and respected – and to activate their contribution to all dimensions of sustainable development in the rangelands.
- **Establish trusted institutions and mechanisms to manage wildlife and resource conflicts**, resolve territorial and land tenure disputes, reduce inequalities in access and benefit sharing, and negotiate trade-offs and leverage synergies for the benefit of rangelands, their communities, and society-at-large.

*Additional guidance:* Promote the co-creation of knowledge and innovation by integrating scientific research, indigenous knowledge, traditional practices, technological advances, and empirical evidence within multi-disciplinary and multi-actor platforms and networks. Monitor rangeland conditions, dynamics, and trends based on field studies, Earth observations, and other remotely sensed data to improve project or programme design and the capacity for adaptive management. Employ advisory and extension services to test and validate the strategies, technologies, and practices that build the human and social capital needed for SRLM and restoration. Celebrate pastoralism and rangelands by honouring their communities as well as their unique heritage and cultural traditions that link together rangelands around the world.

## Economic dimension

National and sub-national authorities can take measures to support the economic viability of extensive livestock production and the livelihoods they support through flexible long-term investments and incentives, including context-appropriate strategies and programmes that link markets and value chains to sustainable rangeland production systems, and support efforts to:

- **Create innovative economic and financial mechanisms** that are accessible to rangeland stakeholders, incentivise good management practices, provide decent work, stimulate market participation, and increase investments in sustainable pastoralism from public and private sources while avoiding adverse consequences for rangeland communities.
- **Develop market and value chain strategies and action plans** that support economic livelihoods and income diversification – and expand innovative and profitable opportunities for rangeland communities engaged in extensive livestock production.
- **Promote adaptive investment and risk management tools**, such as livestock and drought insurance, resource pooling and sharing, and community credit schemes, to better manage risks and uncertainties in a creative but economically sound manner.
- **Conduct economic valuations of rangeland ecosystem services** to better understand their contribution to people, nature, and climate, to help inform rangeland policies, planning and programmes, and to attract donor funds, private sector investments, and public sector allocations for sustainable rangeland management and restoration.

*Additional guidance:* Provide direct incentives to adopt and scale SRLM and restoration practices while reducing and eliminating harmful subsidies that undermine pastoralism, encourage the conversion of rangelands, increase herd sizes beyond the carrying capacity of the land, or otherwise harm their ecological integrity. Encourage investors, donors, and the private sector to make use of flexible and innovative tools and instruments that target the economic development of rangelands with the potential to generate benefits across all dimensions of sustainable development, especially in terms of food security and poverty reduction.

## Final remarks

Rangelands offer a broad array of sustainable development opportunities that are often undermined or compromised by shortsighted economic, social, and agricultural policies. Systemic approaches are clearly needed to conserve, sustainably manage, and restore rangeland health, recognising that pastoralism and extensive livestock practices are often the most effective means to deliver optimal outcomes for rangeland economies and societies.

Governments, investors, and communities should consider new development and investment pathways that put rangelands and pastoralists front and centre – fully engaging with indigenous people, women, youth, and other population groups at risk. Multistakeholder platforms can play a critical role in upholding the rights of pastoralists and rangeland communities by improving tenure security, building trusted institutions, and encouraging participatory land use planning.

Donors should look beyond the traditional recipients of funding in rangeland contexts to allocate resources that support initiatives that deliver multiple co-benefits for people, nature, and climate. As the case studies demonstrate, proven and cost-effective governance and management practices can avoid, reduce, and reverse rangeland degradation while safeguarding pastoralist livelihoods, culture, and heritage.

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# GLOBAL LAND OUTLOOK

The United Nations Convention to Combat Desertification (UNCCD) recognizes that addressing and reversing land degradation is one of the key sustainable development priorities for many countries, particularly in the developing world. In response, the UNCCD secretariat produces strategic communications publications under the brand of the Global Land Outlook (GLO) to facilitate insights, debate, and discourse on a transformative vision for land management policy, planning and practice at various scales.

The aim of the GLO is to communicate and raise awareness of evidence-based, policy-relevant information and trends to a variety of stakeholders, including national governments formulating their responses to commitments to better manage and restore land resources, including the SDGs and associated targets, such as Land Degradation Neutrality (LDN). The evidence presented in the GLO reports demonstrates that informed and responsible decision making can if more widely adopted help to reverse the current worrying trends in the state of our land resources.

All GLO reports and working papers, can be found at:  
<https://www.unccd.int/resources/global-land-outlook/overview>



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