

BRIDGING PRODUCTIVITY AND SUSTAINABILITY IN DRYLANDS: CRITICAL NEED FOR INTEGRATED MANAGEMENT OF RANGELANDS, GRASSLANDS AND PASTORALISM



Environment and Biodiversity Impact Platform

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1. KEY HIGHLIGHTS



Sustainable management approaches and decision support tools are essential to enhancing the sustainability of rangelands, grasslands, and pastoral systems.



The International Year of Rangelands and Pastoralism (2026) presents a unique opportunity to raise awareness of this under-recognized sector, attracting greater attention and securing adequate financing for sustainable management and inclusive governance.



CGIAR Centers and key partners have developed openly accessible innovations for the sustainable management of rangelands, grasslands, and pastoralism, along with decision support tools. Parties to the Rio Conventions are encouraged to adopt and adapt these solutions to local contexts in preparation for the International Year of Rangelands and Pastoralism.

2. BACKGROUND

Pastoralism provides food and income to millions of people worldwide, yet rangelands face significant governance challenges, unsustainable use, degradation, and neglect—issues compounded by the intensifying impacts of climate change. However, silvo-pastoral systems (SPSs)—agricultural systems that simultaneously manage grazing livestock and forest lands to leverage their positive interactions—offer a promising opportunity to restore tree-covered lands. These systems optimize ecosystem functionality, enhance resilience, and maintain productivity.

SPSs are particularly valuable in dryland forests, marginal lands, and areas unsuitable for crop production, where grazing represents one of the most effective land management strategies. They are increasingly recognized as a pathway for forest and rangeland restoration in drylands (FAO, 2022). Trees in these systems provide critical ecosystem services, including food and feed production, soil and water regulation, biodiversity support, and cultural value. Additionally, livestock offers economic benefits while contributing to land management through vegetation control, biomass mobilization, soil fertility enhancement, and seed dispersal.

Despite the potential of SPSs in drylands, a comprehensive understanding of their carbon sequestration capabilities remains elusive. Although scientific literature highlights their significant carbon storage potential—both above and below ground in rangelands, open forests, and savannahs—limited quantitative data and uncertainties around carbon capture in agroforestry systems hinder progress. Soil organic carbon sequestration estimates remain contentious, with debates over changes over time and the impact of various management practices and contexts. This lack of robust evidence not only deters countries from adopting SPSs but also complicates effective planning. Addressing this evidence gap is essential.

Recognizing the management challenges and opportunities in rangelands, grasslands, and pastoralism, the United Nations General Assembly has designated 2026 as the **International Year of Rangelands and Pastoralists**. CGIAR centers are actively contributing through multiple workstreams focused on enhancing and restoring pastoral rangelands in ways that benefit both ecosystems and communities.

3. SELECTED SOLUTIONS: TECHNICAL AND SOCIAL INNOVATIONS BY CGIAR AND CLOSE PARTNERS

Sustainable Management of Pastoral and Grazing Lands

Toolkit for Sustainable Rangelands

Management: Developed by the International Center for Agricultural Research in the Dry Areas (ICARDA) in collaboration with the International Union for Conservation of Nature (IUCN), this toolkit addresses the root causes of rangeland degradation in Tunisia, Jordan, and Uzbekistan. When applied in silvo-pastoral communities in Tunisia, the toolkit reduced animal feeding costs by 65% and tripled vegetation cover. It supports sustainable land use, enhances ecosystem services, and promotes land degradation neutrality while increasing livestock forage production and improving community livelihoods.

Pastoral Living Landscape Approach: Promoted in Tunisia by ICARDA, this holistic, territorial strategy integrates livestock management, sustainable rangeland practices, and crop production. The approach emphasizes restoring rangelands amid climate change challenges, mitigating grazing pressure, and addressing land tenure issues and social dynamics.

Debunking Overgrazing Misconceptions:

While overgrazing is often blamed for rangeland degradation, ICARDA has demonstrated that structured grazing practices enable effective management and restoration. Total exclusion of livestock can accelerate degradation, whereas regenerative grazing, which prioritizes vegetation recovery and soil health, leverages ecological interactions to enhance biodiversity, sequester carbon, improve water retention, and sustain resilient ecosystems. This approach benefits both the environment and pastoral communities, reshaping perceptions with evidence-based strategies.



Photo Credit: Neil Palmer/CIAT



Sustainable Investment in Large-Scale Rangeland Restoration (STELARR): Led by the **International Livestock research Institute (ILRI)** in partnership with **ICARDA**, **Alliance Bioversity & CIAT**, the **Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF)**, and **IUCN**, this initiative focuses on investing in sustainable livestock value chains to combat rangeland degradation, boost productivity, and reduce poverty. STELARR promotes enhanced rangeland restoration through increased investments, global commitments, and the development of a global rangelands monitoring framework.

Participatory Rangeland Management (PRM): Implemented by ILRI in Kenya, PRM emphasizes inclusive governance, tenure security, and improved pastoral land productivity. Using techniques like short-resting and enclosures, the approach strengthens rangeland management institutions, develops management plans, and enhances community access to resources, supported by local government collaboration.

Decision-Support Tools

Global Rangelands Atlas: Addressing critical data gaps, this interactive platform uses big data and crowdsourcing to monitor and report on the state of global rangelands. It provides actionable insights to help stakeholders develop sustainable rangeland management interventions.

I-CLEANED Tool: This comprehensive decision-support tool conducts rapid ex-ante assessments of the environmental impacts of livestock systems. It models interventions and system changes, evaluating impacts on land use, productivity, economics, water, greenhouse gas emissions, and soil health, empowering land users to design sustainable livestock plans.



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4. OPPORTUNITIES AND CHALLENGES IN SCALING INNOVATIONS

Adopting a Holistic Approach to Innovation:

Scaling innovations in pastoral systems requires addressing rangeland management within the broader framework of territorial development. This involves focusing on inclusive innovations that build on traditional knowledge, integrating socio-technical and institutional solutions to drive transformation and resilience, and promoting economic diversification while recognizing the value of ecosystem services.

Tailoring Global Solutions to Local Needs:

Generic solutions for restoring and regenerating rangeland systems must be adapted to local contexts and specific demands to ensure adoption,

transformation, and scalable impact. Customization is key to meeting the unique challenges of diverse rangeland landscapes.

Building Local Capacity and Supportive

Environments: Enhancing the capacity of local partners is essential to scaling rangeland restoration innovations. Additionally, fostering supportive national and local enabling environments—including policies and institutional frameworks—will be critical for wider adoption and sustainable implementation.

Improving Data and Evidence: Collecting robust data and generating scientific evidence are crucial for guiding the management, scaling, and adaptive strategies of rangelands and silvo-pastoral systems. Reliable data will also help inform policy decisions and ensure that interventions are effective and evidence-driven.

5. CALL TO ACTION FROM VARIOUS ACTORS OF THE RIO CONVENTIONS

To effectively meet the objectives of the Rio Conventions and achieve co-benefits for the UN Sustainable Development Goals (SDGs), all stakeholders must take coordinated and strategic actions. Key priorities include:



Document current management practices:

In preparation for the International Year of Rangelands and Pastoralism in 2026, parties to the Rio Conventions are urged to assess and document the management status of rangelands, grasslands, silvo-pastoral systems, and pastoralism, with a focus on land use planning and governance.



Commit resources for sustainability: Parties to the Rio Conventions should allocate resources to enhance the sustainability of rangelands, grasslands, silvo-pastoral systems, and pastoralism. This includes maintaining and restoring genetic resources and implementing robust monitoring, evaluation, and learning frameworks to guide and measure progress.





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