

# How Can Agroecology and Pastoralism Contribute to Land Restoration?

Reflections from Riyadh, UNCCD COP16



Green zone at Riyadh COP16

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# How Can Agroecology and Pastoralism Contribute to Land Restoration? : Reflections from Riyadh, UNCCD COP16

By Jean-Daniel Cesaro (UMR SELMET, CIRAD)

## UNCCD: A Call for Consciousness

The United Nations Convention to Combat Desertification (UNCCD) COP16, held in Riyadh, highlighted the urgent need for sustainable land management strategies to combat the expansion of desertification and land degradation. According UNCCD, 40% of the Earth's land area is degraded likely 5 billion hectares of land. Annually, 100 million hectares of land are lost to desertification, deforestation, and mismanagement, equivalent to 1%/year.

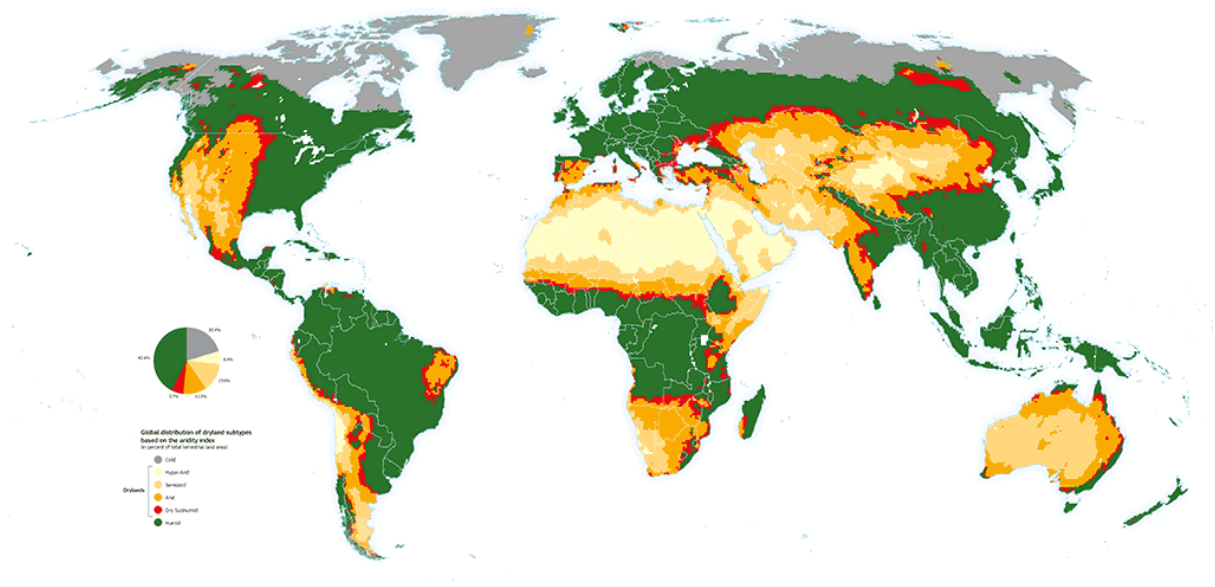
Approximately 25% of the world's arable land is currently degraded. This represents a significant challenge to global food security, especially as demand for agricultural products continues to grow with the increasing population. Of the 1.5 billion hectares of arable land worldwide, about 300-375 million hectares are facing degradation. 12 million hectares of productive land are being degraded every year.

The annual economic cost of land degradation is estimated at \$10.6 trillion, a burden primarily borne by the poorest nations. Land degradation exacerbates poverty, food insecurity, and forced migration, creating a ripple effect of instability.

## Desertification and Drylands: Key Insights

Desertification is the degradation of land in arid, semi-arid, and dry sub-humid areas, primarily due to human activities and climatic variations. It poses a significant challenge in drylands, which cover approximately 40% of the Earth's land surface and are home to 2.5 billion people.

**Map 1 : World map of drylands ecosystems**



Desertification is caused by a combination of natural and human-induced factors, which amplify its impacts on ecosystems and communities. Climate change and anthropization (deforestation, intensive agriculture, urban sprawl) leads to an increase of land degradation and desertification.

UNCCD defines desertification as:

**“Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities.”**

Land degradation refers to

**« The reduction or loss of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest, and woodlands, resulting from land uses or from a process or combination of processes, including those arising from human activities and habitation patterns »**

## Research on land desertification and land restoration

Research into desertification, land degradation, and restoration is critical for understanding the causes, impacts, and solutions to some of the world’s most pressing environmental and socio-economic challenges. These studies aim to provide data-driven approaches to combatting land degradation and promoting sustainable land management and ecosystem restoration.

- Tools and Monitoring
- Causes and Drivers
- Impacts of Desertification
- Techniques for Restoration
- Scaling Solutions

The fight against desertification and land degradation requires a collaborative, interdisciplinary, and global approach. These organizations and initiatives represent a critical force in advancing research, policy, and practical solutions for sustainable land management and restoration. Their collective efforts are essential for achieving Land Degradation Neutrality (LDN) and ensuring the resilience of ecosystems and communities worldwide.

## Land Sparing vs. Land Sharing: A Debate on Land Restoration

The debate between land sparing and land sharing is central to discussions on land restoration and sustainable development. Both approaches aim to balance agricultural productivity with biodiversity conservation, but they represent fundamentally different strategies for land use and ecosystem restoration.

The land sparing vs. land sharing debate, traditionally applied to balancing biodiversity conservation with agriculture, can be adapted to the context of land restoration by reframing the approaches around their potential to rehabilitate degraded land, restore ecosystems, and sustain human livelihoods.

- The land sparing in on Land Restoration focuses on restoring specific areas exclusively for ecological recovery and conservation, separate from intensive land uses. The objective is to maximize biodiversity recovery and ecosystem functions by concentrating efforts in distinct areas.

- The land sharing in on Land restoration integrates restoration into multi-functional landscapes, blending ecological recovery with human activities like sustainable agriculture or grazing. This restoration tends to achieve ecological restoration while maintaining land productivity and supporting local communities.

It reflects a fundamental tension between competing priorities in addressing desertification, land degradation, and restoration. These challenges are inherently multifaceted, involving ecological, social, economic, and political dimensions, which makes finding a universally agreed-upon approach difficult.

Organizations like WWF, BirdLife International, and Conservation International often favor land sparing because it allows for the protection of large, contiguous areas of natural habitats critical for species survival. The Bonn Challenge and 30x30 Initiative, which aim to restore or conserve a significant percentage of ecosystems, align closely with land sparing. High-yield, intensive agricultural producers may align with land sparing as it allows them to operate on smaller land areas while meeting production targets, leaving other lands for conservation.

Groups like FAO, IFAD, CGIAR and CIRAD support land sharing as it enhances local food security, maintains livelihoods, and promotes sustainable land use practices. Organizations advocating for indigenous and rural communities, such as Oxfam and International Land Coalition, lean toward land sharing to preserve community rights and avoid displacement. Land sharing supports specifically advocate for agroecological approaches that balance productivity and ecosystem health.

## **Afforestation as a Pillar of SLM drives on by carbon market**

Afforestation, the process of planting trees in areas that were previously non-forested, serves as a cornerstone of SLM policies. Afforestation/reforestation plays a critical role in achieving global environmental goals, as highlighted across multiple international frameworks :

- Under the Paris Agreement, afforestation is a key strategy for carbon sequestration to limit global warming,
- the UN Decade on Ecosystem Restoration (2021–2030) identifies it as a cornerstone for reversing land degradation.
- The Bonn Challenge further amplifies this goal, aiming to restore 350 million hectares of degraded land by 2030 through initiatives like Forest Landscape Restoration (FLR) or AFR100 (Africa’s Forest Restoration Initiative) .

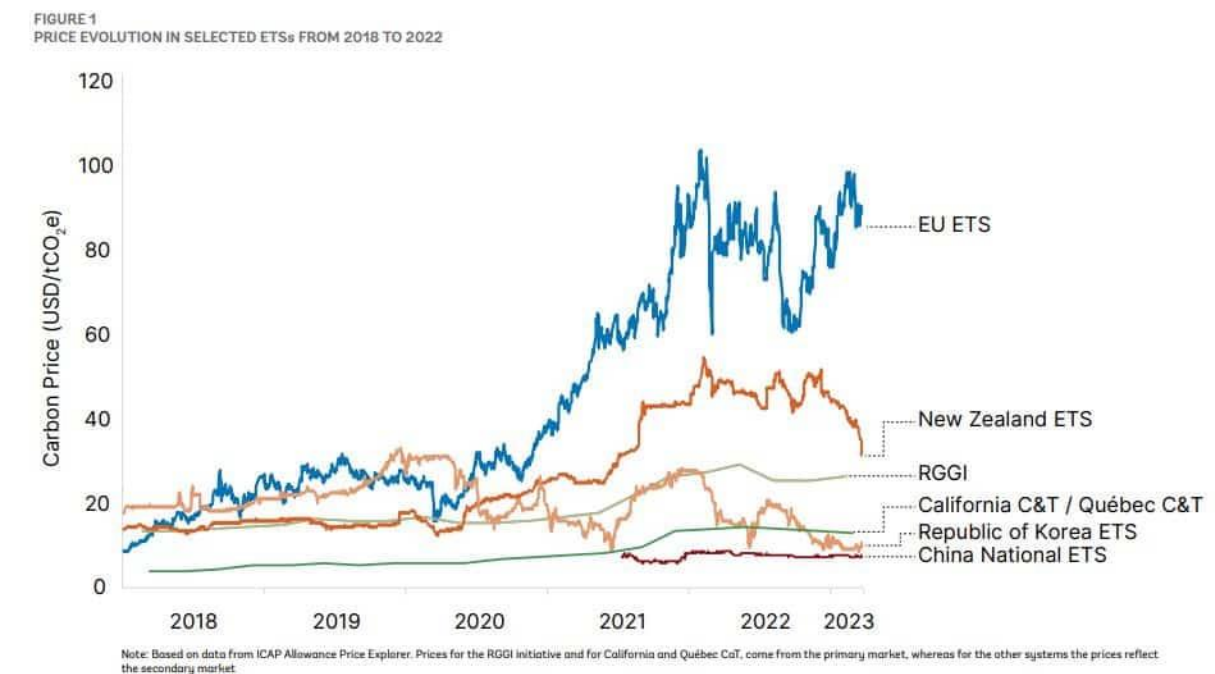
The Convention on Biological Diversity (CBD) integrates afforestation into its Kunming-Montreal Global Biodiversity Framework, targeting the restoration of 30% of terrestrial ecosystems to halt biodiversity loss. Additionally, the Sustainable Development Goals (SDGs), particularly SDG 15 (Life on Land) and SDG 13 (Climate Action), emphasize afforestation as a pathway to combat desertification, enhance ecosystem resilience, and mitigate climate change. Programs like REDD+ incentivize afforestation through financial rewards for carbon sequestration, while the Global Forest Goals aim to increase global forest cover by 3% by 2030.

During the 2021 One Planet Summit held on 11 January 2021 and reinforced at COP26 in Edinburgh, international donors pledged €16 billion over a period of four years (2021–2025) to accelerate the implementation of the Great Green Wall (GGW) initiative. The Great Green Wall

project was born in the 1980s, in the wake of the major droughts of the 1970s. It aims to restore, by 2030, 100 million hectares of degraded land, mainly for agricultural use, and create 10 million jobs, which will capture 250 million tons of carbon<sup>1</sup>. This financial commitment aims to enhance biodiversity, sequester carbon, and improve the livelihoods of millions of people.

In the post-COVID era and amidst increasing energy conflicts, the spot carbon market is growing to \$50-100 per ton. The Great Green Wall (GGW) represents a potential carbon market value of 10-20 billion USD in 2022-2024, and possibly more in a decade. The sequestration potential through afforestation ranges from 1.5 to 5 tons per hectare, depending on tree density. To achieve the GGW targets, the required land area ranges from 50 to 160 million hectares. The Sahelian belt of the Great Green Wall countries (Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Eritrea, Ethiopia, and Djibouti), where aridity levels allow for afforestation, represents a total area of 300 to 400 million hectares.

Figure n°1 : Carbon markets pricing since 2015 Paris Agreements



## Pastoralism and rangeland under pressure in the fight against desertification

Rangelands are particularly critical as they constitute vast expanses of emerged land both globally and across the GGW countries. Their restoration holds immense potential for carbon sequestration with almost 8 billions hectares worldwide. Africa accounts for almost 2 billions hectares of rangelands. Rangelands are far from being "empty land." They are vital ecosystems that serve as the home to millions of pastoralists who depend on them for their livelihoods. These

<sup>1</sup> Representing 0,7% of world CO<sub>2</sub> emission per year, within a 10 years programm so 0,07% of global emission (assuming that global emission stablize at 35 billions tons per year)

communities practice extensive livestock grazing, an activity that has sustained populations for centuries while maintaining the ecological balance of these landscapes.

But livestock and herders are often seen as degradation agents. Overgrazing is considered as the root of a cascade of negative impacts on the environment and one of the primary drivers of land degradation in rangelands and other fragile ecosystems, particularly in arid and semi-arid regions like the Sahel. This situation has led to the exclusion of herders and pastoralists from the governance and decision-making processes of GGW. This exclusion can lead to further **land degradation**, conflict over resource access, and reduced project effectiveness, as restoration efforts fail to align with local needs and realities.

Growing interest of restoration action plan for rangelands leads International Year of Rangelands and Pastoralist to publish a policy brief « Rangeland Afforestation is not a Viable Climate Change Mitigation Strategy A contribution to the public consultation of the Integrity Council for Voluntary Carbon Markets (IC-VCM) »<sup>2</sup>.

## Rethinking Pastoralism involvement in rangeland restoration

As pastoralism is a agroecological system a pathway to greening rangelands with trees does exist with natural regeneration of trees (NRT) and requires further support services while providing insights into provisioning services and the development of multifunctional landscapes (Cesaro et al., 2023) and strengthening linkages with agro-pastoralism at inter and intra-landscapes level .

In Abdijan COP15, dP PPZS/ISRA/CIRAD/CSFD came across GGW objectives with option to put herders in charges of restoration and afforestation programs. « Reforestation and Pastoralism in the Sahel: (Re)conciliating Land Use to Revitalize the Great Green Wall ». In this semi-arid environment, the resilience of pastoralism depends on trees. It is therefore possible to align herders with the goals of the Great Green Wall (GGW) initiative. However, this collaboration requires a solid understanding of the role of "commons" in pastoral systems, co-development of solutions with local populations, and capacity building of stakeholders at the local level to ensure sustainable management of restored resources. This idea came to Dundi Ferlo project a project with Weforest, AVSF, ISRA, CIRAD and ASERGMV convention.

### In Riyadh COP16, we advocated for this vision through several side events:

- **5th December 2024: Potential of Dryland silvopastoral systems for global decarbonization action (CGIAR Pavillon) : – JD. Cesaro et al. (2024) Challenges and Opportunities of Silvopastoral Practices in Arid Zones**
- **7th December 2024 : Promoting new research strategies and innovation in support to the implementation of GGW (Green zone) – JD. Cesaro et al. (2024) Territorial Modeling of the Great Green Wall Initiative: Why Are Pastoralists Left Out? What Are Their Visions and Solutions?**

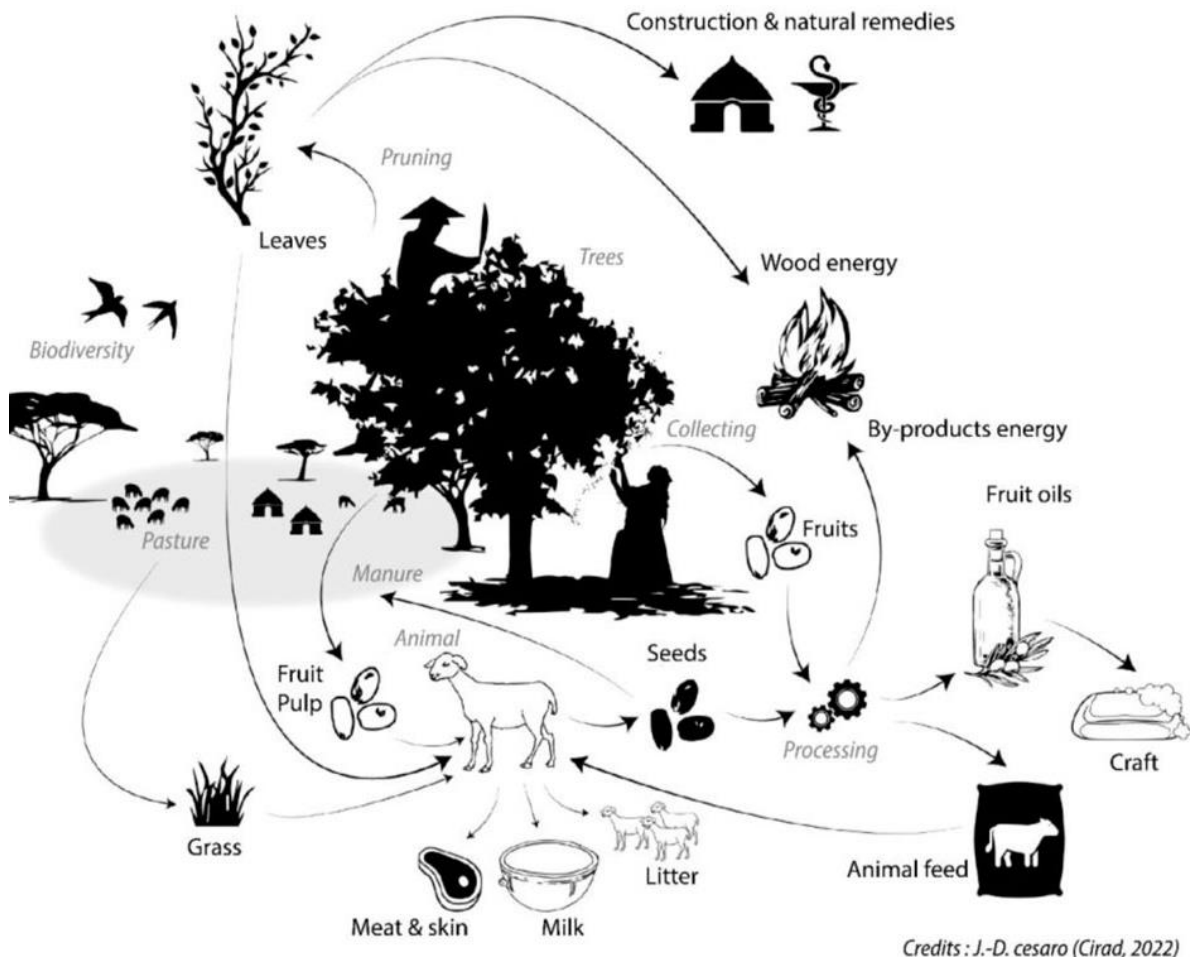
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<sup>2</sup> [Working Groups | International Year of Rangelands and Pastoralists Initiative](#)

## The ecosystem services framework in rangelands

Based on the ecosystem services framework, the geography of rangelands shows the interlinkage between resource regeneration and resource management, taking into account climate inter- and intra-annual variability, and mobility as an agroecological practice for adaptation (Figure n°2).

Figure n°2 : multifunctionality of rangelands provisioning services



The study assessed the return on investment of ecosystem provisioning services derived from reforestation in the drylands of the Sahel, with a particular focus on Senegal. By using a quantitative methodology, it evaluated the profitability of these operations from the perspective of pastoral economies. The results indicate that while reforestation can significantly enhance the economic potential of silvopastoral systems, this success hinges on collaborative resource management between herders and forestry services during and after reforestation. However, from an investment standpoint, the economic viability of such operations remains uncertain. The analysis suggests that reforestation programs, when evaluated solely for their provisioning services, may not be financially sustainable in the long term. For these investments to be truly sustainable, they must account for broader ecosystem services, including support and regulation, which provide essential long-term benefits for the environment and local communities.

## Collective action and multifunctionality of rangelands : an opportunity

This vision, stemming from the work on the management of sylvopastoral areas by the dP PPZS, resonates well with the participatory management of pastures (PMR) by ILRI in Tanzania (Fiona Flintan et al.) and the collective action supported by the CGIAR agroecology initiative, through collaboration with the Livestock & Climate initiative between ICARDA (Aymen Frija) and CIRAD (Irène Carpentier, Véronique Alary) in Tunisia<sup>3</sup>. The new organizational forms, such as Pastoral Units in Senegal and Groupements de Développement Agricole (GDA) in Tunisia, can strengthen collective action for sustainable rangeland management (SRM) with particular emphasis on common land tenure and livestock mobility.

A key focus of The Global Agenda for Sustainable Livestock (GASL) is the concept of multifunctionality in livestock grazing systems, which recognizes that these systems provide a range of environmental, social, and economic benefits beyond food production. GASL's Action Network "Restoring Value to Grassland" has been instrumental in exploring and promoting the multifunctionality of livestock grazing systems. This network emphasizes the need for a holistic approach to grazing, considering not only productivity but also the ecological services and cultural values these systems offer.

Multifunctionality of livestock grazing systems and Participatory Rangeland Management (PRM) could be a key component within a broader framework of Integrated Landscape Management (ILM) in rangeland context. PRM is a collaborative approach that actively involves local communities, particularly pastoralists, in the planning, decision-making, and management of rangeland resources. This approach aligns well with the holistic and inclusive principles of ILM by recognizing the importance of local knowledge, fostering shared responsibility, and balancing ecological, economic, and social objectives.

Thinking Multifunctionality of rangelands specially in restoration action plans is urgent as the demand for climate mitigation is increasing. The results of this approach will be useful for IYRP 2026 and COP17 in Mongolia.

## IYRP at Riyadh COP16 : a strong commitment for pastoralism and rangelands

Through the framework of the International Year of Rangelands and Pastures, the team from the International Alliance mobilized at COP16 through various side events organized by CGIAR, ILC, and FAO particularly with the publication of the report on the state of rangelands worldwide : GLO rangelands report (2024). In anticipation of the International Year of Rangelands and Pastoralists (IYRP) in 2026, this report serves as a catalyst for global awareness and action.

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<sup>3</sup> Aymen Frija, Veronique Alary, Zied Idoudi, Irene Carpentier, Jean-daniel Cesaro, BABA BA, Mohamed Arbi Abdeladhim, Udo Rudiger, Mounir Louhaichi. (12/7/2023). Science workshop on sustainable rangeland governance and restoration in tunisia and senegal. URL: <https://www.icarda.org/media/news/science-workshop-sustainable-rangeland-governance-and-restoration-tunisia-and-senegal>



In COP16, the negotiations focused on the decision to better integrate rangelands and pastures into the convention. The IYRP group in Riyadh made advocacy in Civil society declaration on Grasslands and Rangelands.

**Civil Society Declaration on Grasslands and Rangelands**

COP16, Riyadh, 06/12/2024

Presented by **Didja Tchari Djibrillah**

**ASSOCIATION DES FEMMES PEULES AUTOCHTONES, TCHAD**

COW Meeting, 3rd session: New emerging issue: grasslands and rangelands

Thank you, Mr./Madam President,  
Distinguished Delegates,

On behalf of the accredited Civil Society Organizations, pastoralists, indigenous peoples, and local communities present at COP16, we wish to emphasize the importance of grasslands and rangelands in the fight against desertification and land degradation, as well as the crucial role of those who use these ecosystems. These communities are essential for food security, carbon sequestration, and climate change resilience, but remain underappreciated and neglected.

We urge the Parties to:

- 1. Promote agroecological and pastoral approaches that support biodiversity, improve soil health, and foster sustainable food systems.**
- 2. Ensure the security of land rights and transhumance, including for collective, overlapping, and seasonal land uses, to support community-based conservation and restoration initiatives.**
- 3. Recognize the role of indigenous peoples, pastoralists, and mobile indigenous groups in the sustainable management of their ecosystems, in line with relevant decisions from previous COPs, to secure land rights for communities living on grasslands and rangelands.**
- 4. Ensure the inclusion of populations living on grasslands and rangelands in all planning and decision-making processes.**
- 5. Ensure coherence with broader climate, water, and land action plans.**
- 6. Mobilize financial resources to restore degraded grasslands and rangelands, including through equitable benefit-sharing mechanisms and accessible means for local and community projects, as well as training for local actors and rights holders on management practices.**
- 7. Facilitate collaboration among stakeholders, including communities, scientists, holders of traditional knowledge, and policymakers, to exchange best practices and innovations for sustainable management.**
- 8. Cease implementing exclusionary conservation and restoration initiatives that displace and violate the rights of communities.**

By prioritizing the protection and sustainable management of grasslands and rangelands, we can unlock their potential to contribute to land restoration, climate resilience, and sustainable development. We urge the Parties to protect these ecosystems for present and future generations.

Thank you.

The proposed decision titled "Pastures and Rangelands" has been changed to the final decision on "Rangelands and Pastoralists" ICCD/COP(16)/L.15, with strong alignment with the IYRP 2026 and COP17 in Ulaanbaatar, Mongolia. [ICCD/COP\(16\)/L.15](#)

## Agroecology : an overlooked sustainable land management technology ?

As « rangeland & pastoralism », another emerging issue has been discussed at Riyadh COP16 : « ecologically sustainable agrifood systems ».

Agroecology, an integrative approach that applies ecological principles to agricultural systems, is increasingly recognized as a transformative Sustainable Land Management (SLM) technology. Despite its proven benefits in enhancing biodiversity, improving soil health, and building resilience to climate change, agroecology remains overlooked in SLM technics and technologies.

Agroecology, often limited to a reduced set of agronomic practices tailored for vegetable production, has yet to be fully recognized as a technology for land restoration by environmental ministries. This oversight arises from the division of responsibilities across government institutions, where agriculture typically falls under the jurisdiction of agricultural ministries, leaving environmental ministries less engaged with agroecological approaches. Also agroecology is seen as more « political » concept while market and private stakeholders focus on regenerative agriculture.

Agroecology's **multifunctionality** could be a path to deliver multiple ecological, social, and economic benefits—along with its integration with **citizen science** approaches, holds significant potential in transforming agricultural landscapes. Citizen science, by engaging farmers and local communities in monitoring and decision-making processes, enhances the effectiveness of agroecological practices, promoting both local ownership and broader-scale adoption for land restoration.

**In Riyadh COP16, we advocated for this CIRAD-CGIAR vision through Agroecology Initiative framework in several side events:**

**December 5, 2024**

- **Providing Small-Scale Farmers with Tools and Approaches: Monitoring Soil Health at the Farmer Level to Accelerate Resilience to Aridification : JD. Cesaro et al. (2024) Challenges and opportunities integrating local knowledge into soil health MRV resilience to aridification**
- **Enabling Environments for Smallholder Farmers: Transitioning to Socio-Ecological Resilient Agri-Food Systems : JD. Cesaro et al. (2024) Participatory Guarantee System (PGS) as a valuable agroecological business model**
- **Framing Sustainable Agricultural Approaches: Presentation of the CGIAR Agroecology Initiative**

**December 9, 2024**

- **CARI Anticipating, managing, and rebuilding: strategies for supporting territories facing increasing crises? : : JD. Cesaro et al. (2024) Viability of Agroecological Practices in Shock-Prone Environments: A Review of Agropastoral Systems in Senegal**

## **Framing Sustainable Agricultural Approaches : a Missed Opportunity for Agroecology in Riyadh?**

Current food systems are facing significant challenges, while also addressing food security and nutrition issues. In response, several sustainability concepts have gained attention in food systems governance, including "sustainable," "organic," "agroecology," "nature-based solutions," "regenerative ». These concepts, while often grouped together, can represent different meanings and approaches.

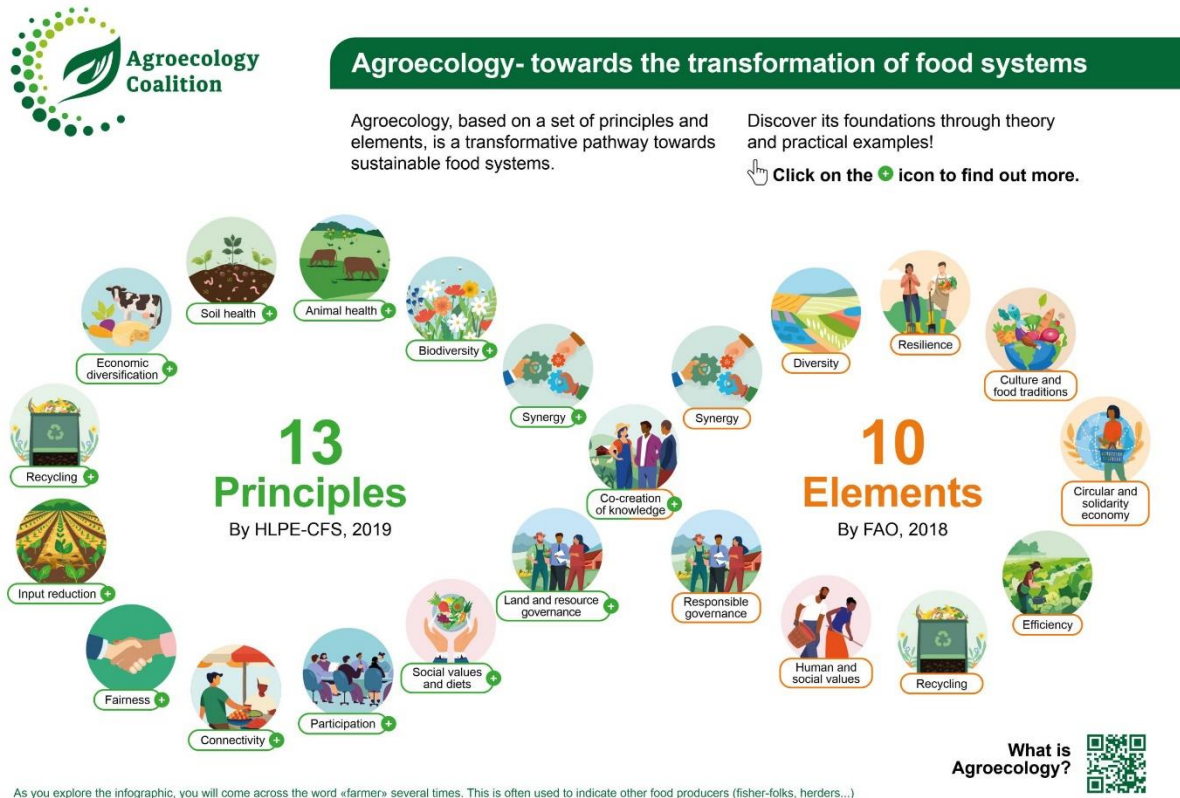
These competing concepts propose unique frameworks and methodologies for transitioning towards more sustainable agricultural practices. During this UNCCD COP16, the Agroecology Coalition and GIZ are co-hosting a conversation to explore the differences and synergies between these various concepts. The goal is to discuss how these frameworks and approaches can work together to transform food systems into more sustainable and resilient models, addressing both environmental and social challenges in a comprehensive manner. This conversation aims to clarify the nuances between two main concepts : Regenerative agriculture and agroecology. Regenerative agriculture and agroecology are both sustainable farming approaches aimed at enhancing environmental health and agricultural resilience, but they differ in focus, scope, and philosophy.

- Regenerative agriculture primarily centers on soil health, carbon sequestration, and reversing environmental degradation. It emphasizes practices such as no-till farming, cover cropping, crop rotation, and agroforestry, often implemented at the farm level. Its main objective is to rebuild soil fertility, restore degraded lands, and contribute to climate change mitigation by sequestering carbon in soils.
- In contrast, agroecology takes a holistic and systemic approach, integrating ecological principles with local knowledge, cultural practices, and social justice. It views farming as part of the broader ecosystem and emphasizes biodiversity, community engagement, and reducing external inputs. Agroecology includes similar practices as regenerative agriculture but extends its focus to encompass social and economic dimensions, such as food sovereignty, equitable value chains, and farmer empowerment.

While regenerative agriculture is often linked to carbon markets and premium certifications, agroecology promotes resilient local food systems and places a strong emphasis on social and cultural sustainability.

Despite its growing importance, agroecology struggles to gain the same prominence as well-established restoration technologies and technics approaches such as afforestation, water basin management, Sand Dune Stabilization, Holistic land planning. The discussions at COP16 in Riyadh highlighted the deepening debate surrounding agricultural solutions, with competing ideas and frameworks for transforming food systems and addressing land degradation. The terminology surrounding these approaches has sparked significant debate. These terms embody different philosophies, practices, and policy implications, which makes it difficult to settle on one definitive decision. Inside the convention, this debate reflects the broader challenges in reaching a consensus on agricultural policies that can effectively address global crises like climate change, biodiversity loss, and food insecurity. While the United States proposed a specific direction, the broader dialogue in Riyadh underscored the complexities of advocating for a single, unified solution to global agricultural challenges.

Figure n°3 : Coalition’s work is guided by the 13 principles of Agroecology defined by the High-Level Panel of Experts for Food Security and Nutrition (HLPE-FSN) of the Committee on World Food Security (CFS) that are aligned with the 10 Elements of Agroecology adopted by the Food and Agriculture Organization of the United Nations (FAO)’s Council in December 2019.



## Enabling Environments for Smallholder Farmers in Transitioning to Resilient Agri-Food Systems

Smallholder farmers contribute significantly to global food production, providing one-third of the world's food. Their resilience is essential for food security, sustainable livelihoods, and ecosystem restoration. However, they face challenges such as limited access to resources, technical knowledge, and fair markets, and are disproportionately affected by the global crises of biodiversity loss, climate change, and land degradation.

The session, “Enabling environments for smallholder farmers to transition to socio-ecological resilient agri-food systems,” held on December 5, 2024, during Agri-Food Systems Day at UNCCD COP16 in Riyadh, Saudi Arabia, focused on the challenges and solutions for empowering smallholders. Organized by CGIAR, the event brought together diverse stakeholders, including policymakers, farmer organizations, and Indigenous Peoples, to discuss how to support smallholders in transitioning to more resilient agri-food systems.

The session emphasized the importance of multifunctional landscapes that integrate biodiversity, land restoration, and climate goals. Practices such as agroforestry, wetland restoration, and sustainable land-use planning were highlighted as key strategies to enhance ecosystem services

and agricultural productivity. Panelists stressed the need for community-centered solutions that combine traditional knowledge with modern science.

Opening remarks by Cargele Masso from CGIAR underscored the central role of smallholders in addressing the triple crises, noting that unsustainable agricultural practices, such as excessive pesticide use, contribute to both land degradation and biodiversity loss. Masso highlighted the need for policies that integrate biodiversity into agriculture and equip farmers with the necessary tools for sustainable practices.

## **Agroforestry as agroecological solution for Great green wall ?**

Agroforestry can play a significant role in the implementation of the Great Green Wall (GGW), which is an ambitious African-led initiative aimed at combating desertification, land degradation, and climate change in the Sahel region. The concept of agroforestry, which integrates trees, crops, and livestock in a sustainable way, aligns perfectly with the goals of the GGW, as it enhances soil fertility, improves biodiversity, and increases resilience to climate impacts. Here's how agroforestry can be applied as an agroecological solution within the GGW framework.

Christine Magaju, Leigh Winowiecki, and Patrick Worms have indeed been highly active and influential in COP16. Their involvement in the conference, through side events, moderation, and participation, has been crucial in elevating the role of agroforestry and agroecological solutions particularly focusing on their involvement with the Great Green Wall (GGW) initiative.

Agroecological practices, particularly agroforestry, play a significant role in carbon sequestration in the Sahel, a region facing the challenges of desertification and climate change.

According to the World Agroforestry Centre (ICRAF), agroforestry systems can sequester between 1,000 to 3,000 kg CO<sub>2</sub> per hectare per year in semi-arid regions like the Sahel, where soil quality is improved and carbon is stored both in tree biomass and soil organic matter (ICRAF, 2018). T

The FAO's 2018 report on agroforestry for landscape restoration highlights that agroforestry, through improved land management practices like soil conservation and crop diversification, can help sequester up to 3 tons of CO<sub>2</sub> per hectare per year (FAO, 2018).

Similarly, the IPCC Special Report on Climate Change and Land (2019) emphasizes the potential of agroecological practices to increase soil carbon storage, with estimates ranging from 500 kg to 2,000 kg CO<sub>2</sub> per hectare per year (IPCC, 2019).

Several factors influence the effectiveness of agroecological practices in sequestering carbon, including:

- Tree species: Fast-growing trees (e.g., *Leucaena*, *Moringa*) sequester more carbon compared to slow-growing species (e.g., *Acacia*).
- Soil type: Soils with high organic matter content tend to sequester more carbon.
- Climate: The amount of rainfall and temperature significantly affects tree growth and carbon storage.
- Land management: Sustainable practices such as mulching, cover cropping, and water conservation increase carbon sequestration potential.

These findings align with the goals of the Great Green Wall initiative, which aims to restore degraded lands across the Sahel and mitigate the effects of climate change.

## The Multifunctional Landscape Level: A Catalyst for Agroecology

Agroecology emphasizes the importance of small-scale, diversified, and locally adapted farming systems that prioritize sustainability, biodiversity, and the resilience of agricultural ecosystems. Many agroecology projects are increasingly focused on the « transition » from conventional agricultural practices to more sustainable, ecologically integrated methods. This transition is not only about adopting new farming techniques but also about reshaping the entire agricultural system.

The concept to agroecology transition places a strong emphasis on both agronomical sciences and a farming system-level analysis. This focus is critical for understanding and addressing the complexities of sustainable agricultural identifying barriers and Levers & promoting local Supply chains. Agroecology faces the risk of commodification, where its principles and practices are transformed into market-driven products and services. The aggregation of agroecology services at the landscape level represents a significant step forward in the theory of change for agricultural transformation. Multifunctionality refers to the idea that farmers, in addition to producing food, fiber, and other raw materials, can offer various other services, such as COP objectifs : climate mitigation, biodiversity conservation and degraded land restoration.

The ecological services and multifunctionality framework offer an opportunity to enhance agroecology by quantifying and making its benefits more visible, accountable, and effective. Integrating these frameworks with tools like HOLPA databases (or Holistic Landscape Performance Assessment databases), which track and assess the performance of landscapes in delivering ecological services, can significantly strengthen agroecological practices by providing data-backed evidence of their benefits. However, for agroecology to truly succeed and scale, there is a need for collective action and living lab approaches that can address the trade-offs inherent to agroecological transitions at landscape level.

## Citizen Science and Living Labs: Pushing Further Research, Society, and Policy Platforms for Agroecology

Participatory approaches in scientific research, such as citizen science and Living Labs, bridge the gap between top-down policy interventions and bottom-up local knowledge, ensuring that the solutions developed are context-specific, practical, and locally accepted. Through this intersection of science, territorial management, and participation, we can pave the way for transformative change, where communities are not only « beneficiaries » of new technologies but are also co-creators of the solutions that will shape their future.

In Senegal, four projects, adopte participatory methodologies and Living Lab frameworks.

- **The CGIAR Agroecology initiative** focuses on integrating agroecological practices into both agricultural and pastoral systems. Through Living Labs, it actively engages local communities in the implementation and adaptation of agroecological solutions. This promotes sustainable land management practices while enhancing the resilience of production systems in the face of climate and environmental crises.
- In the **Dundi Ferlo project**, reforestation and rangeland restoration is central to the management of pastoral lands, focusing on reforestation and the restoration of degraded lands. The participatory approach allows local communities, especially pastoralists, to

play a critical role in selecting reforestation sites and managing restored areas, thereby fostering a sustainable model of natural resource management.

- The **DESIRA Santé Territoires** project is based on a One Health framework, aiming to improve the health of ecosystems, animals, and human populations by implementing context-specific agroecological solutions. Community engagement in decision-making processes through Living Labs allows for the co-design of land management strategies that address both public health challenges and sustainable development needs.
- Finally, **PEPR FairCarbon** integrates pastoralism with carbon sequestration and sustainable land management objectives. This project also uses the Living Lab framework, where local herders and farmers collaborate in implementing agroecological techniques, balancing livestock production with soil preservation and climate change mitigation.

## Conclusion

The UNCCD COP16 held in Riyadh underscored the urgency of addressing land degradation and desertification, highlighting their critical impact on global food security, climate resilience, and poverty reduction. The discussions emphasized the need for sustainable land management practices and innovative solutions, such as agroecology, pastoralism and multifunctional landscapes, to combat these challenges.

While the **debate between land sparing and land sharing approaches continues**, it is clear that a collaborative, inclusive approach is crucial for achieving long-term sustainability and resilience in both drylands and pastoral landscapes.

**The inclusion of smallholders, pastoralists and local communities in land restoration initiatives**, such as the Great Green Wall, is vital for ensuring that these efforts are both effective and equitable. By prioritizing participatory approaches, fostering collaboration between scientists, policymakers, and local stakeholders, and recognizing the multifunctionality of rangelands, we can unlock the full potential of these ecosystems to support both environmental and socio-economic goals. And the International Year of Rangelands and Pastoralists is clearly our path for the next two years !

**The growing recognition of agroecology as a transformative tool for sustainable land management** offers an opportunity to integrate ecological principles with agricultural practices, promoting biodiversity, soil health, and climate change mitigation. However, the complexity of transitioning to agroecological systems and overcoming barriers such as policy fragmentation and the dominance of market-driven solutions requires collective action and a unified vision.

CGIAR and CIRAD should work on this unified vision as an essential step for addressing the pressing challenges and ensuring a more resilient and sustainable future for all.



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**World Economic Forum. (2022).** *The Untapped Potential of Great Green Wall Value Chains: An Action Agenda to Scale Restoration in the Sahel.*

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## Complete list of COP16 events participation (Event as speaker)

### December 3, 2024

- 17:00-18:30: *Participatory rangeland management* (CGIAR Pavilion) - Process on participatory rangeland management, ecosystem improvement.

### December 4, 2024

- 9:00-10:30: *Women for the future of rangeland restoration & resilience* (International Land Coalition – MET 33)
- 11:00-12:30: *The Regreening Africa Approach* - K4GGWA project, interventions from Tamsir Mbaye (ISRA CNRF), Gora Diop (former ASERGMV director), Sekouna Diatta
- 14:00-15:30: *Improving policy dialogue, knowledge management, information dissemination, and stakeholder management in the GGW* (UNDP, UEP, IFAD)
- 16:00-17:00: *Agriculture, Pastoralism, and Protected Areas* (COMIFAC Pavilion) - Conference on transhumance and challenges for protected areas
- 19:00-20:00: *Rangeland restoration reception* - Opening by CGIAR CEO.

### December 5, 2024

- 09:30-11:00: *Building a greener future: Tackle the nexus between sustainable value chain and land restoration for the Great Green Wall* (MET-23)
- 11:30-13:00: *Restoring the Forgotten Landscapes: A High-Level Dialogue on Funding Grasslands, Savannahs, and Rangelands* (MET-23)
- 13:00-14:00: *IYRP Open door* (WOCAT Pavilion)
- 14:00-15:00: *Provide small-scale farmers with the appropriate tools and approaches to monitor soil health at the farmer level in order to accelerate their resilience to aridification* (4/1000, CGIAR pavillon)
- 15:00-17:00: *Enabling environments for smallholder farmers to transition to socio-ecological resilient agri-food systems* (MET-23 ACTION AGENDA)
- 15:00-17:00: *Potential of Dryland silvopastoral systems for global decarbonization action*
- 17:00-18:30: *Framing sustainable agricultural approaches* (ACTION AGENDA) - Presentation of the CGIAR Agroecology initiative.

### December 6, 2024

- 09:00-10:00: *CSO meeting on rangelands*
- 11:00-12:30: *FAO Integrated Land Use Planning, Implementation and Monitoring for LDN* (Senegal Pavilion)
- 15:00-18:00: *COW follow-up on country declarations*
- 18:00-20:00: *Shared Lands, Shared Futures: Inclusive Governance for Rangelands and Pastoralists* (MET-33).

### December 7, 2024

- 13:00-14:00: *Promoting new research strategies and innovation in support of the implementation of the GGW* (IRN RESET, IRD, Green Zoon, Science Pavilion)
- 15:00-16:00: *Improving food systems and promoting value chains in the Great Green Wall Initiative for the Sahara and Sahel* (Maguette Kaire)
- 17:00-18:30: *International Year of Rangelands and Pastoralists*
- 18:00-19:30: *Promoting a new system of scientific and societal knowledge* - Research, education, and training for an effective and contextualized fight against land degradation.

### December 8, 2024

- Day OFF

### December 9, 2024

- 09:00-10:30: *CARI Anticipating, managing, and rebuilding: strategies for supporting territories facing increasing crises?* (SIDE-EVENT MET-6)
- 13:00-14:30: *The World Drought Atlas* – European Commission Joint Research Center
- 13:00-14:30: *Sustainable Partnerships for African Research and Knowledge on Great Green Wall* (African Union Commission).

### December 10, 2024

- 11:45-13:30: *Session 3: Resilience through Early Warning Systems*
- 15:00-17:00: *The Global Rangelands Standard* - Supporting market access for responsibly produced diverse rangeland commodities.

### Media Coverage

- **France inter : Journal 18h00 du lundi 02 décembre 2024**
- **Radio France internationale : Journal 9h00 du samedi 07 décembre 2024**
- **Le Figaro : [Désertification : une COP à Riyad pour créer un Observatoire international sur la sécheresse](#)**
- **Libération : [En Arabie Saoudite, comment la «petite COP» sur la désertification est devenue grande – Libération](#)**
- **CIRAD.fr : [COP16 désertification : agroécologie et pastoralisme pour lutter contre la dégradation des terres | Cirad](#)**
- **CGIAR.org : [Smallholders, big impact: Building resilience against biodiversity, climate, and land crises - CGIAR](#)**

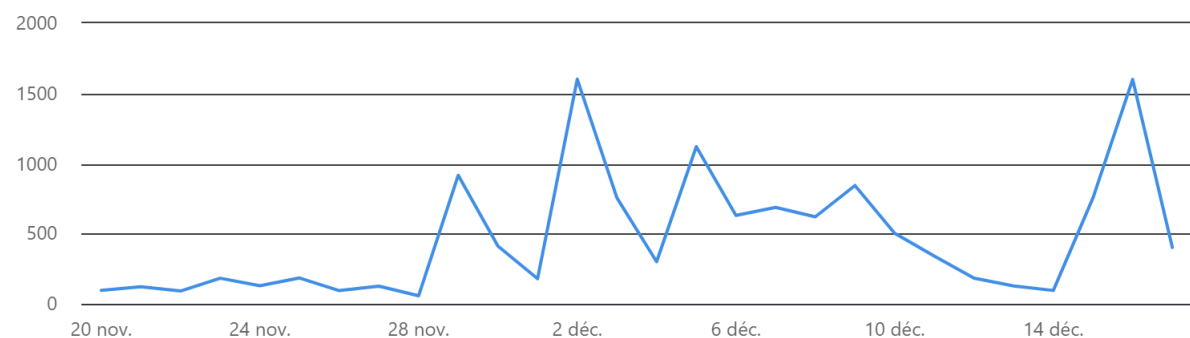
### Linkedin : 7 publications

#### Performance du contenu

13 146

Impressions

▲1,4% Les 28 derniers jours



Les données quotidiennes sont enregistrées en heure UTC

