

Potential leverage of soil biodiversity and soil organic carbon for enhancing sustainable rangeland ecosystem management and Land Degradation Neutrality (LDN)

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Rangelands, a neglected biome

This technical session develops the argument for giving more attention to rangeland restoration in the West Asia North Africa region. It highlights a few principles or approaches that show how ecosystem management can be adapted to the context of rangelands. Rangelands occupy up to 50% of all land on the planet, and up to 80% of the West Asia region. While we don't have total agreement on these measurements, rangelands are neglected for many reasons. Under estimation of their ecosystem service values (such as biodiversity, carbon sequestration, quality water provision, food from livestock and medicinal plant production, cultural services) is an important one among them. Insufficient recognition of traditional knowledge that land management practices in the rangelands should allow periods of rest and recovery, and pasture protection is another one, as such practices will contribute to sustainable use and conservation of biodiversity. However, such pastoralist practices are often neglected or even made dysfunctional by formal legislations on land use. Rangelands are worth protecting because of their many values, which can be generated simultaneously under the right management. Rangelands are often managed primarily for livestock production and food, but in many cases in the Middle East, water supply is of much greater value, given the high value of water in this region. The objective of rangeland management should therefore be one that capitalizes on the **multi-functionality** of these multiple values, and not to focus exclusively on one or another function or value. Failure to value these services contributes to decision making that maximises some values at the expense of others, often to the overall detriment of society.

Risks of rangeland degradation and Land Degradation Neutrality

Moreover, there is lack of agreement over the extent of rangeland degradation in the region. One of the recurring challenges in drylands is reaching consensus on land degradation – which is also referred to as desertification. Opinions differ over management objectives and baseline states, particularly given the continuous transition between states that can be observed in rangelands. However, all analyses agree that there is a major land degradation risk in the rangelands, but mapping and diagnosis of the problem is incomplete, and we don't have good figures for the cost of land degradation in West Asia and North Africa. As a result, the responses are not always effective.

Land Degradation Neutrality (LDN) has become a powerful global objective, as reflected in Target 15.3 of the SDGs: adopted by the UNCCD in 2015 as the principal target for the convention. LDN is gaining traction and many countries are setting targets to achieve LDN. In any case it is a great opportunity to generate support for restoring rangelands.

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What is LDN?

“a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales”. To achieve SDG Target 15.3, UNCCD agreed on three measurable indicators:

- ‘trends in land cover’ (metric: vegetative land cover);
- ‘trends in land productivity or functioning of the land’ (metric: land productivity dynamics);
- ‘trends in carbon stocks above and below ground’ (metric: soil organic carbon stock).

The third of these indicators is particularly important, as it constitutes a reliable indicator of soil health and soil biodiversity, even if this is not (yet) widely monitored. Moreover, it is an indicator for the extent of carbon sequestration.

IUCN (GDI, CEM/DESG and other IUCN Commissions) has played an important role in supporting the conceptual and political process of UNCCD to get LDN adopted as a critical SDG Target. This was done through inputs to defining the conceptual framework, support to National Voluntary Target Setting (75 countries), implementation of actions to achieve LDN on the ground, and strengthening the use of evidence for target setting and monitoring (Davies et al, 2016)³. Notably IUCN recommendations to achieve offsetting or counterbalancing land degradation in national targets were adopted by UNCCD, such as *“Restore more than you degrade”*, *“Prioritize in situ restoration”* and *“Restore “like with like”* (i.e. in offsetting irreversibly degraded ecosystems, restore ecosystems that are similar). This has contributed to a final mitigation hierarchy as follows: first *“Avoid land degradation”*, then see how to *“Upscale SLM practices”*, and as a last resort *“Adopt restoration measures”*.

The dry rangelands are an important biome for LDN, not in the least by their large extent, but also by their high value in terms of ecosystem services and because of the important degradation taking place in these lands. There are indeed many major degradation challenges with places that witness extreme land degradation, sometimes degraded for a long time so that restoration processes are lengthy. LDN in the rangelands is therefore an important objective to pursue.

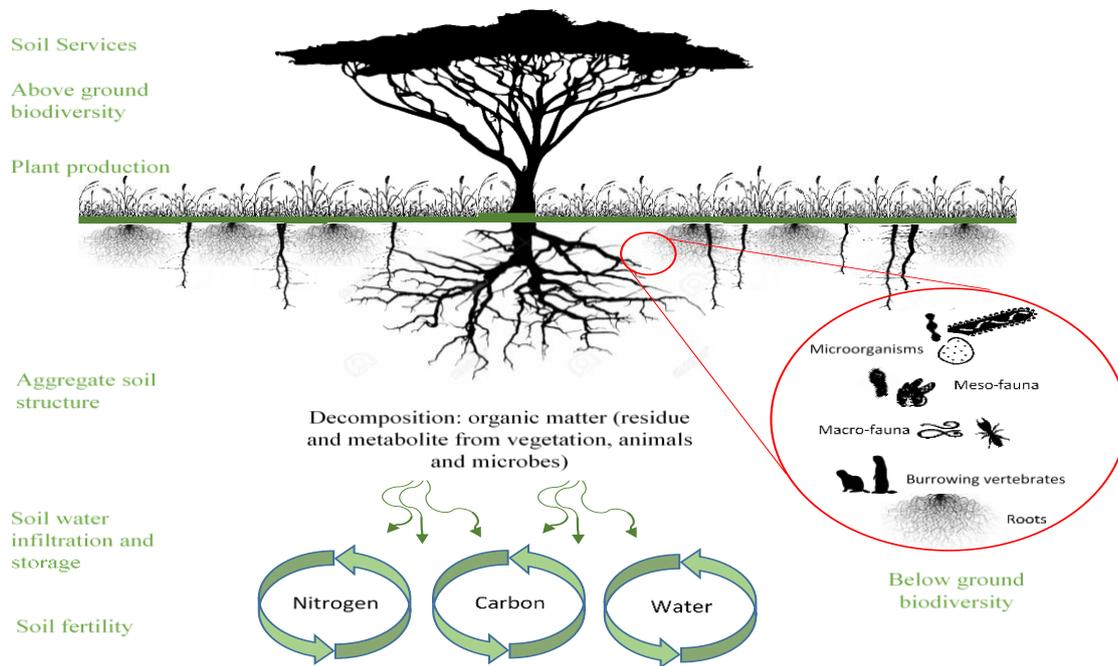
Conserving soil biodiversity and soil organic carbon in the rangelands

The graphic below (developed for a joint publication of CEM/DESG and IUCN/GDI⁴) shows the richness of biodiversity in the soil. Soil biodiversity really drives ecosystems – it determines the major cycles that enable life on earth, like the nitrogen cycle, carbon cycle, water cycle. It determines soil fertility and productivity, but also water storage, water flows and so on.

³ Davies. J. (ed), and Contributors, (2015). Technical Brief. *Land Degradation Neutrality: implications and opportunities for conservation; Nature Based Solutions to Desertification, Land Degradation and Drought*. IUCN Global Dryland Initiative and IUCN Commission on Ecosystem Management, Nairobi www.iucn.org/drylands

⁴ Peter Laban, Graciela Metternicht, and Jonathan Davies, 2018. *Soil Biodiversity and Soil Organic Carbon: keeping drylands alive*. Gland, Switzerland: IUCN. viii + 23p; ISBN: 978-2-8317-1889-7 (PDF) - DOI: <https://doi.org/10.2305/IUCN.CH.2018.03.en>

Fig. 1. Soil Biodiversity and Soil Organic Carbon



As mentioned soil organic carbon (SOC) can be used as a reliable indicator for soil health and hence for soil biodiversity. It is important to note that there is more carbon in the soil than all the carbon above ground plus all the carbon in the atmosphere combined (Laban et al, 2018).

Conserving soil biodiversity and soil organic carbon in rangelands is important in itself so as to sustain rangeland ecosystem management; it is also important to achieve LDN. Many SRM approaches are available for conserving, and managing rangelands, and when necessary restoration. Many rangelands have co-evolved for millions of years with grazing ungulates – to the extent that they are co-dependent. Restoration is often therefore more effective when ungulates are managed as a restoration tool. However, this requires a deep understanding of rangeland ecology and a strong commitment to the restoration process.

Making use of livestock as a rangeland ecosystem management tool

Nomadic and semi-nomadic livestock rearing is a dominant use of the rangelands, and hence understanding the dynamics of such use is critical. Herd movements are vital for pasture management and careful timing of grazing allows desirable plants to recover and allows preferred seeds to be grazed and distributed. Pastoralists often have a strong understanding of how livestock and rangelands interact. Most pastoral societies have strong traditions of communal management on a large scale, involving seasonal movements that are essential for rangeland health. The scale of such movements has changed – in many places traditional movements are no longer possible – and therefore new systems of herd movement often need

to be established. This is an evolution of the pastoral system, rather than a replacement with a completely unknown system. Pastoralists often have a strong understanding of how livestock and rangelands interact, and taking into account this local knowledge is vital. From above it follows that sustainable livestock management in arid and semi-arid rangelands requires organised management on a large scale. Pastoralists should therefore be promoted as managers of livestock and rangelands so as to enhance the positive interaction between herbivores and rangelands.

Strengthen local governance for SRM

IUCN's approach – along with other agencies in this region and in other parts of the world – is to re-establish the local governance⁵ of communal rangelands in order to manage livestock grazing patterns. These are low cost approaches, but they are highly demanding in human resources – skills, motivation, time and patience. A lot of patience! In the Arab speaking world, we have the great advantage that such governance systems, known as *Hima*⁶, are well understood and is strongly legitimised. In the West Asia region, we use this as our entry point – but unlike other actors, IUCN focuses on *Hima* as a way to strengthen community rights, rather than as a tool to persuade local communities to tolerate the conservation actions of outsiders. An important guideline for improving governance of pastoral lands was written by IUCN and published by FAO, entitled “Improving governance of pastoral lands: Implementing the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security” (FAO, 2016)⁷. Many governments have signed up to the here described Voluntary Guidelines on the Governance of Tenure (VGGT). These guidelines help those countries interpret the VGGT according to the local rangeland context. More recent experience in governance of rangelands is documented in a new publication⁸. Good governance implies many things as is illustrated in the figure below. For rangeland management, scale is critical to consider.

Key principles of governance are common – but participation, inclusion etc. take on new meaning in a pastoral context. Questions of scale are unique as they have big implications for how pastoralists plan their resources, how they move livestock, how their rights overlap with their neighbours – or with different people at varying scales of influence. This has major implications for stakeholder analysis and inclusion – something IUCN-ROWA has been pretty good about. It is important to greatly increase our ambition when we work on management of rangeland ecosystems. We have to move from small projects – of a few hundred hectares like Hima Bani Hashem in Jordan - towards a real landscape approach. The potential for sustainable management and where necessary restoration need to be mapped and development road maps outlined. It is only at sufficient scale that one can perceive the impact on ecosystem services. In Jordan for example, the Zarqa river basin supplies the city of Zarqa with water and

⁵ Governance is about how decisions are made; management about how decisions are implemented.

⁶ Hima is an age-old pre-Islamic community management system of natural resources, be that rangelands, wetlands, forests or other natural resources

⁷ <http://www.fao.org/3/a-i5771e.pdf>

⁸ Herrera, P.M., Davies, J. M. and Manzano Baena, P., 2014. The Governance of Rangelands: Collective action for sustainable pastoralism. Routledge/IUCN, London and New York.

hydro-power via the King Talal dam. Rangeland restoration safeguards this water supply whilst also reducing sedimentation of the dam.

Fig 2. Good Governance for the rangelands at the landscape scale



Managing rangelands for multiple ecosystem services that reward people

The key to sustainable rangeland management appears to be emphasizing the multi-functionality of ecosystems and incentivising the multiple services they produce for mankind. Livestock in rangelands provide meat, milk, fibre, and hides, but livelihoods in rangelands should be "livestock plus". Livelihoods are also connected to and depend on biodiversity – some with market value like Artemisia or crocus, others with non-use value (e.g. recreation, conservation). Rangelands provide livelihoods for some of the region's poorest, but at the same time are a major contributor to rural economies, biodiversity conservation and carbon storage. At the same time, sustaining healthy rangelands, and the livelihoods they provide, depend on the wise management of soil, carbon and water resources. We should therefore not only focus on provisioning services (food and commodities), but also how to encourage incentives for regulating and supporting services, for instance, as in Jordan by examining opportunities for payments for ecosystem services for watershed protection, or through ecotourism or renewable energies.

Opportunities to sustainably manage or restore rangelands

Such opportunities are on the increase. More finance is available than ever before, but we need to capitalize on this and mobilize investments in sustainable range management, especially as good practices have been well established and technological growth and development is creating new opportunities. There is high level support from SDGs, UNCCD and LDN, FCCC, CBD, triggering growing political demand at the national level (c.f. SDG targets on LDN) to simultaneously meet goals for food security, water security and climate regulation: only ecosystem management can deliver these simultaneously in the rangelands. At the same time, national policy support, such as Jordan's National Rangeland Strategy, create the necessary frameworks for scaling up good practices.

In short, we are poised to go to scale and we need to identify the triggers for scaling up investments at all levels. Priorities to ensure national scale up are: (1) piloting in demonstration sites; (2) scaling-up within landscapes; (3) replicating to all degraded landscapes. For this we need to build capacities, strengthen policies, leverage investments, build alliances and capitalize on key resources such as water, soil biodiversity and soil organic carbon.