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LAND DEGRADATION AND CLIMATE CHANGE

The multiple benefits of sustainable land management in the drylands

- The world's soils store more carbon than the planet's biomass and atmosphere combined.
- An increase of just 1% of the carbon stocks in the top metre of soils would be higher than the amount corresponding to the annual anthropogenic CO₂ emissions from fossil fuel burning.
- Many innovations in sustainable land management are now known and recognised for their multiple environmental, social and economic benefits.
- Sustainable land management can be mainstreamed in national development and conservation planning based on existing commitments under the Sustainable Development Goals and the United Nations Convention to Combat Desertification (UNCCD).
- Urgent improvements are needed to monitor soil organic carbon and increase awareness of, and capacity to pursue, the many opportunities of sustainable land management.

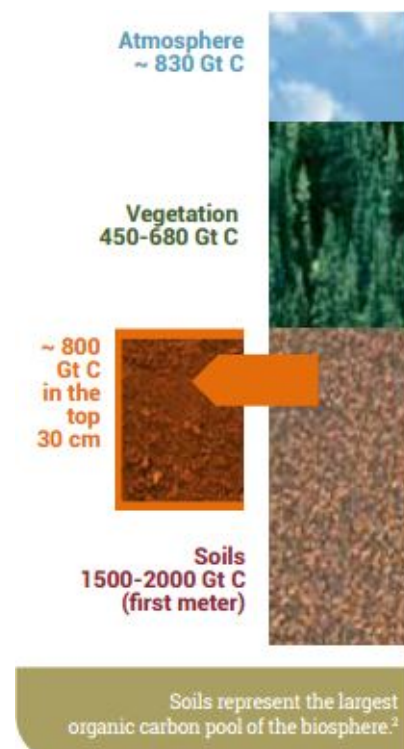
What is the issue?

Soil is the biggest terrestrial carbon sink. The world's soils store more carbon than the planet's biomass and atmosphere combined. This includes soil organic carbon, which is essentially biodiversity: microbes, fungi and invertebrates, as well as root matter and decomposing vegetation. Soil carbon stocks can be increased through appropriate land management to provide many benefits besides offsetting greenhouse gas emissions.

Loss of soil organic carbon is one of the principal signs of land degradation, and land degradation is one of the leading challenges for sustainable development, biodiversity conservation, and mitigating and adapting to climate change. It is defined as a reduction or loss of the biological or economic productivity and complexity of land. In drylands, land degradation is known as desertification.

When land is degraded, soil carbon can be released into the atmosphere, along with nitrous oxide, making land degradation one of the biggest contributors to climate change. An estimated two-thirds of all terrestrial carbon stores from soils and vegetation have been lost since the 19th century through land

degradation. Agriculture, forest and other land-use sectors generate roughly a quarter of all anthropogenic greenhouse gas emissions.



Why is this important?

Recent estimates of the global loss of ecosystem services due to land degradation and desertification are between US\$ 6.3 and 10.6 trillion annually. These high costs have not received adequate attention, partly due to the complexity of accurately measuring the knock-on effects and externalities of land degradation. There is a tendency by countries to only consider the impact on food production and to overlook ecosystem services such as water supply and regulation or reduction in carbon sequestration. IUCN’s work in Jordan has shown that these values can dwarf the value of food production by an order of magnitude.

Managing land sustainably means less carbon emissions and more carbon capture. Soil organic carbon contributes to the fertility of the soil and to its capacity to hold water, and therefore to a large extent determines the capacity of the soil to produce food and to support other biodiversity. The resilience of societies and ecosystems is increased where soil productivity, and hence carbon stock, is increased.

What can be done?

A broad suite of agro-ecology practices can be used to increase carbon in the soil, including agroforestry, fallows (resting soil for a year or more), and sustainable pasture management through managed herd mobility. In many countries these are known – and even Indigenous – practices that can be revived with the right support.

Recent studies suggest that soil carbon management presents one of the most cost-effective climate change mitigation options. Rangelands, for example, contain more than a third of all the terrestrial above- and below-ground carbon reserves. With improved rangeland management they could potentially sequester a further 1,300-2,000 million metric tons of CO₂ by 2030.

Small increases in global soil organic carbon will have a high impact on the global carbon cycle and on the atmospheric concentration of CO₂. An increase of just 1% of the carbon stocks in the top metre of soils would be higher than the amount corresponding to the annual anthropogenic CO₂ emissions from fossil fuel burning. Reversing land degradation and increasing soil organic carbon provides one of the surest and lowest-cost multiple-wins: climate change mitigation and adaptation, conservation of biodiversity, and increased food production.

Role of dryland soils in storing carbon

	Biomass carbon	Terrestrial carbon		
		All soil carbon	Soil organic carbon	Soil inorganic carbon
Global	576Gt	2,529 Gt	1,583 Gt	946 Gt
Drylands	83Gt	1,347 Gt	431 Gt	916 Gt
Portion in drylands	14%	53%	27%	97%

There are several options that countries can consider to increase soil organic carbon stocks.

Sustainable land management can be accelerated through policy and financial instruments, to increase soil organic carbon in a way that simultaneously combats desertification, prevents biodiversity loss and helps climate change mitigation and adaptation.

Other measures include treating land-based approaches to climate change mitigation as integral to global and national strategies; promoting awareness and sharing experience of the multiple benefits provided by sustainable land management; and ensuring that soil organic carbon is fully accounted for across all sectors as an indicator of the multiple benefits of sustainable land management.

Moving ahead, countries can improve monitoring and reporting by fulfilling their commitment to the three priority land-based progress indicators of the United Nations Convention to Combat Desertification (UNCCD): trends in land cover; trends in land productivity or functioning of the land; and trends in carbon stock above and below ground.

Where can I get more information?

- iucn.org/drylands
- UNCCD Science-Policy Interface
- Technical Brief

More on IUCN at COP21:

