The importance of grasslands, savannahs and rangelands in global climate change strategies

Grasslands, savannahs and rangelands contain huge carbon stores to mitigate climate change and provide ecosystem services that help adapt to a changing climate

- Rangelands alone account for 54% of global land
- Grasslands store between 25-35% of terrestrial carbon
- 90% of it underground

Whilst GSRs store less carbon per area than forests, their underground stocks are considered safer in areas of high fire or future logging risks

GSRs are also essential but under-valued assets in adapting to present and future climate change

- Reduce soil erosion, dust storms and desertification,

- Protect against flooding

- Provide water security through protection of surface and groundwater sources

- Support food security through livestock production, pollinators and wild foods

- Maintain recreational, cultural and aesthetic benefits

GSR ecosystems can play a key role in government responses to climate change under the UNFCCC, both in Nationally Determined Contributions (NDCs) and in adaptation plans

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- By maintaining or restoring natural, old-growth grasslands

- By changing agricultural practices and livestock management

But these ecosystems are increasingly vulnerable and threatened

– by conversion, degradation, invasive species, pollution, climate change…

...including conversion to tree plantations

Plans for major forest expansion under the UNFCCC could increase this problem

- Natural GSRs support high levels of biodiversity, including many threatened species.

- There is also evidence that biodiverse GSRs have greater resilience in the face of environmental change.

- Restoration of GSR biodiversity accelerates soil carbon sequestration in some conditions.

- Protection of Soil Organic Carbon is therefore most effective if combined with biodiversity conservation
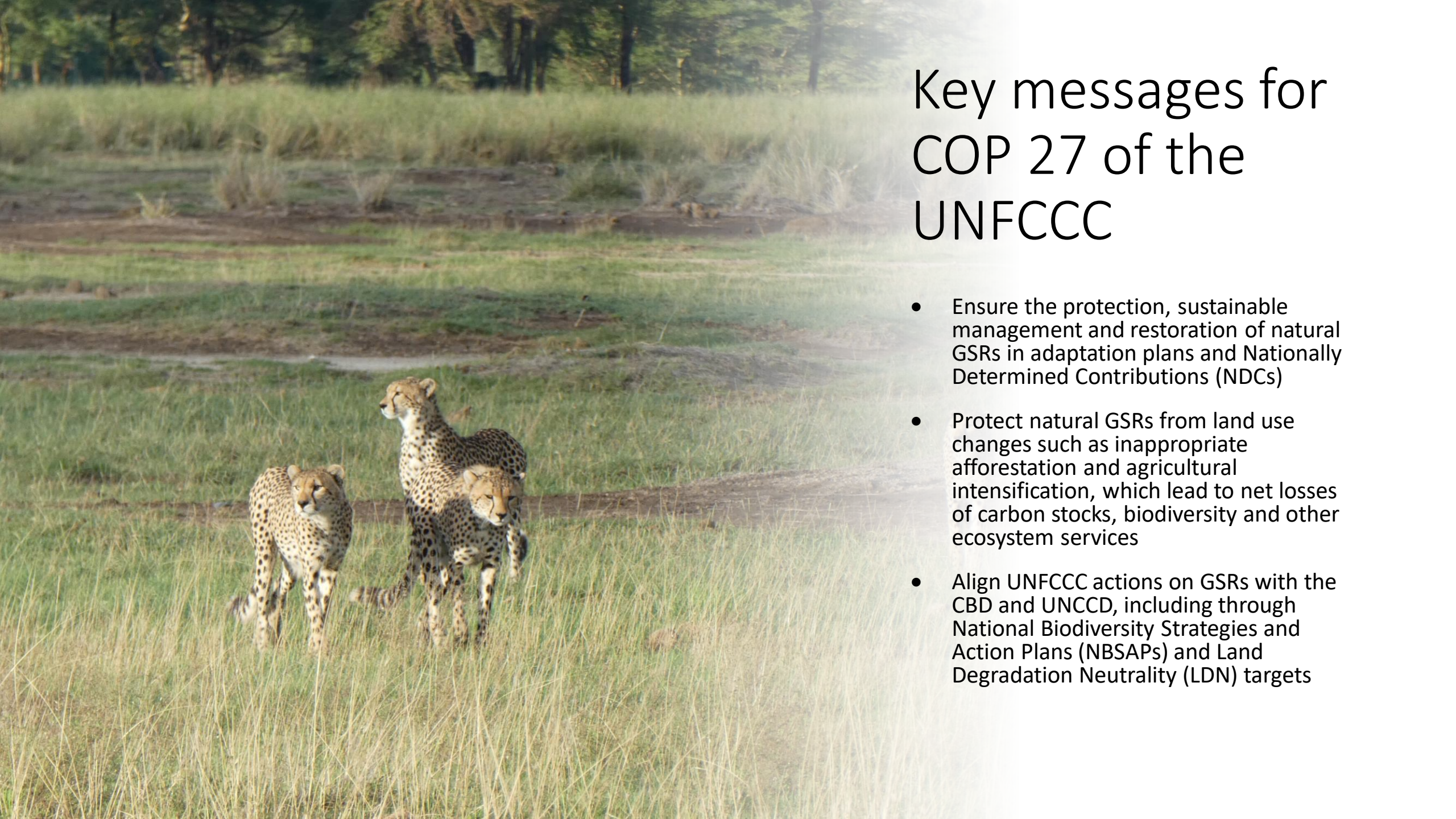
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There is synergy between aims of the **Convention on Biological Diversity** and the **UNFCCC**

A combination of protection, sustainable management and restoration can maximise the potential of GSRs in climate change strategies.

Key messages for COP 27 of the UNFCCC

- Ensure the protection, sustainable management and restoration of natural GSRs in adaptation plans and Nationally Determined Contributions (NDCs)

- Protect natural GSRs from land use changes such as inappropriate afforestation and agricultural intensification, which lead to net losses of carbon stocks, biodiversity and other ecosystem services

- Align UNFCCC actions on GSRs with the CBD and UNCCD, including through National Biodiversity Strategies and Action Plans (NBSAPs) and Land Degradation Neutrality (LDN) targets
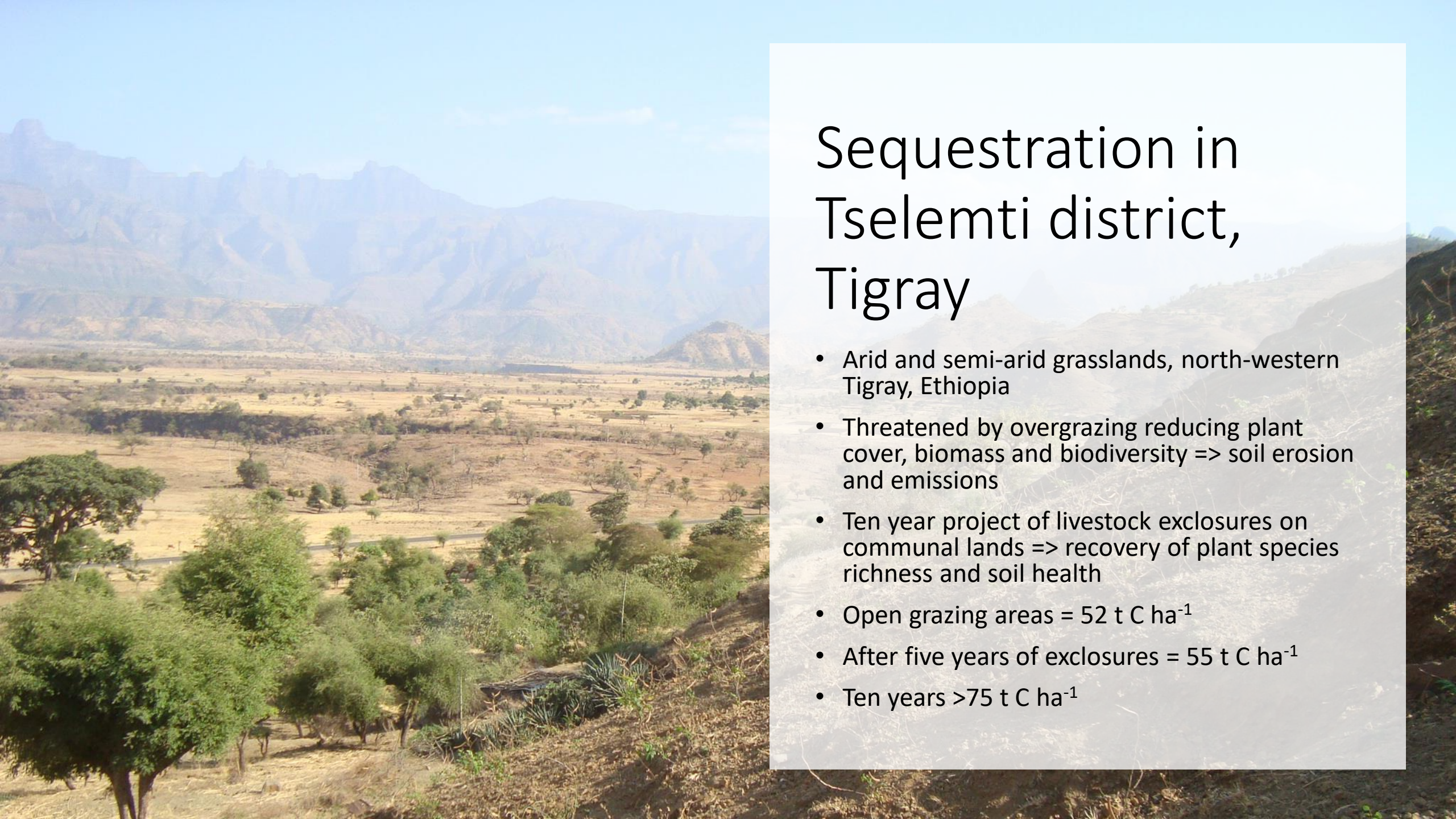
Carbon Case Studies

Storage in North Meadow Nature Reserve

- 44 ha floodplain in Cricklade, southern England

- Stores a total of 2,097 Tg C (0-100cm)

- approximately twice the mean soil carbon density for arable and agriculturally 'improved' grasslands and 20 per cent higher than semi-natural acid grasslands

- provides countless biodiversity benefits, sustainable hay yield and grazing services and climate regulation services = £1,100 per hectare per year

Sequestration in Tselemti district, Tigray

- Arid and semi-arid grasslands, north-western Tigray, Ethiopia

- Threatened by overgrazing reducing plant cover, biomass and biodiversity => soil erosion and emissions

- Ten year project of livestock exclosures on communal lands => recovery of plant species richness and soil health

- Open grazing areas = 52 t C ha^{-1}

- After five years of exclosures = 55 t C ha^{-1}

- Ten years >75 t C ha^{-1}

Northern Kenya Carbon Project

- The world's first large-scale grasslands soil carbon project (very few large, grassland carbon removal ventures currently on the market)

- 1.9 M ha of 14 community-owned conservancies grazed and managed sustainably

- 2020: Verra verified 3.2M carbon credits

- Should remove and store 50 M t of CO_2 over 30 yrs (annual emissions of >10M cars)

- Restoring habitat of endangered rhino, zebra, giraffe and oryx

Other case studies

Cerrado Brazil

Colombian Orinoquía

Mongolian Society for Range Management