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Potential for carbon sequestration through grassland restoration:

A South and East Asia Perspective

Regional Consultation

Lanzhou 27-30 November 2015

Grasslands in S and E Asia

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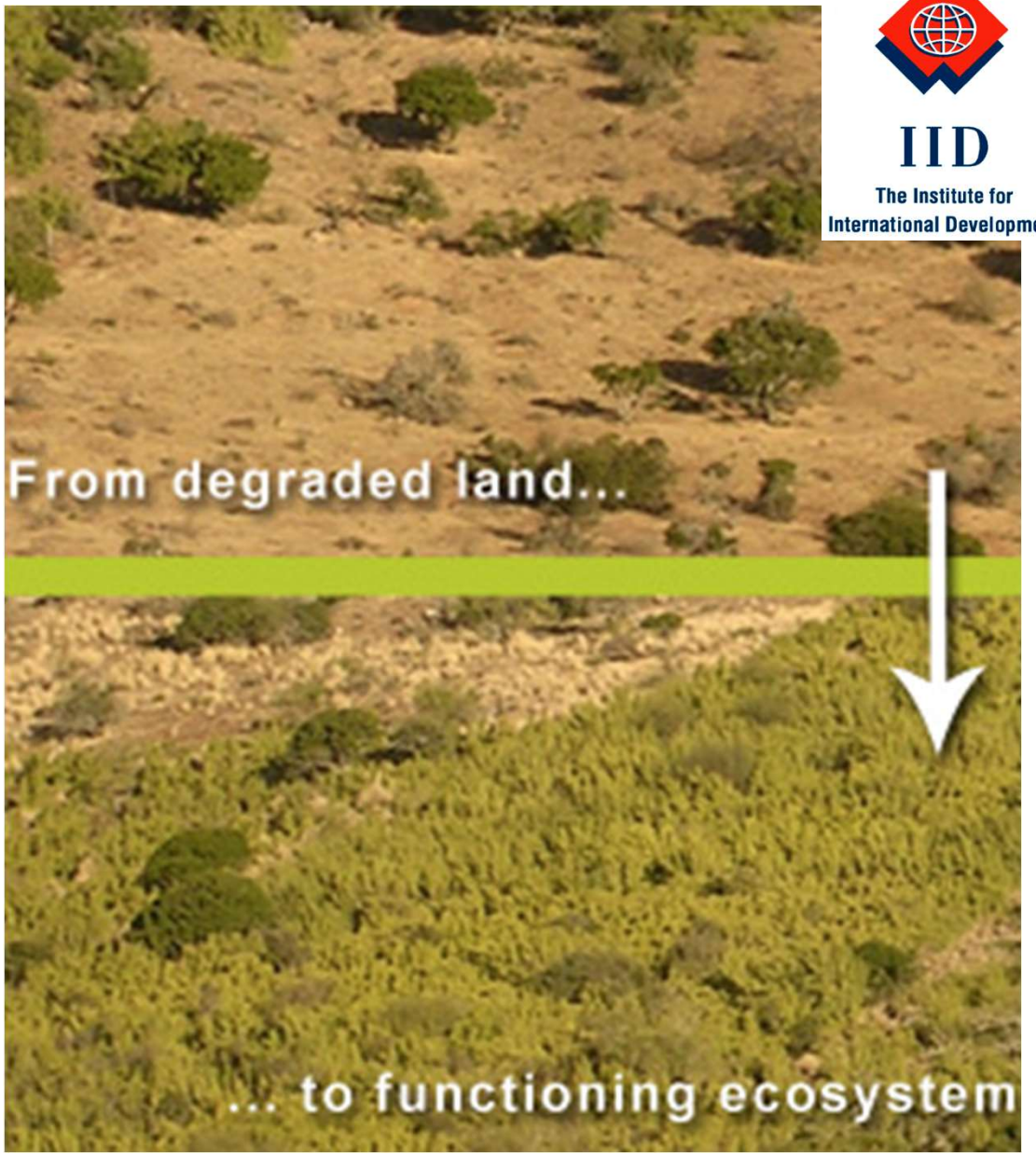
- Estimates of pasture and grassland areas are confounded by definitional issues (FAO stats 2008)
- Some authors include Silvi pastoral systems since many grasslands are interspersed with crops and are then integrated systems Murthy et-al for India (2013) and Hua Limin et-al for China (2015)
- Salinized grass and crop lands increase and many can be restored and use salty water (Al-Attar 2002)
- These total 70% of agricultural area holding 20% of Carbon stock FAO Challenges and opportunities for C Seq. 2010

Carbon Sequestration improves income

- Grazing management changes
- Improved species, legumes, shrubs
- Inputs water fertilizer
- Restoring degraded and saline lands
- Including grass in cropping rotations

All improve income, soil health and carbon

But all need investment



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Accepted Potential

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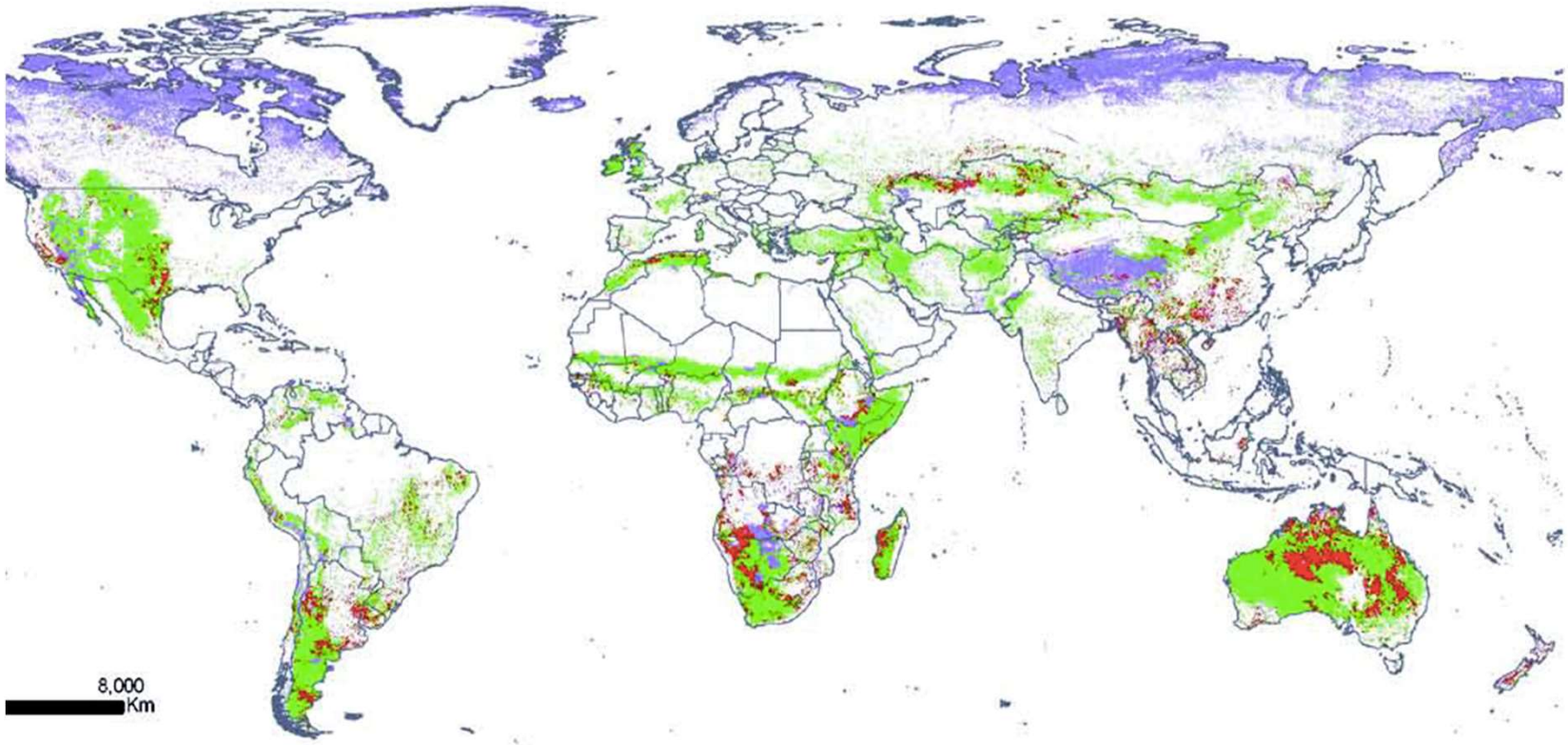
- It has been known for decades that grasslands store significant carbon Fisher et- al 1994 and Conant Puastian 2002
- It is accepted technology that improving management to increase sustainable production also sequesters carbon FAO Policy Brief for pastoralists 2009
- Improving grassland management and reversing degradation offer the most important technical mitigation solutions in Agriculture IPCC 2010
- Why is grassland restoration not a mainstream development action?

Land Use Systems LADA



Geographic projection. 30 arc seconds resolution at the equator.

C 2000, Joint Research Centre 2003. FAO / UNEP LADA project: Land use systems map of the world, 2008. Bai et al.,

Challenges

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- The funding of change; who pays? (Lipper and Catavassi FAO 2003)
- The management of change, a multi disciplinary activity (UNCCD Land restoration 2016)
- Measuring carbon gains and losses remains a challenge

Grassland decline

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- Around 20% of the worlds 3.5 billion ha of grasslands have been converted to cultivated crops, much within grassland areas (FAO 2010)
- Estimates of degraded areas varies from 7.7% Conant ands Paustian 2002 based on GLASOD survey, to 20- 70 % FAO Livestock's Long Shadow 2006

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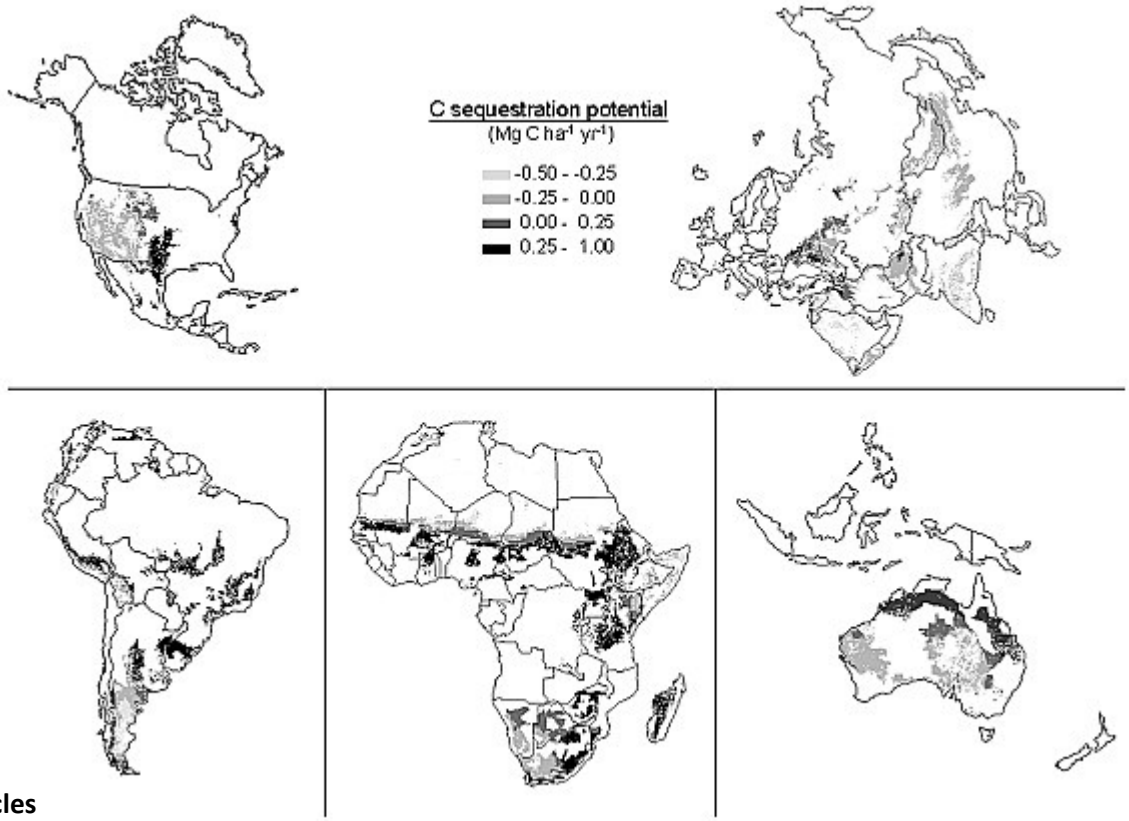
- Estimates of pasture degradation vary from 7.7% Conant Puastian 2002 to 20-70 % FAO Livestock's long shadow
- Carbon gains will depend on the degree of restoration; the actual potential gain is unknown but significant
- tree shade and legumes improves C sequestration 1.7- 2.3 times over just improved management

Potential soil carbon sequestration in overgrazed grassland ecosystems



Global Biogeochemical Cycles
Volume 16, Issue 4, pages 90-1-90-9, 31 DEC 2002 DOI: 10.1029/2001GB001661
http://onlinelibrary.wiley.com/doi/10.1029/2001GB001661/full#gbc869-fig-0004

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Grassland soils and carbon

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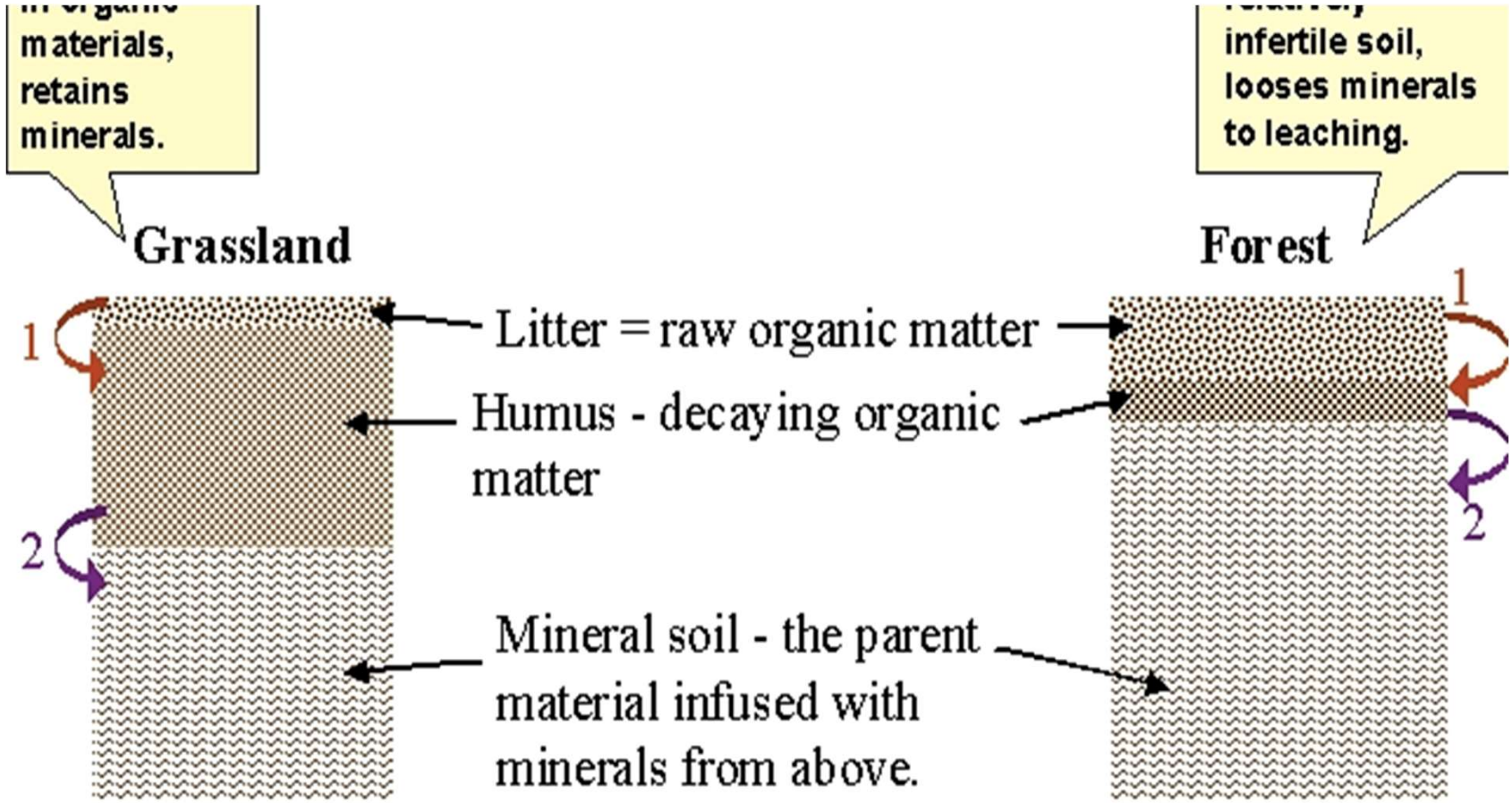

1. Humification - the biological process which creates humus. It is rapid in calcified soils, slow in podsols.