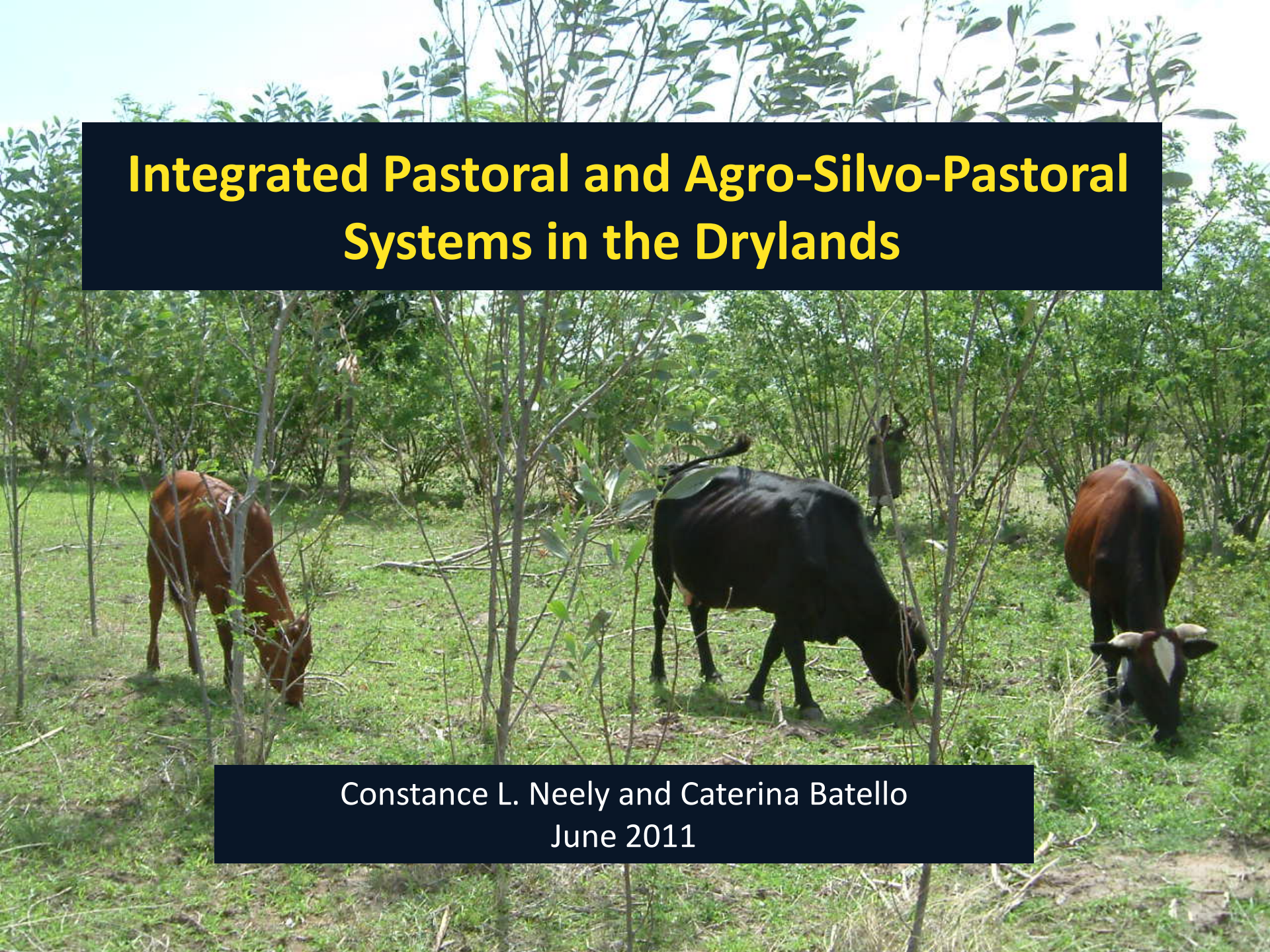
Integrated Pastoral and Agro-Silvo-Pastoral Systems in the Drylands



Constance L. Neely and Caterina Batello
June 2011

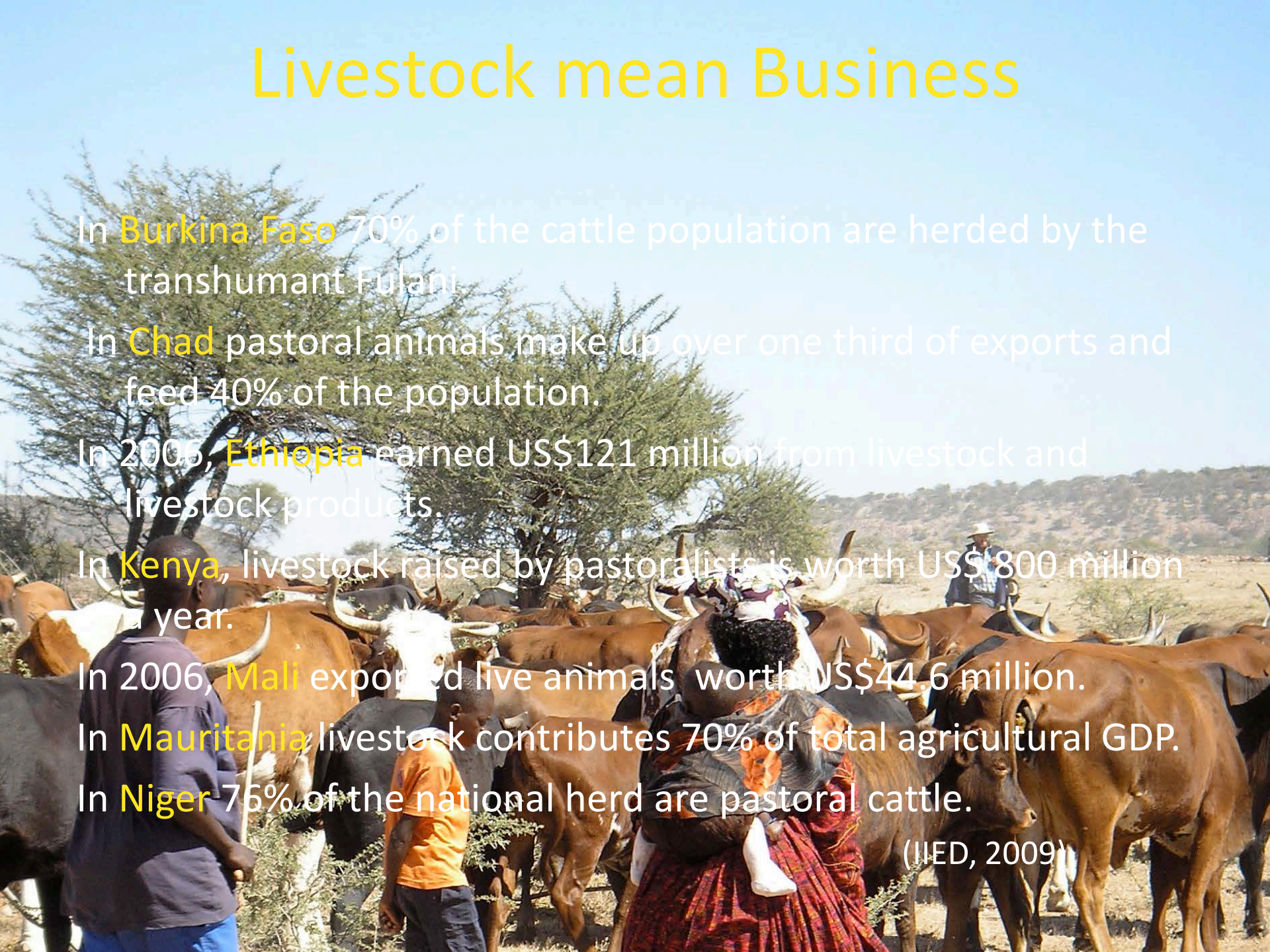
Livestock Based Livelihoods

- An estimated 50 million pastoralists and up to 200 million agro-pastoralists live from West to East across dryland Africa (IIED, 2009).

- These Livestock keepers manage 40% of the land area.

- Livestock is the fastest growing agricultural sub sector. In some countries accounting for as much as 50% of GDP (WB, 2007).

Livestock mean Business



In Burkina Faso 70% of the cattle population are herded by the transhumant Fulani.

In Chad pastoral animals make up over one third of exports and feed 40% of the population.

In 2006, Ethiopia earned US$121 million from livestock and livestock products.

In Kenya, livestock raised by pastoralists is worth US$ 800 million a year.

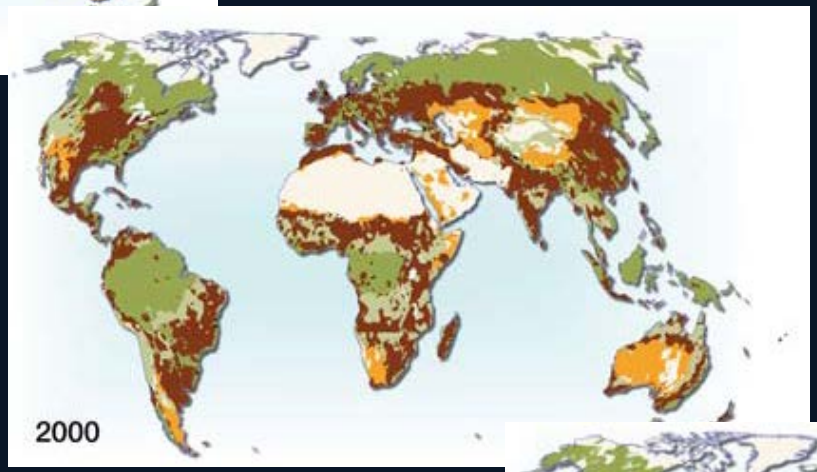
In 2006, Mali exported live animals worth US$44.6 million.

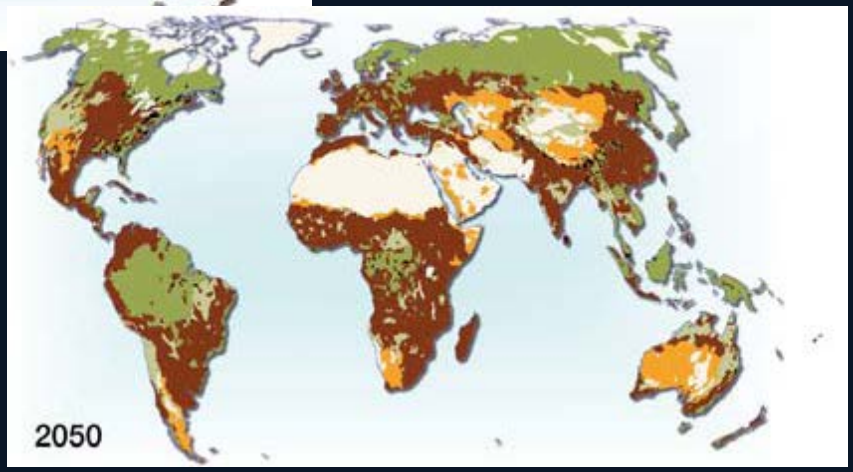
In Mauritania livestock contributes 70% of total agricultural GDP.

In Niger 76% of the national herd are pastoral cattle.

(IIED, 2009)

Projected Land Use Conversions

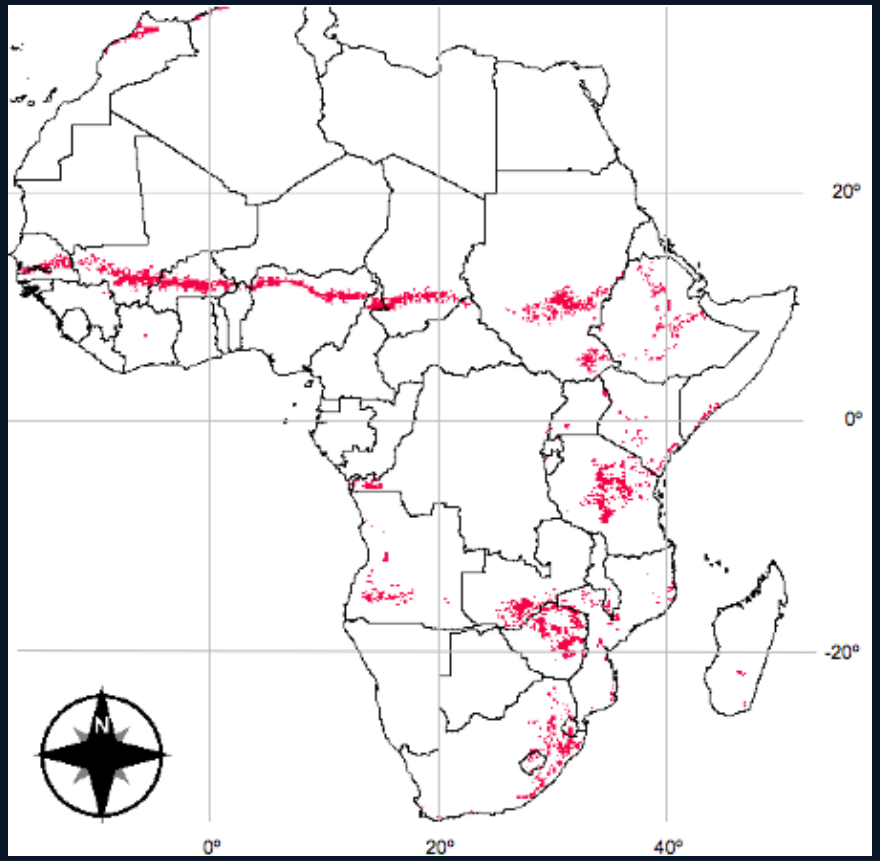




Landuse and agriculture
- Agricultural land
- Extensive grasslands (incl pasture)
- Regrowth after use
- Forests
- Grasslands
- Non-productive land

Source:UNEP

“There are likely to be substantial shifts in the patterns of African cropping and livestock keeping”



•Cropping of an indicator cereal may become unviable between now and 2050 and where farmers may have to rely more on livestock as an livelihood strategy,

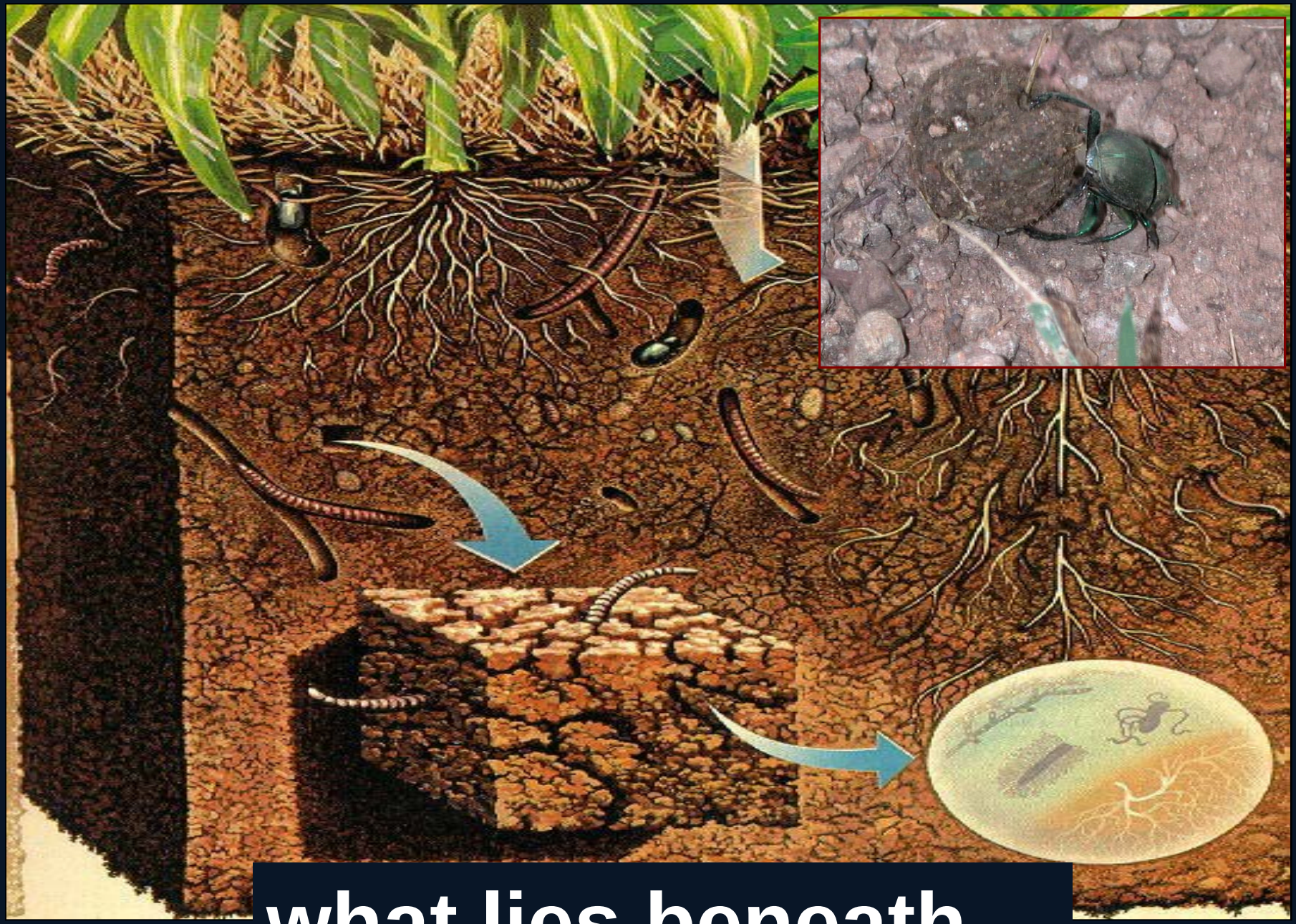
Jones and Thornton (2008))

Systems and holistic approaches are back in large part thanks to climate change

- Integrated small holder farming systems
- Pastoral and sylvo-pastoral Systems
- Farm or landscape Level

- Productivity, food and nutrition security, livelihoods improvement
- Global public goods and ecosystem services
- Mitigation and adaptation
- Resilience

Managing Ecosystem Processes



what lies beneath…

Can Livestock be used to manage ecosystems processes?

Photo credit: C. Leggett

Photo credit: C. Leggett

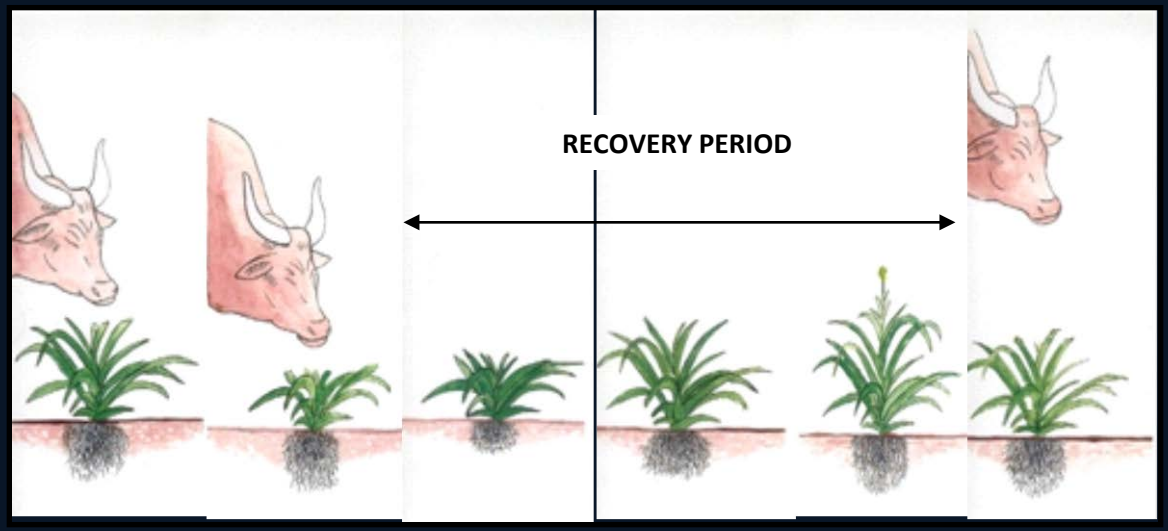
Photos: C. Leggett, C. Neely

Photos: C. Neely, A. Savory

Western know-how…

National Park or Tribal Land?

Overgrazing and Land Degradation



Planned grazing

Animal impact

Slide Source: Belinda Low, Grevy's Trust

Photos: A. Savory, C. Neely

Severe rainfall failure during 2004/5 rains

Good rains 2005/6

30 years bare & compacted soil.

Severe rainfall failure during 2006/7 rains

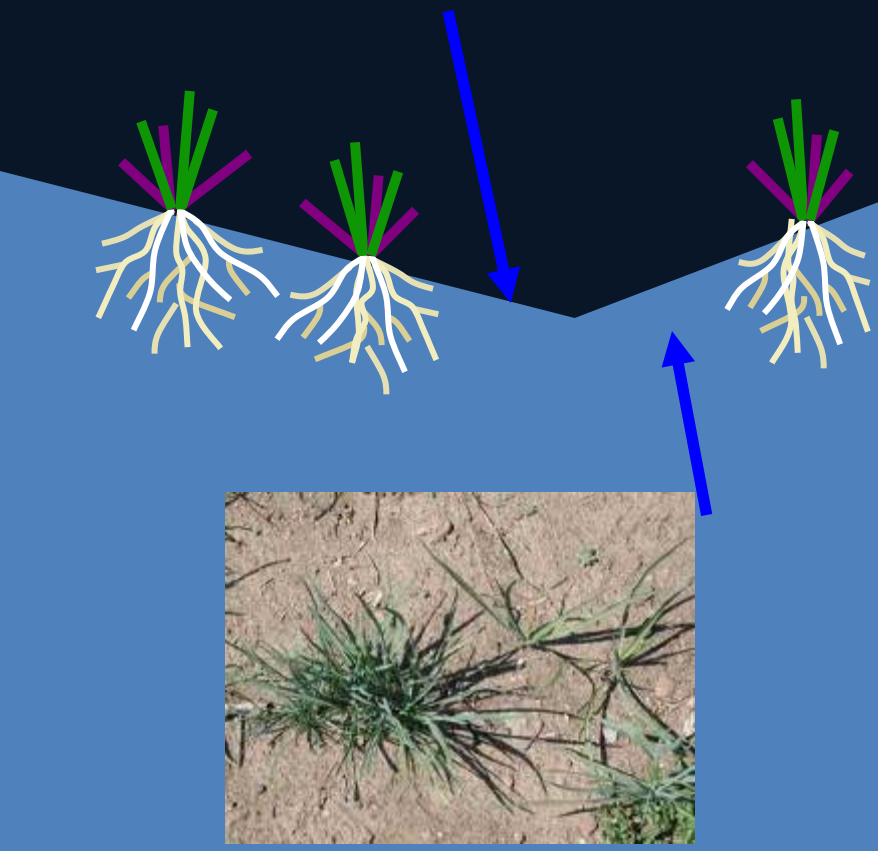
Africa Centre for Holistic Management, Zimbabwe.

Photo Credit: A. Savory

Non-effective water cycle

50-80% of rainfall is lost through run-off and evaporation.

Soil bare between plants

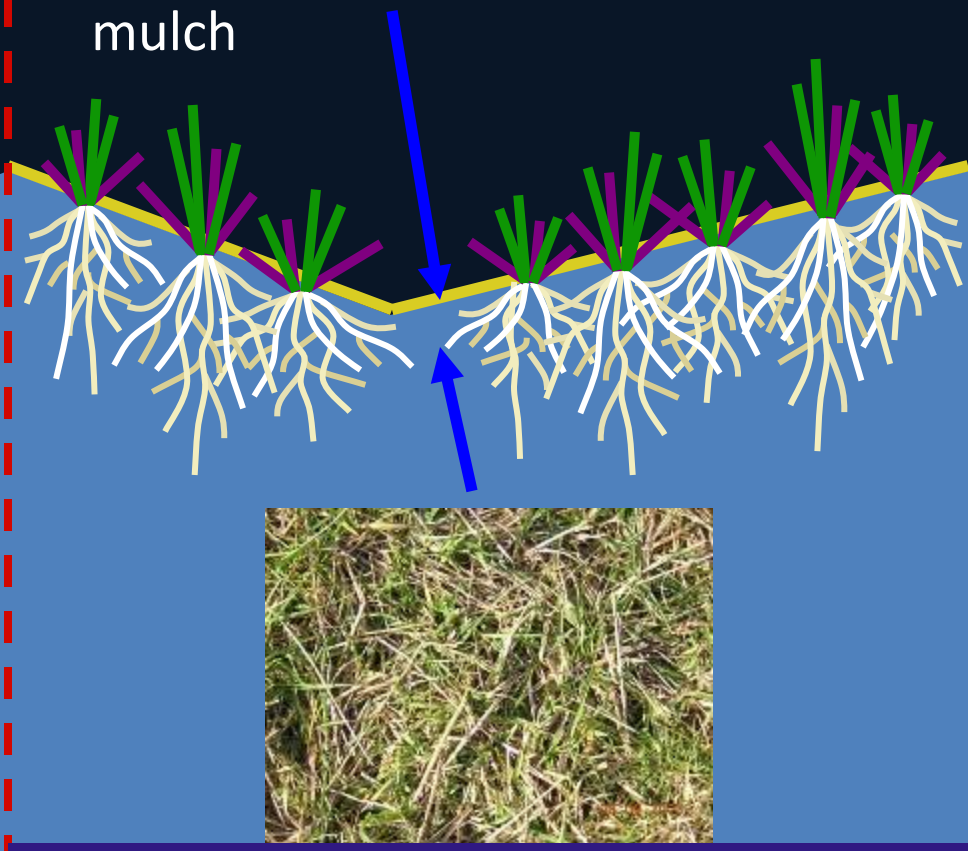


water table

Effective water cycle

1 % increase in SOM
144,000 L H_20 per Ha

Soil covered with plants and mulch



After:
www.managingwholes.com

Regenerating Landscapes

Photos: A. Savory

Boreholes failing or filling

Wildlife died in the core conservation area (livestock-free 14 years) - the drought of 2009

Animal Impact
Results
Behind

Slide Source: R. Hatfield, LWF

Grazing planning – Il Ngwesi community

Slide Source: R. Hatfield, LWF


Photo: C. Neely

SARD Kenya Livestock Working Group
Value Chain Pastoralist Field School
Kajiado, Kenya

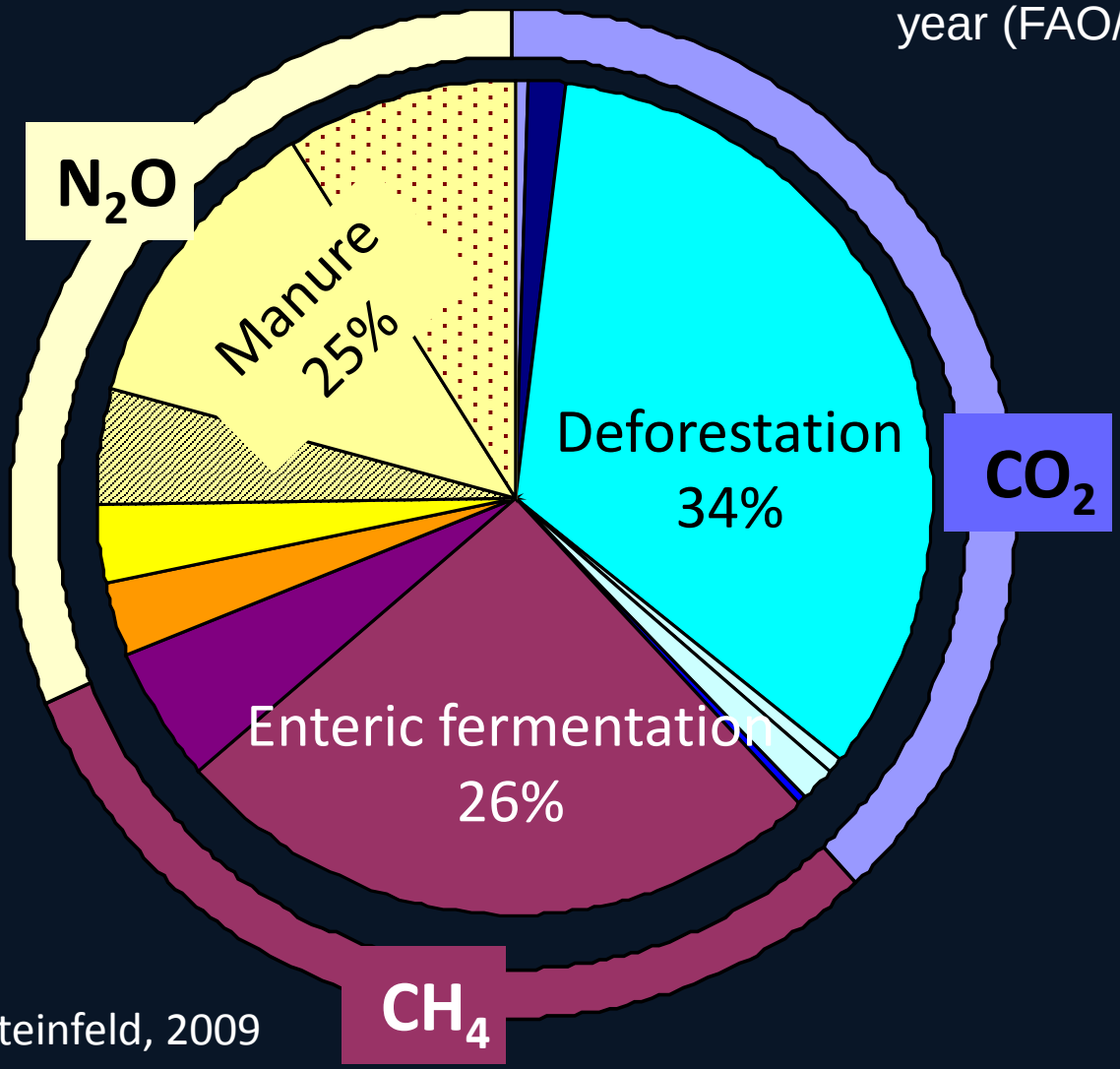
Innovations


Mitigation and Adaptation

Livestock Related Emissions by GHG

Livestock is said to make up 80% of the agricultural emissions.

Grazing-induced desertification in the drylands has been estimated to emit as much as 100 million tonnes of CO_2 per year (FAO/LEAD)



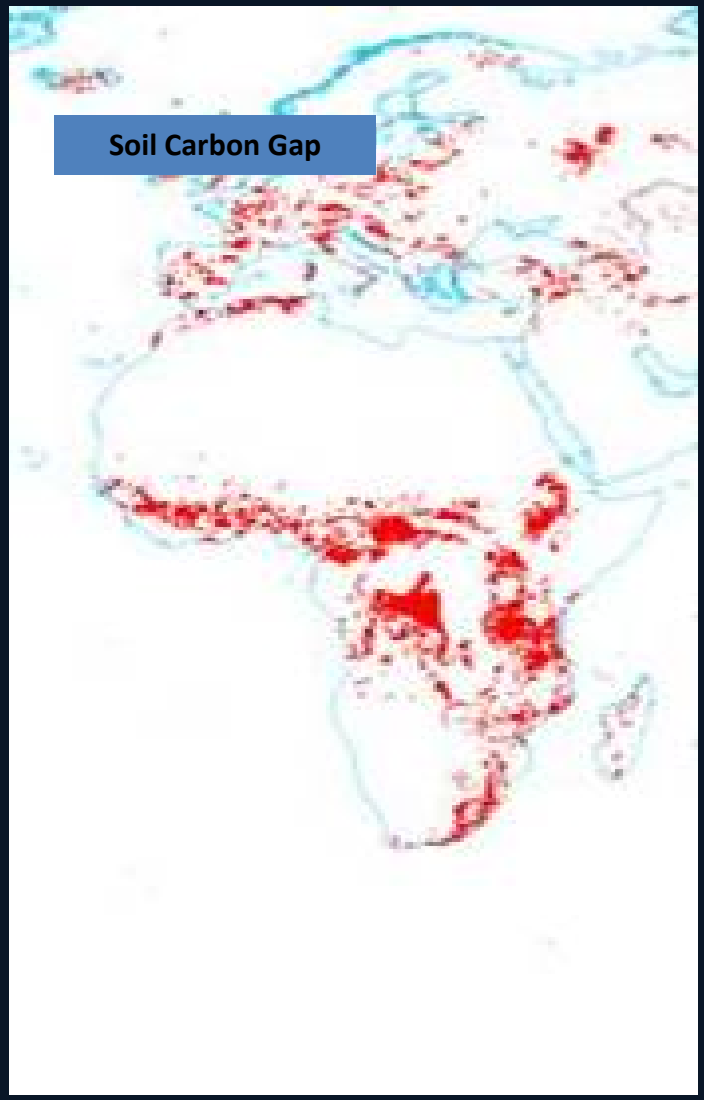
- Chemical N. fert. production
- On-farm fossil fuel
- Deforestation
- OM release from ag. soils
- Pasture degradation
- Processing fossil fuel
- Transport fossil fuel
- Enteric fermentation
- Manure storage / processing
- N fertilization
- Legume production
- Manure storage / processing
- Manure spreading / dropping
- Manu indirect emissions

Steinfeld, 2009


Capturing Carbon
Building Biomass

“Insatiable Carbon Absorbers”

- Africa drylands store approximately 56% the carbon.
- Improving grazing land management has the second highest technical potential for mitigating C emissions (IPCC 2007))



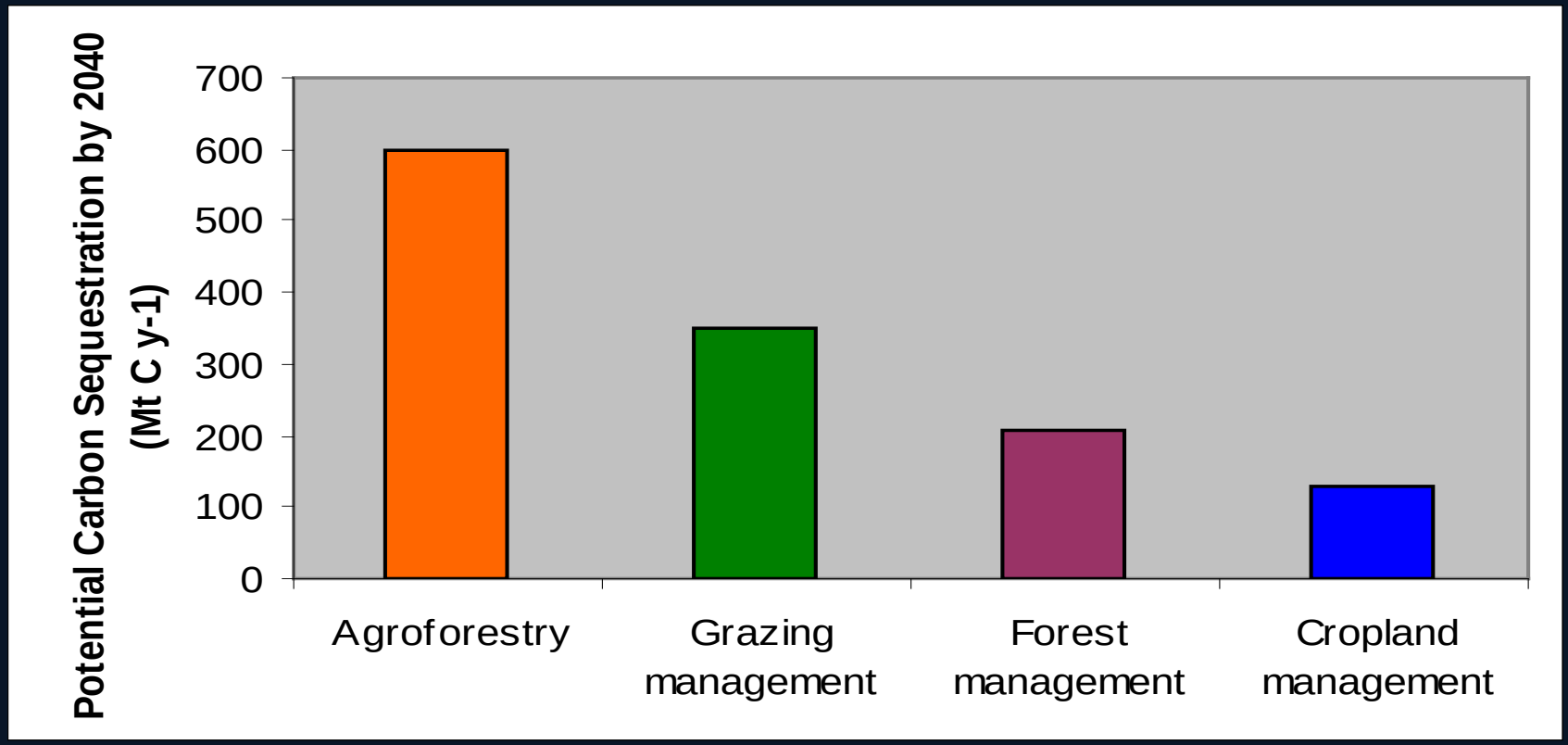
“Insatiable Carbon Absorbers”

- Batjes (2004) estimated that improved management of 10% of the African grazing lands could increase soil carbon stocks by 13-28 MT-C.yr-1.

- Natural or improved fallow systems, under agroforestry and managed for resting of land, have potential sequestration rates of 0.1–5.3 T-C.ha-1.yr-1 (Vagen et al., 2005).

Carbon Sequestration Potential of Four Land Use Systems

(Adapted from IPCC, 2000, Swaminathan, 2nd WAC, 2009)



Farmer Management Natural Regeneration contributes to:

Stress reduction and nutrition of livestock, and the availability and quality of fodder.

Crop productivity from manure from livestock which spend greater time in fields during the dry season.

And increases fodder availability (tree pods and leaves), farmers are in a better position to leave crop residues on their fields (Renaudo, 2009).

Natural Regeneration
Ngitili system

Photo: ICRAF-TZ

Tanzania - Ngitili System
500,000 hectares regenerated

Homestead nursery potential

Grasslands Carbon Working Group

Food and Agriculture Organization of the United Nations

for a world without hunger

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Rangelands and Climate Change: Mitigation, Adaptation and Co-benefits

World Agroforestry Centre

ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

RANGELANDS REPRESENT 24% OF THE WORLD'S LAND AREA AND ARE AN IRREPLACEABLE SOURCE OF LIVELIHOODS FOR THE POOR

Rangelands directly support 200 million households and support 50% of the world's livestock population. Livestock, which greatly depend on rangelands for their growth, are socially, culturally and economically critical to rural livelihoods. Livestock is a fast-growing agricultural sub-sector, accounting for as much as 50% of GDP in countries with significant areas of rangeland (World Bank, 2007). Pastoralism is considered the most appropriate strategy to maintain human well-being in rangelands, as it provides secure livelihoods, conserves ecosystem services, promotes wildlife conservation and honours cultural values and traditions (ILRI, 2006; UNDP, 2006). However, managers of rangelands face socio-political constraints - for example tenure insecurity, lack of social and education services, and conflicting policies have exacerbated their societal marginalization and economic poverty.

LIVESTOCK GRAZING SYSTEMS CAN HAVE A NEGATIVE IMPACT ON THE ENVIRONMENT AND CLIMATE CHANGE

Globally, 10–20% of drylands, and 31% of African rangeland soils, are degraded (MEA, 2005; (Olderman 1994). Unsustainable grazing management, fire and land-conversion are important drivers of degradation and GHG emissions. Grazing-induced desertification severely impacts biological diversity and is estimated to emit 8.2 MT-C.yr-1 (FAO/LEAD, 2006) globally, while savannahs contribute 42% of the total carbon released from biomass burning (Levine et al., 1999; Andreae, 1991). The conversion of rangelands to cropland, including biofuel production, may result in a loss of 95% aboveground and up to 60% below-ground carbon (Reid et al., 2004; Guo and Gifford, 2002). Further degradation leaves bare ground, which reduces the effectiveness of the conversion of rainfall in primary production by 50-70%. Climate change induced shorter crop growing seasons may lead to abandoning of cropland and increase the area under rangelands in the future (Jones and Thornton, 2008).

IMPROVED GRAZING MANAGEMENT, REVERSING DEGRADATION, AND AGROFORESTRY ARE THE MOST IMPORTANT TECHNICAL MITIGATION SOLUTIONS (IPCC, 2007)

Grazing management techniques intended to increase forage production through increased perennial species have the potential to increase above and below ground soil carbon stocks, and to restore degraded drylands. Rangelands store 30% of the world's soil carbon (White, 2000; Grace et al. 2006). Smith et al. (2007) estimated that improved rangeland management could globally sequester 0.35–0.55 Gt-C.yr^{-1} up to 2030. Batjes (2004) estimated that improved management of 10% of the African grazing lands could increase soil carbon stocks by 13-28 Mt-C.yr^{-1}. Natural or improved fallow systems, under agroforestry and managed for resting of land, have potential sequestration rates of 0.1–5.3 T-C.ha^{-1}.yr^{-1} (Vagen et al., 2005).

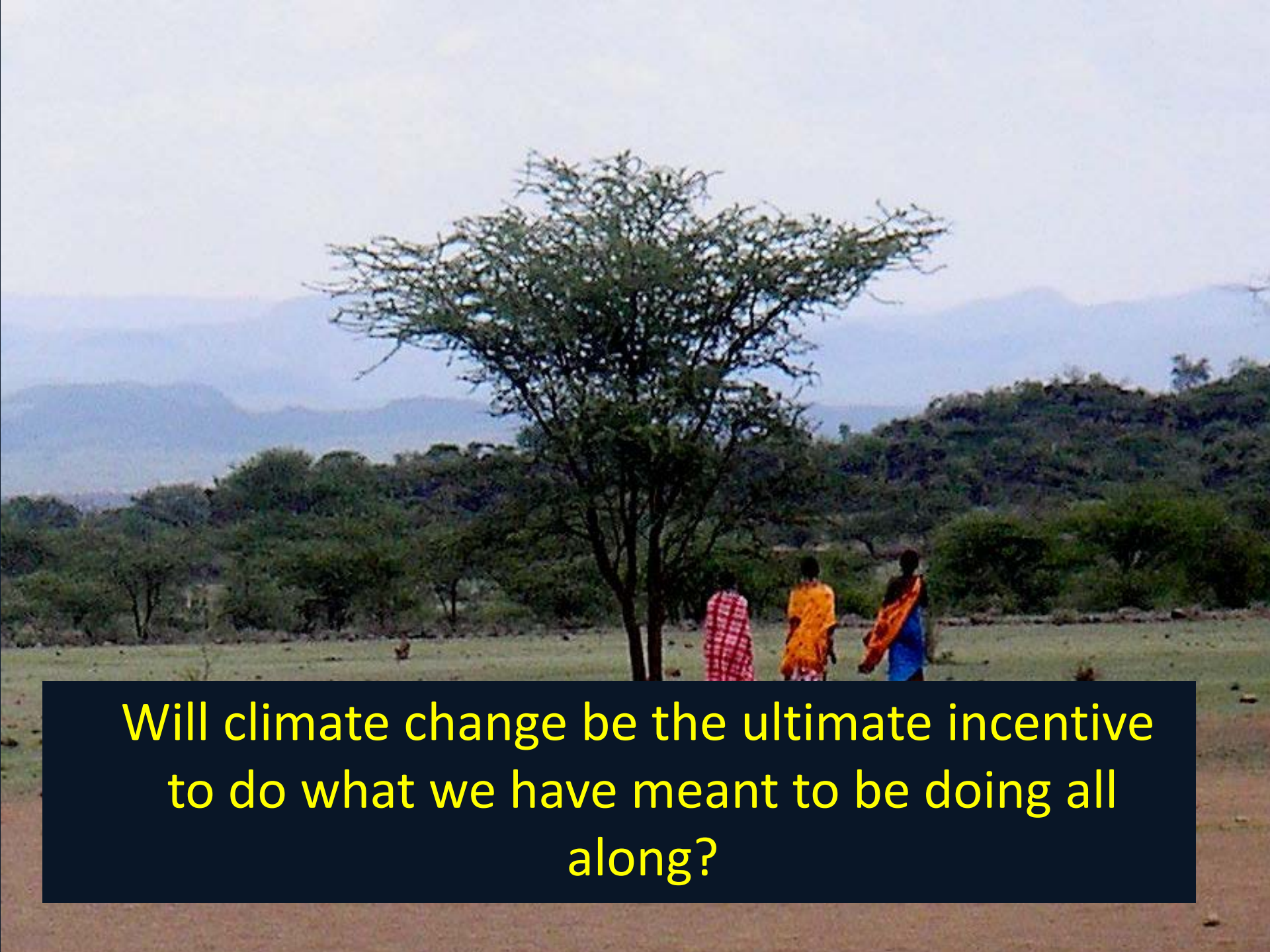
Take Home

- Women and men farmers and pastoralists are managing and stewarding Africa's ecosystem processes.
- Are we prepared to challenge paradigms and address root causes?
- Investments can constellate around the capacity of local institution associated with ensuring functioning systems, that build diverse biomass, and ecosystem processes systems and for the long term.

United Nations Decade for Deserts and the Fight Against Desertification

Deserere = 'to abandon'

We can not abandon the peoples and ecosystems in the drylands


Will climate change be the ultimate incentive to do what we have meant to be doing all along?