

Soils – Opportunities and Risks for Climate Mitigation and Adaption



COMBATING
CLIMATE CHANGE
MAINTAINING
MOMENTUM

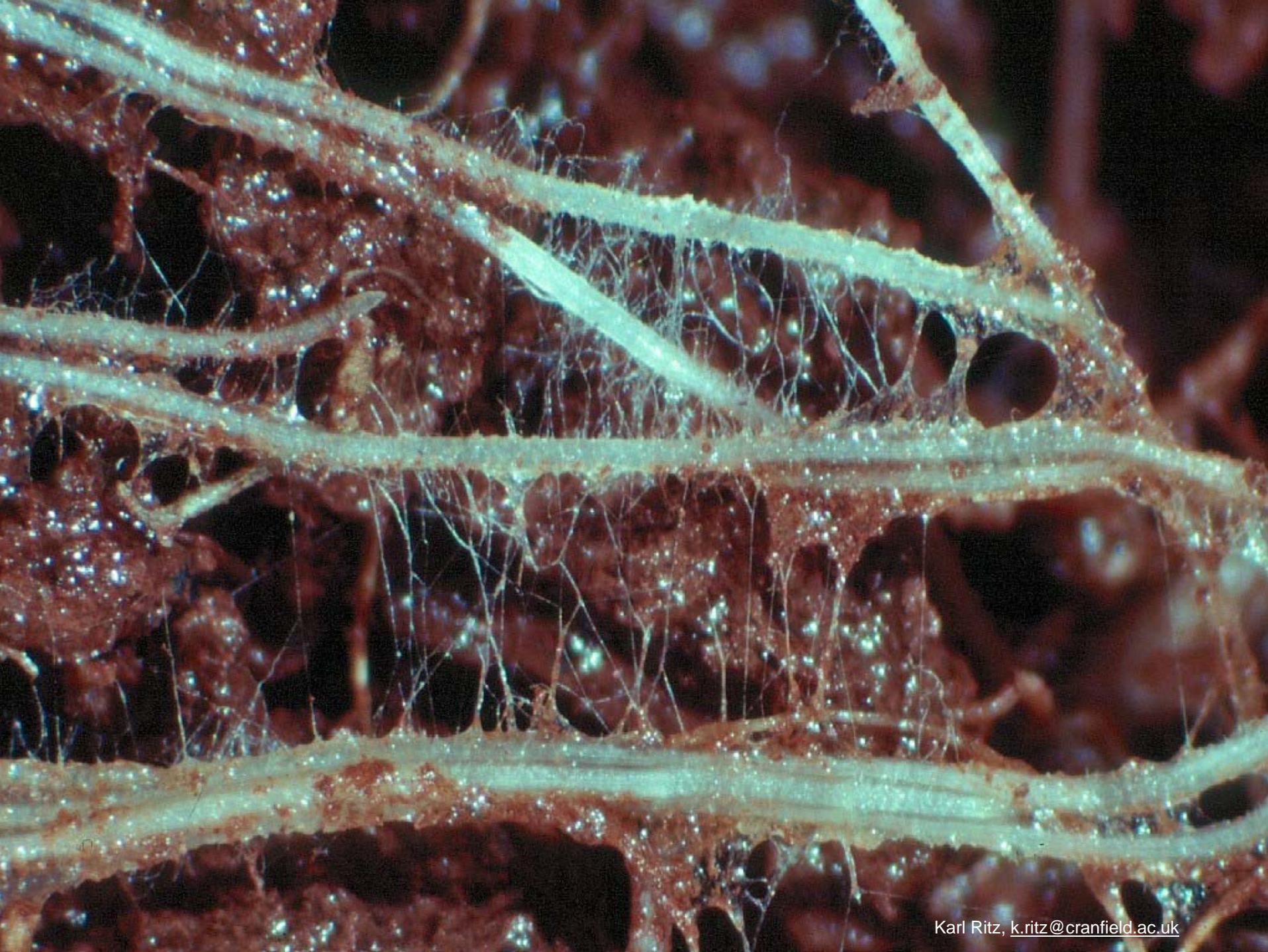
ieep.eu/briefingsonclimate

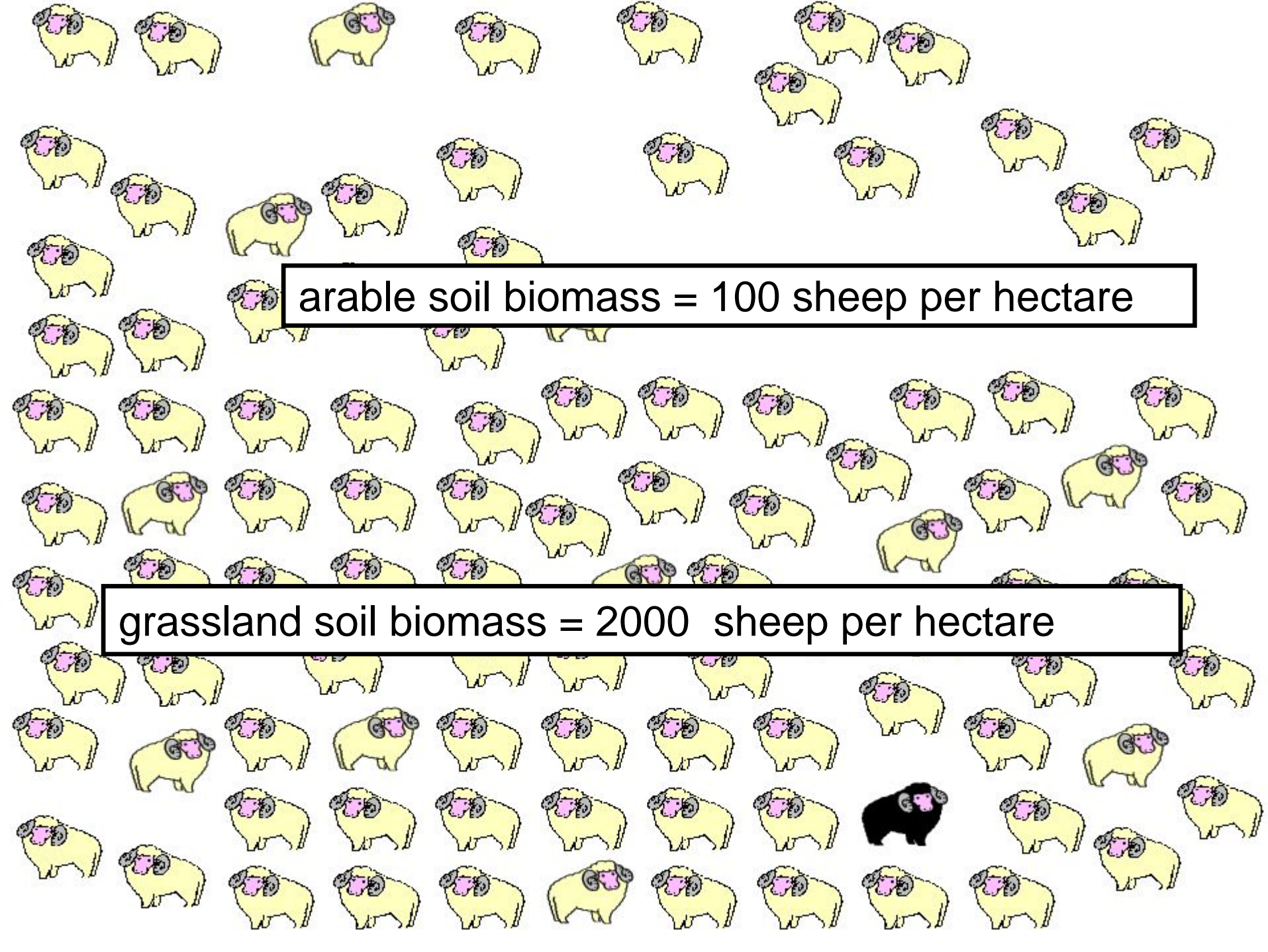
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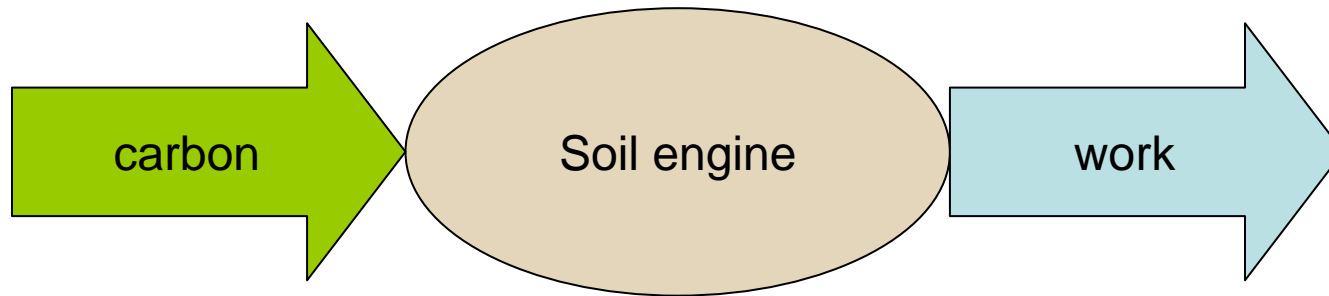


The diagram illustrates the concept of soil biomass using sheep as a proxy. It is divided into two horizontal sections. The top section, representing arable soil, contains 100 yellow sheep icons with pink faces and black horns, arranged in a sparse, irregular pattern. The bottom section, representing grassland soil, contains 2000 yellow sheep icons in a dense, regular grid, plus one black sheep icon in the bottom right. Two text boxes with black borders are overlaid on the image. The top box, positioned over the arable soil section, contains the text 'arable soil biomass = 100 sheep per hectare'. The bottom box, positioned over the grassland soil section, contains the text 'grassland soil biomass = 2000 sheep per hectare'.

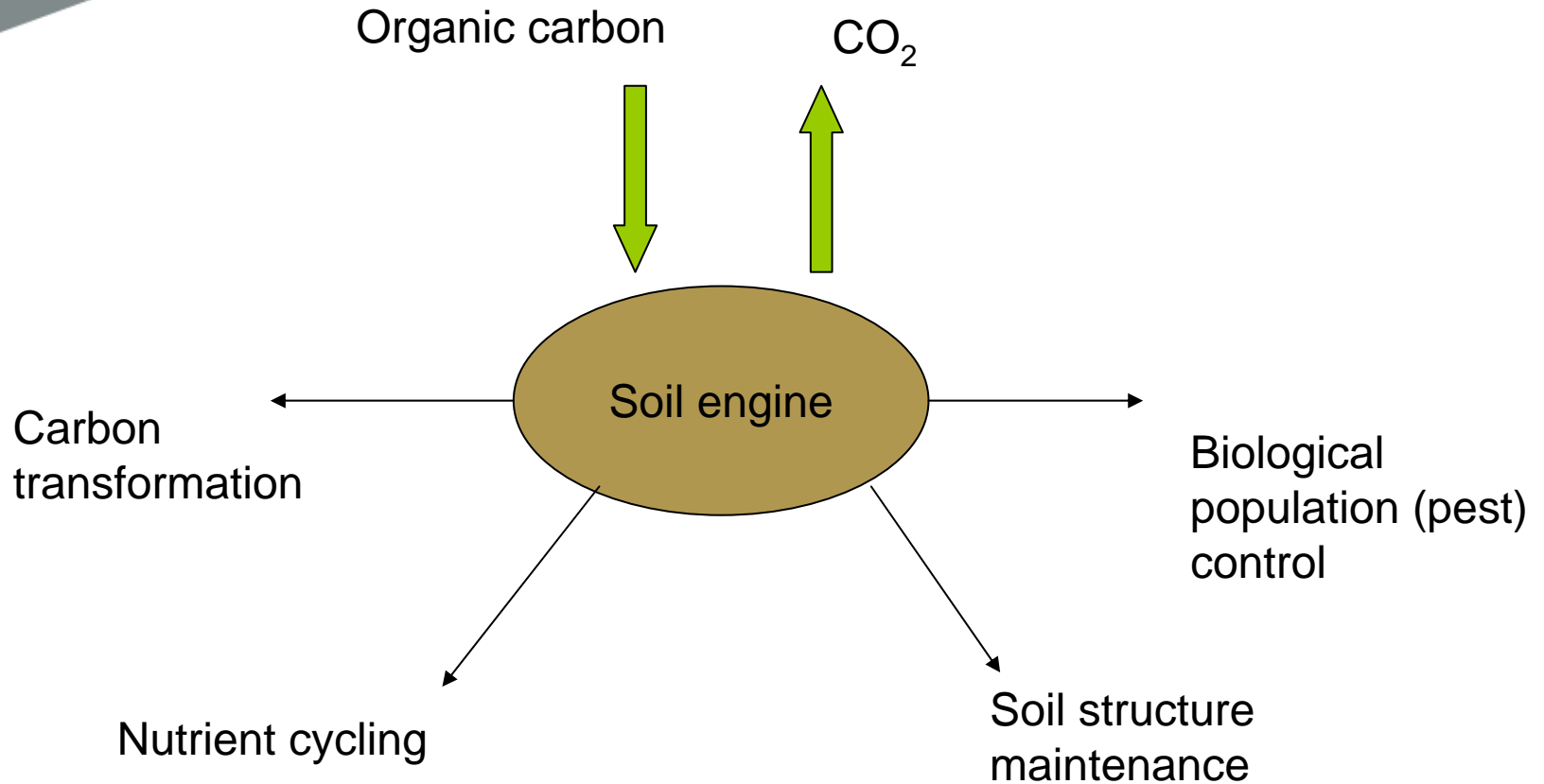
arable soil biomass = 100 sheep per hectare

grassland soil biomass = 2000 sheep per hectare

Soil as a system that does work



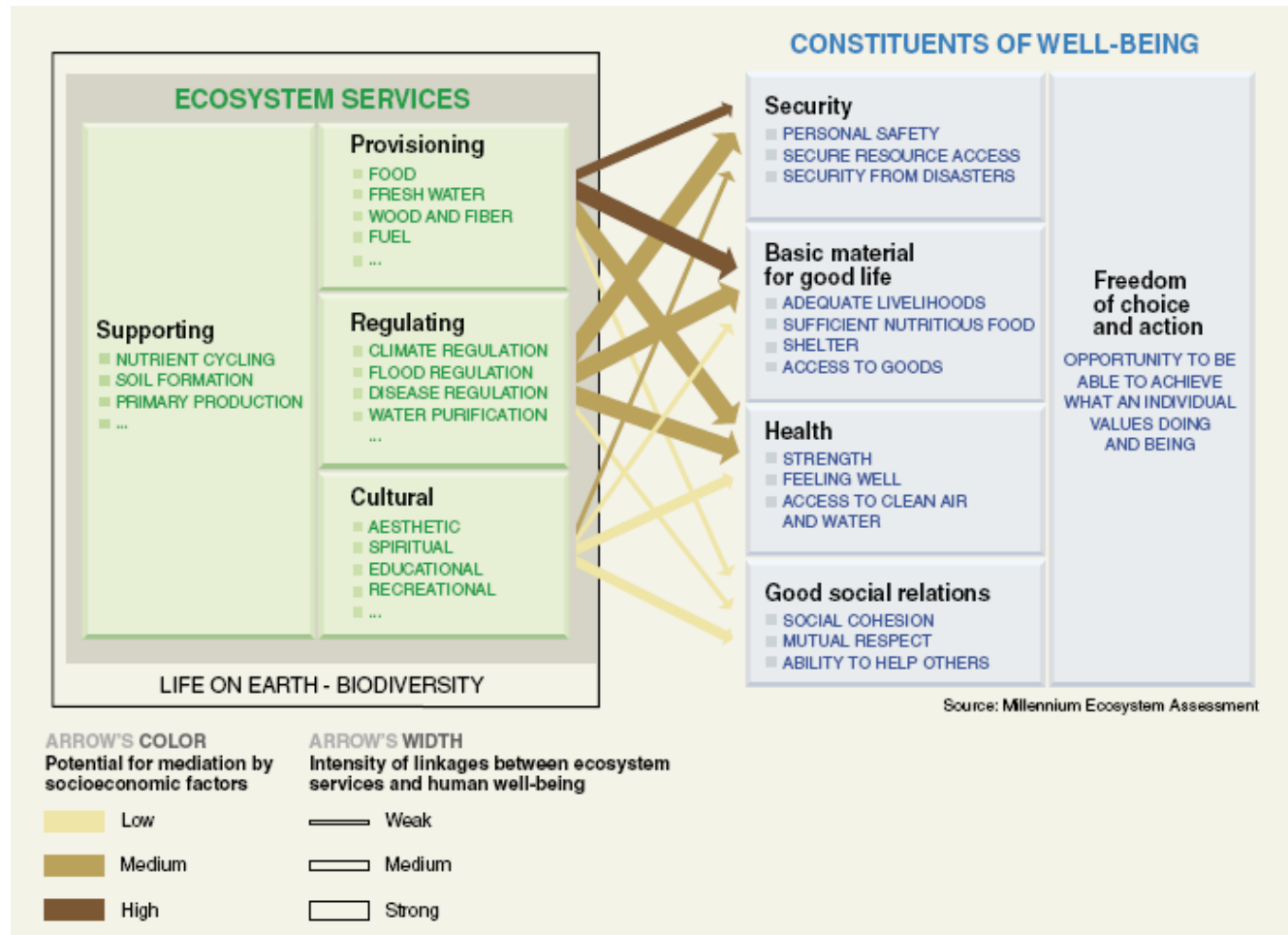
A connected set of assemblages of organisms working in concert, within a physical infrastructure (the soil habitat), using energy from carbon to maintain a medium for plant growth – the engine can only be described in terms of statistical distributions

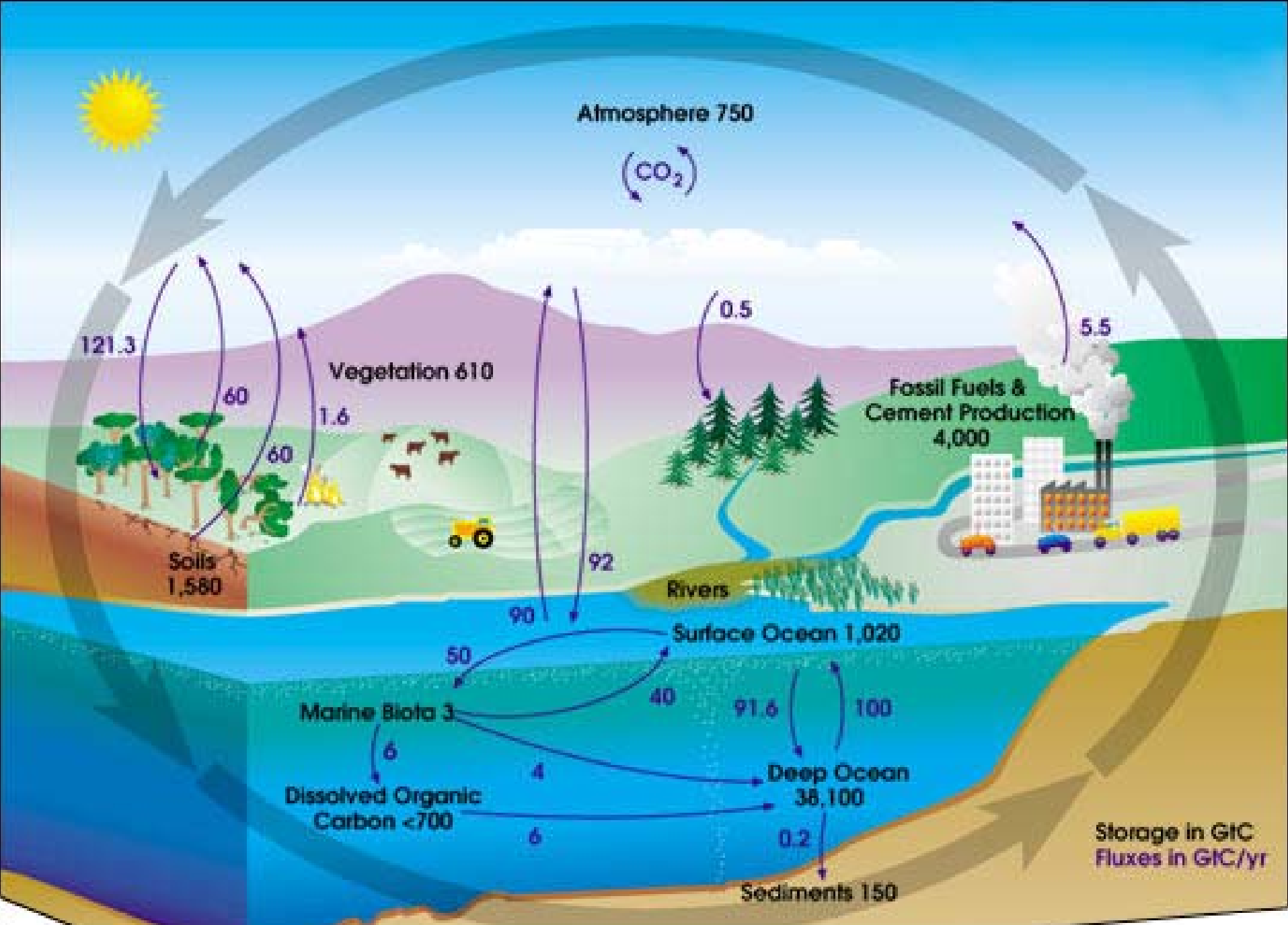


The engine operates at a range scales and effective interventions are probably only feasible via changes to bulk habitat conditions

Linkages between ecosystem services and human well-being

Life in soil is foundational to all terrestrial ecosystem services

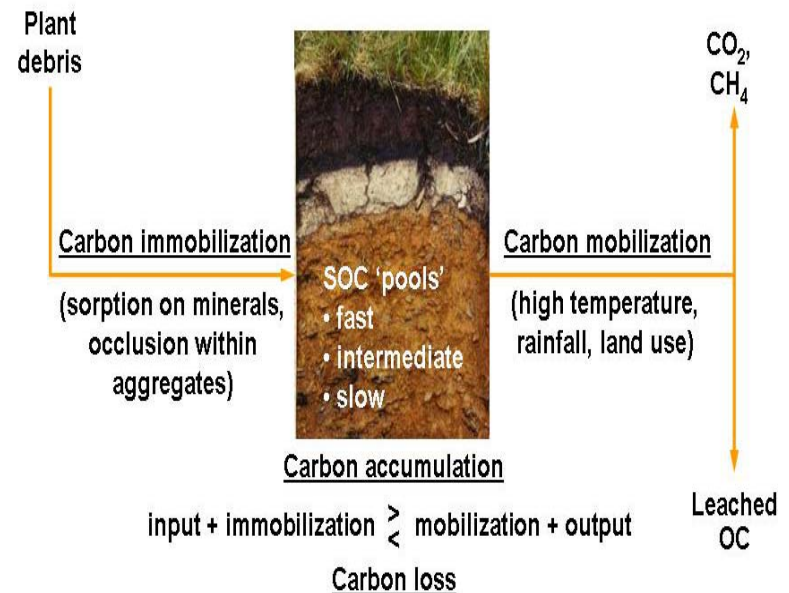




The Carbon Cycle

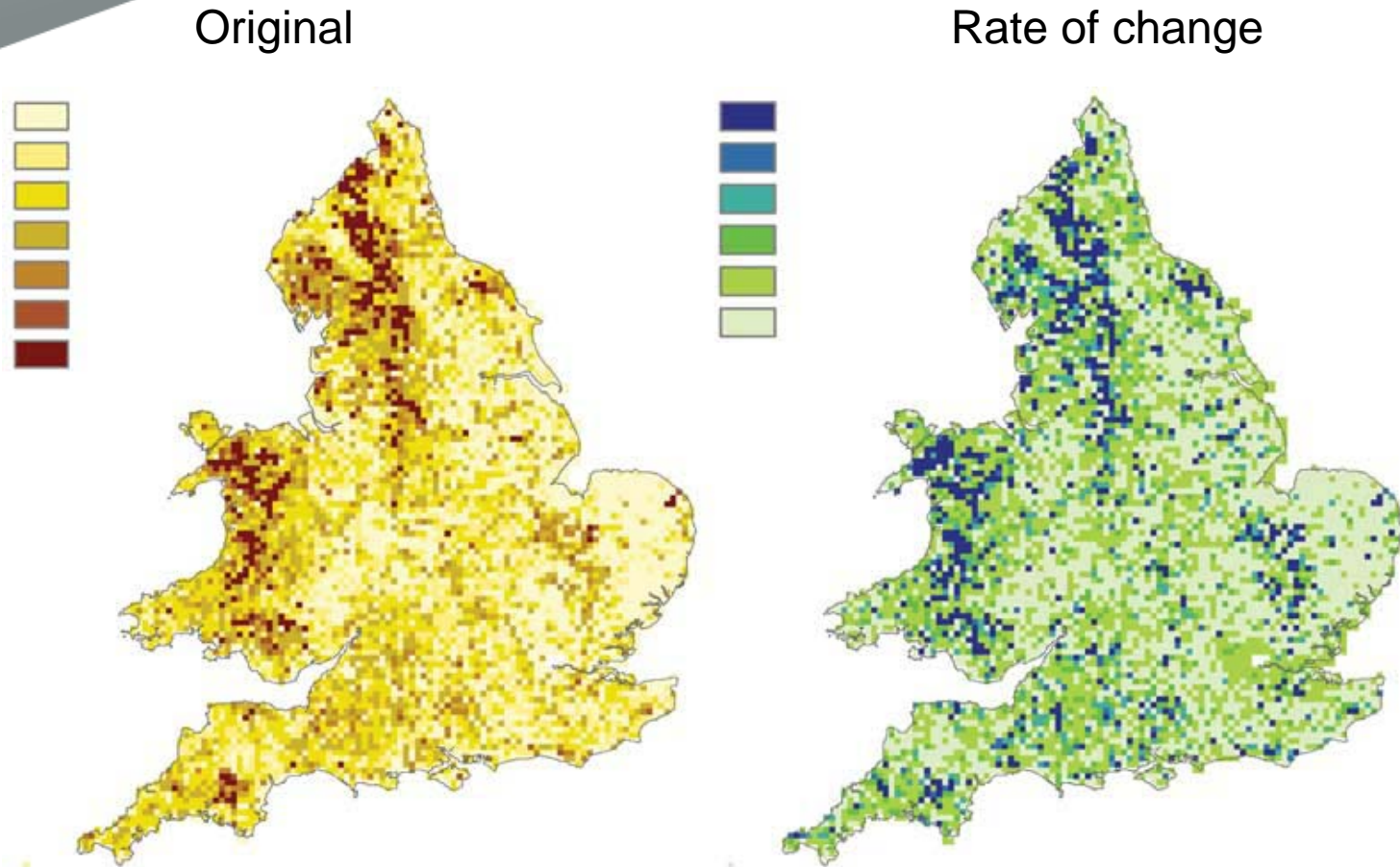
Soil organic carbon

- Levels of organic carbon in soil reflect relative rates of carbon inputs from plants and losses to the atmosphere and to water



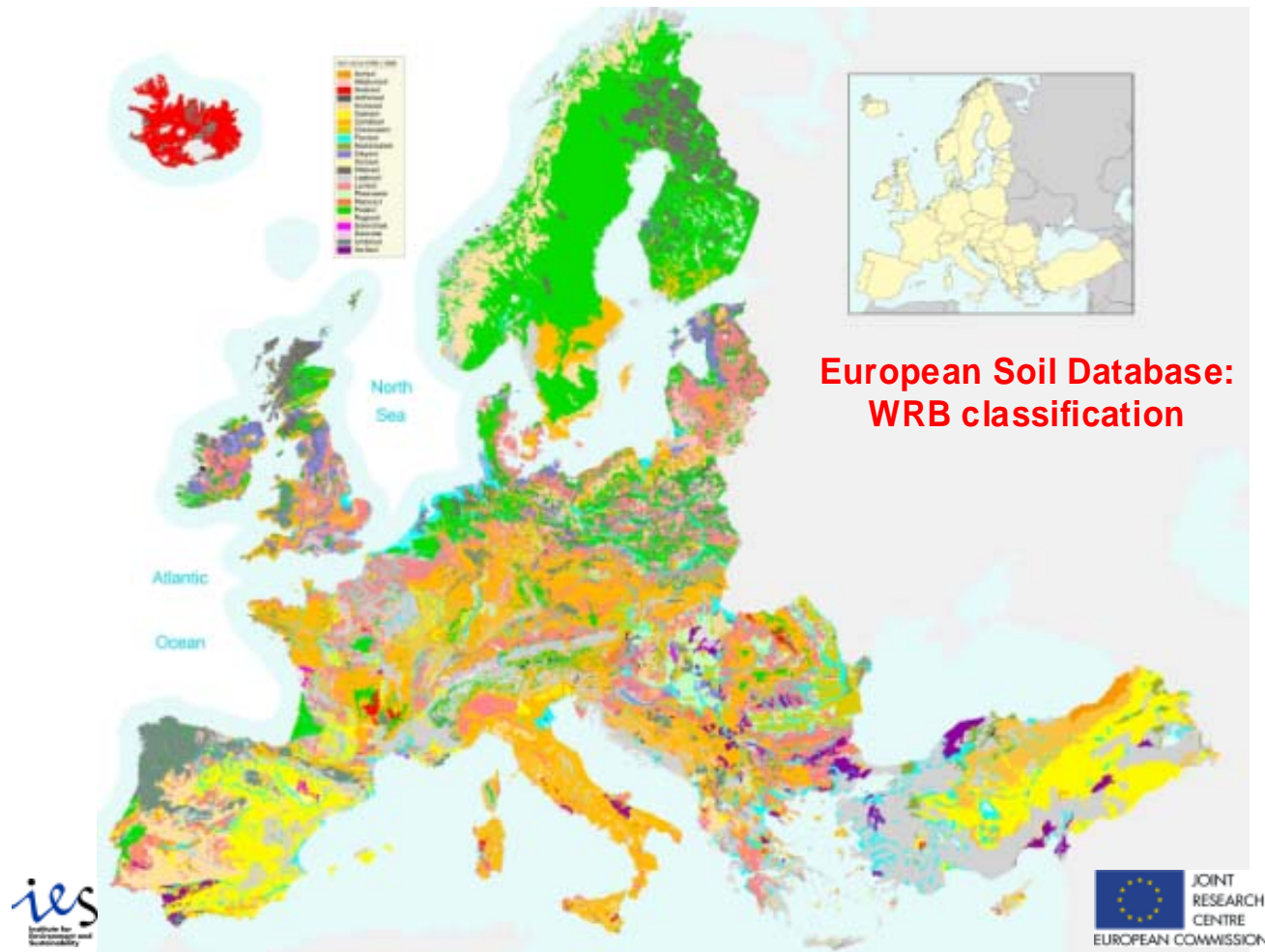
G.J.D. Kirk based on Schulze ED & Freibauer A (2005)

Losses of soil carbon



The losses of carbon from soil in England and Wales are similar to reductions in fossil carbon emissions

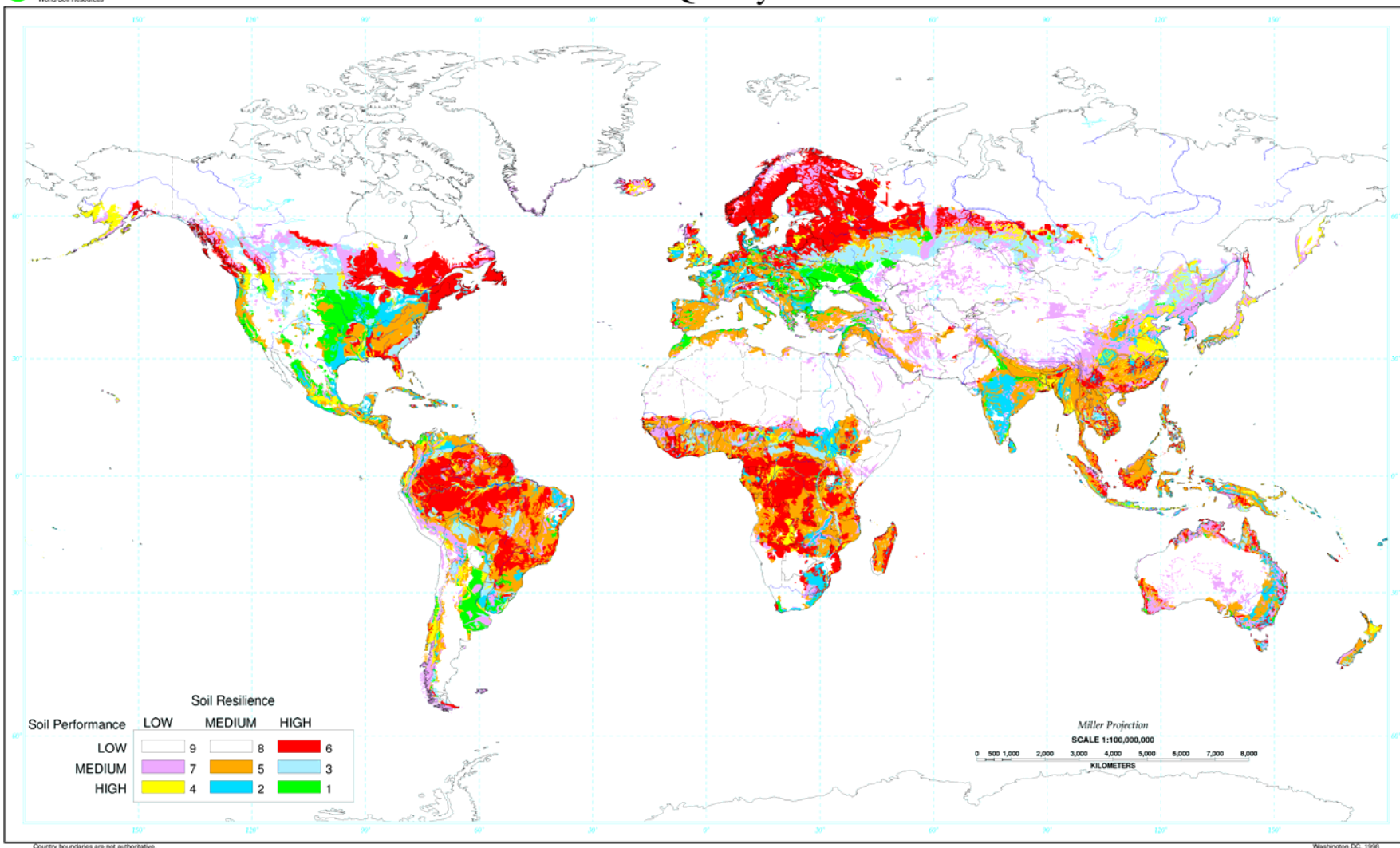
European soils are a huge store of carbon



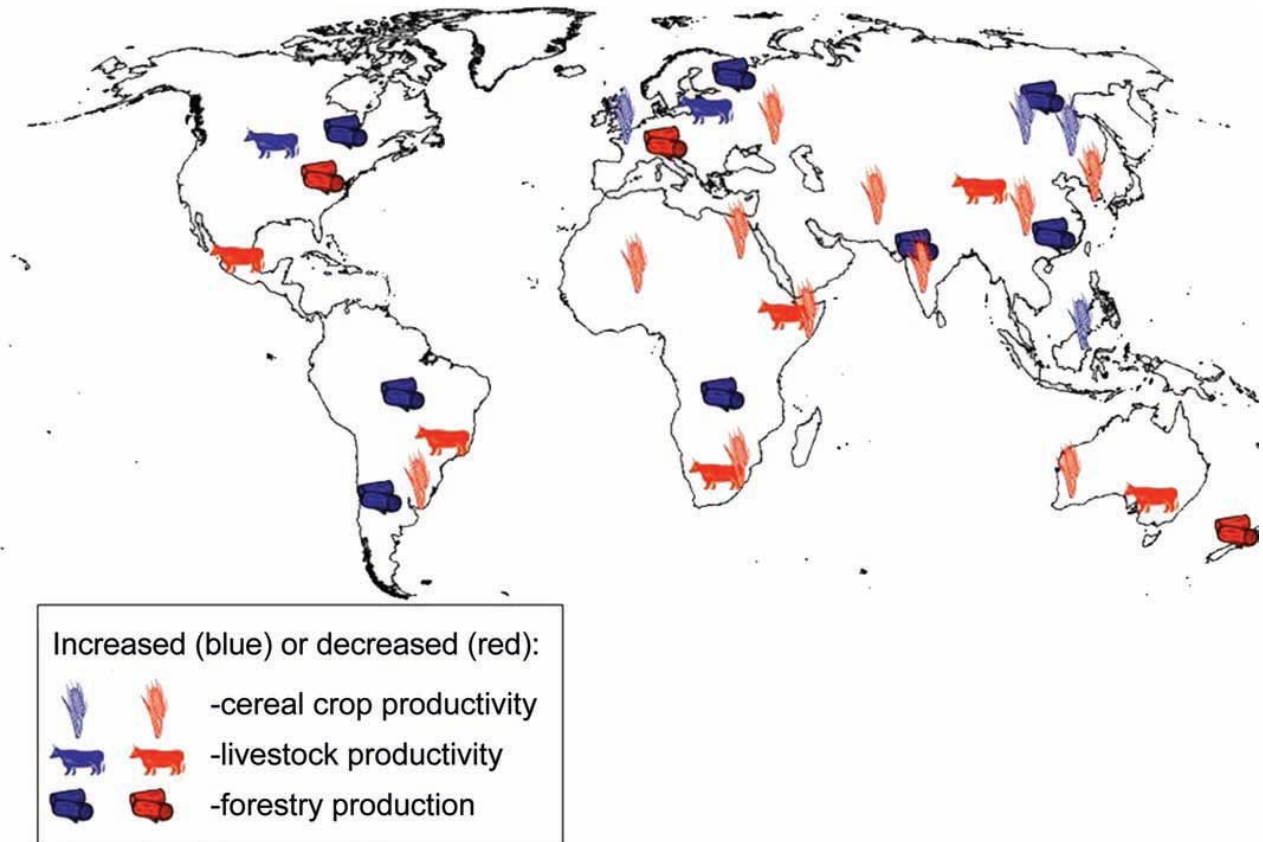
Are there enough global soil resources?

- The World population will grow by 40% by 2050
- Thankfully, there will be an even more rapid growth in the population whose incomes increase beyond \$5 / day
- Demand for food will increase faster than that of population and demand for protein will increase even faster
- Food production will compete with crops for energy, fibre and chemicals

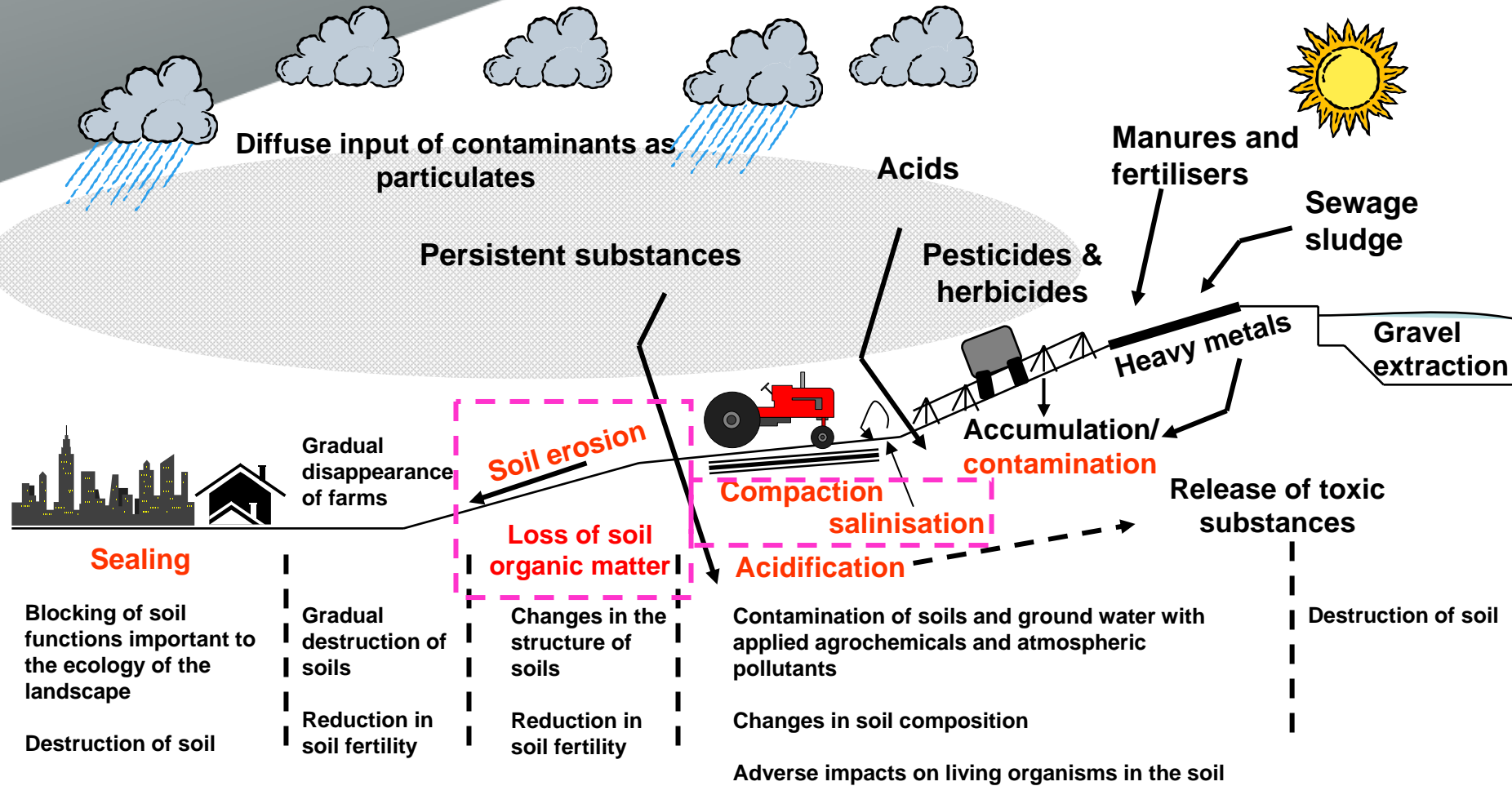
Inherent Land Quality Assessment



Impacts of climate change on crop and livestock yields, and forestry production by 2050



Soil degradation



Soil Thematic Strategy

- Bring soil protection up to the same level as that for water and air
- Introduce a Framework Directive, requiring member states to assess the risk to their soils and take appropriate protective actions
- Mainstream in to other sectors – especially Agriculture as part of cross-compliance and agri-environment measures

Conclusions

- Soil is the dominant form of land-based natural capital
- Soil organic carbon is the largest terrestrial carbon store
- Conservation of soil resources and soil organic carbon is a strategic imperative

