

# Scenarios and Projecting GEP into the Future

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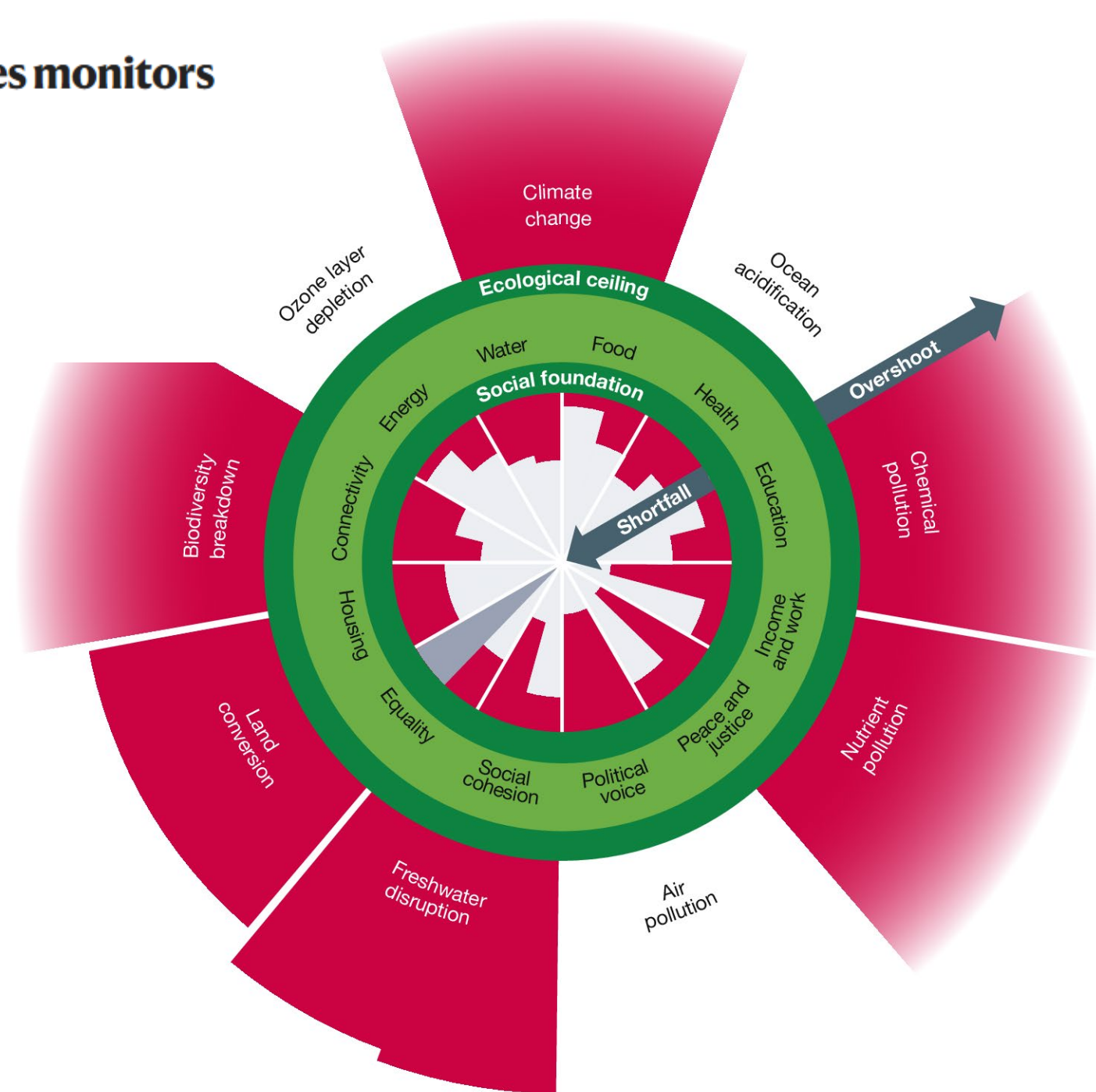
# Doughnut of social and planetary boundaries monitors a world out of balance

[Andrew L. Fanning](#)  & [Kate Raworth](#)

[Nature](#) **646**, 47–56 (2025) | [Cite this article](#)

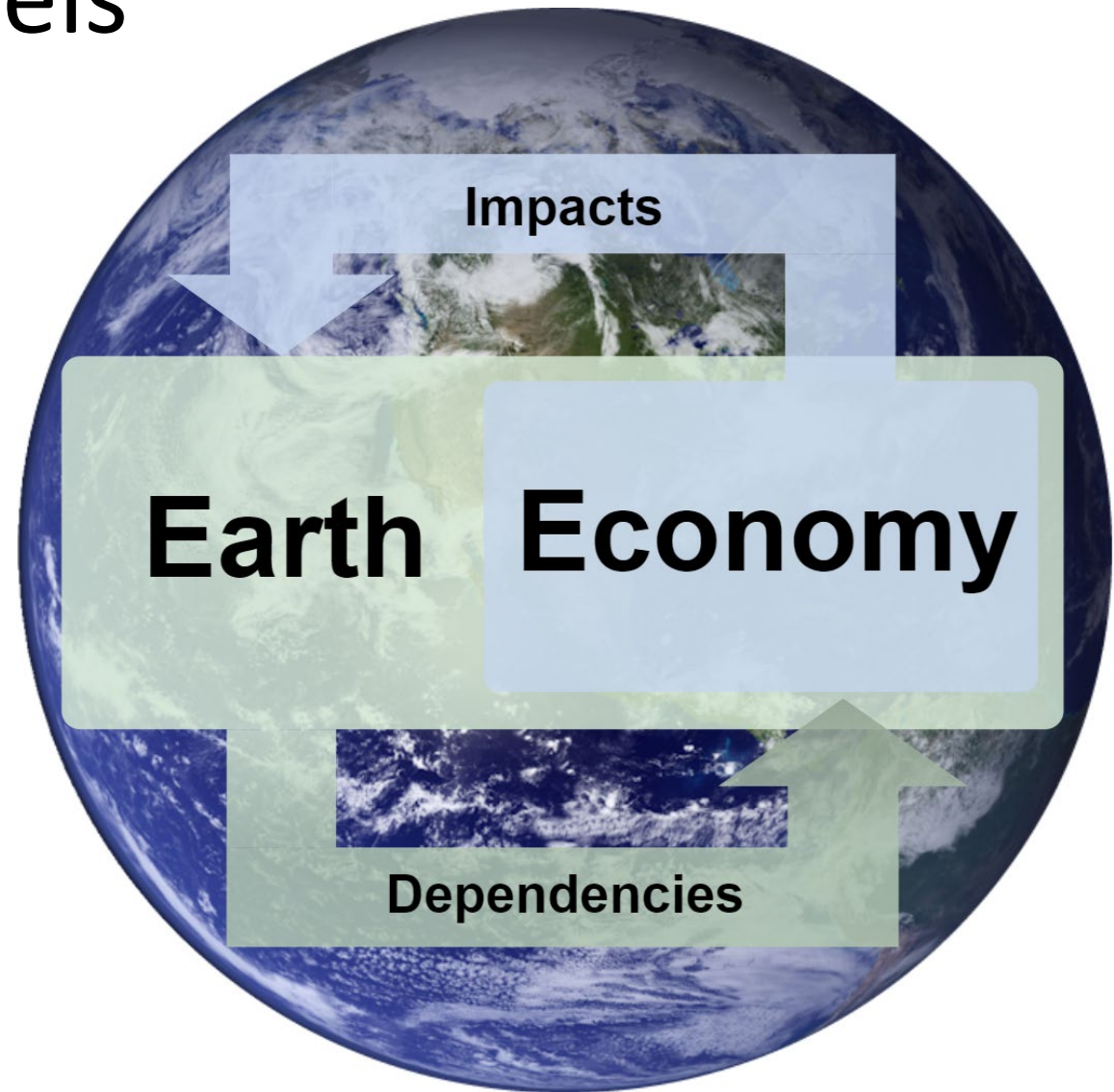
**114k** Accesses | **9** Citations | **603** Altmetric | [Metrics](#)

- Positioning GEP and GDP in the “Planetary Doughnut”
  - GDP measures the **Social Foundations**
  - GEP measures the **Ecological Ceiling**
- Better metrics helps us stay within the “Safe and Just Corridor”
- But metrics alone don’t give us **projections** for the future or details on how **policies** might shape that future



# We need detailed models

- Staying within the Safe and Just corridor understanding how the Earth and Economy are linked:
  - Detailed general equilibrium
  - Detailed earth-systems
- Two-way linkage:
  - Impacts
  - Dependencies
- A more GENERAL general equilibrium
  - We're calling these Earth-Economy models

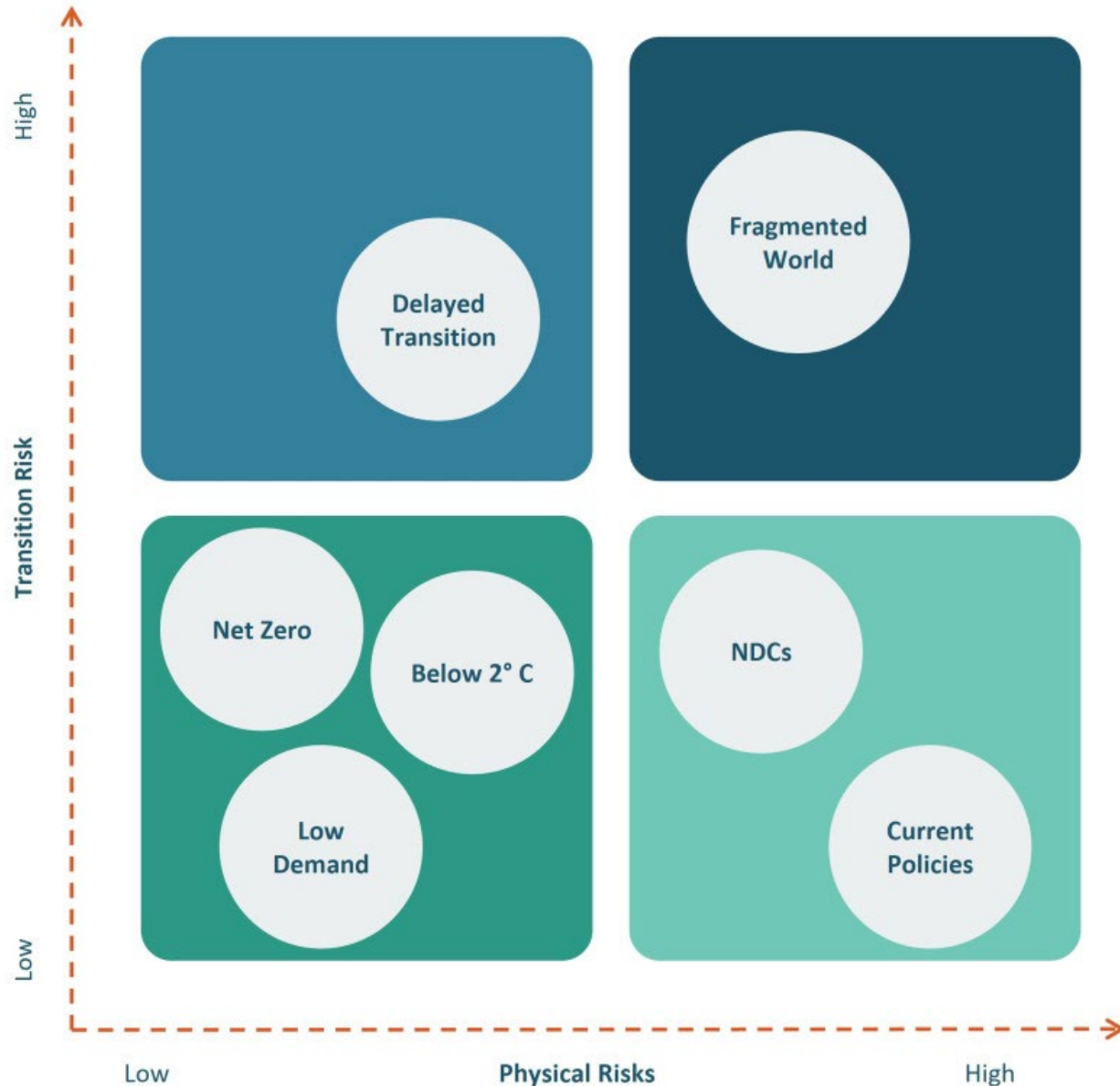


# Network for Greening The Financial System (NGFS)



- Coalition of 171 central banks and financial supervisors focused on managing climate- and nature-related financial risks
- Best known for publishing the **NGFS climate scenarios**, which have become the de facto standard inputs for supervisory stress tests and climate-economy modeling.
- Taskforce on Nature-Related Risk is expanding beyond climate to include nature

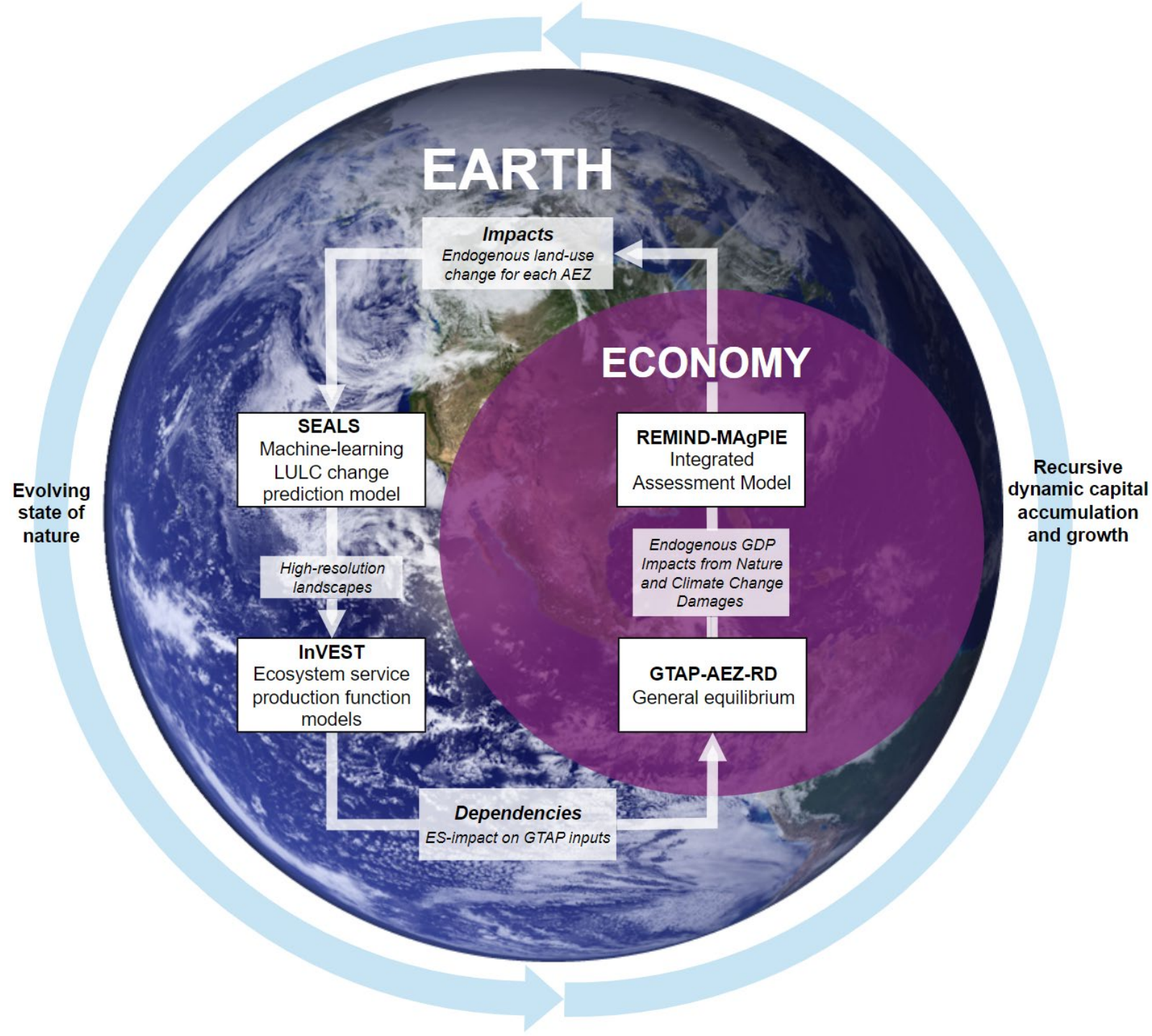
# The NGFS Scenarios



- **Net Zero 2050:** 1.5°C limit via immediate, smooth global policy action.
- **Below 2°C:** gradually tightening policies, 67% chance under 2°C.
- **Low Demand:** Paris-aligned transition driven by behavioral change and lower consumption.
- **Delayed Transition:** No emission cuts until 2030, then abrupt harsh policies.
- **Fragmented World:** Divergent national ambitions, ~2.3°C by 2100.
- **Nationally Determined Contributions:** Pledged targets only, weak implementation, severe physical risk.
- **Current Policies:** Only implemented policies, ~3°C+ warming, worst physical damages.

# NGFS Scenarios Assessed via Earth- Economy Models

- In-submission manuscript uses new version of GTAP-InVEST to project 7 NGFS scenarios
  - How nature benefits the economy
  - How nature degradation poses real risks
- Immediate next step: calculate GEP for these scenarios too



# Challenge: Cross-Scale Analysis

- The NGFS scenarios require detailed modeling of medium-scale modeling of Transition Policies
  - E.g., Biofuels, landscape management plans
- Previous NGFS work uses the major Integrated Assessment Models (IAMs) to spell out these effects
  - We use a version of MAgPIE that is linked with LPJmL and REMIND to address this detail
  - BUT, the land-use effects are driven by General Equilibrium logic (via GTAP)

