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# **Modelling regional impacts of trends and policies on EU and global level:**

*Integrating agriculture, land use,  
environmental and socio-  
economic aspects with  
EUruralis 2.0*

Laxenburg, November 29<sup>th</sup> 2007



Netherlands Environmental  
Assessment Agency



# Shifting approaches

## Policy agenda

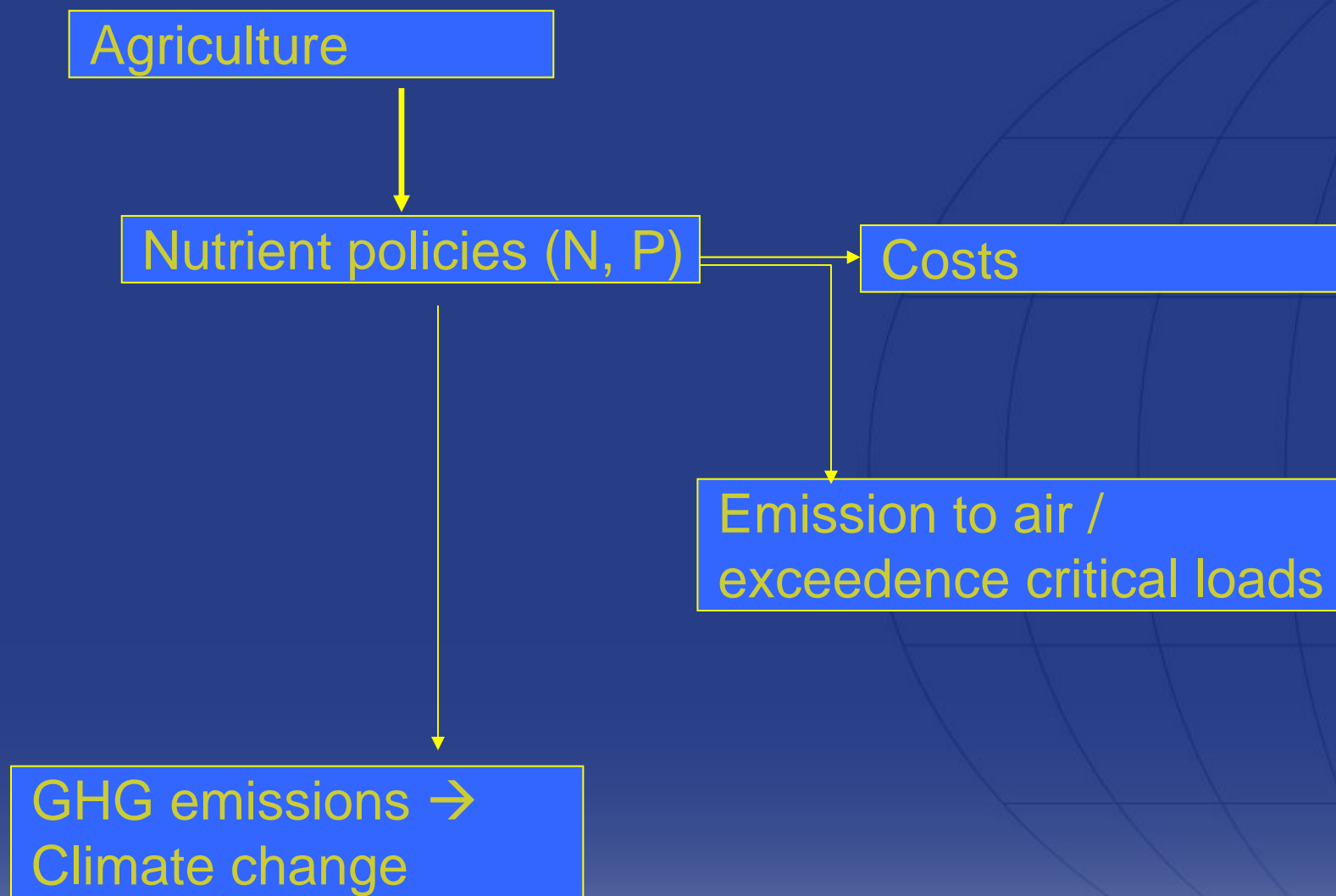
- Sustainable development:
  - integrated and coherent policies
  - stronger global dimension

## Scientific agenda

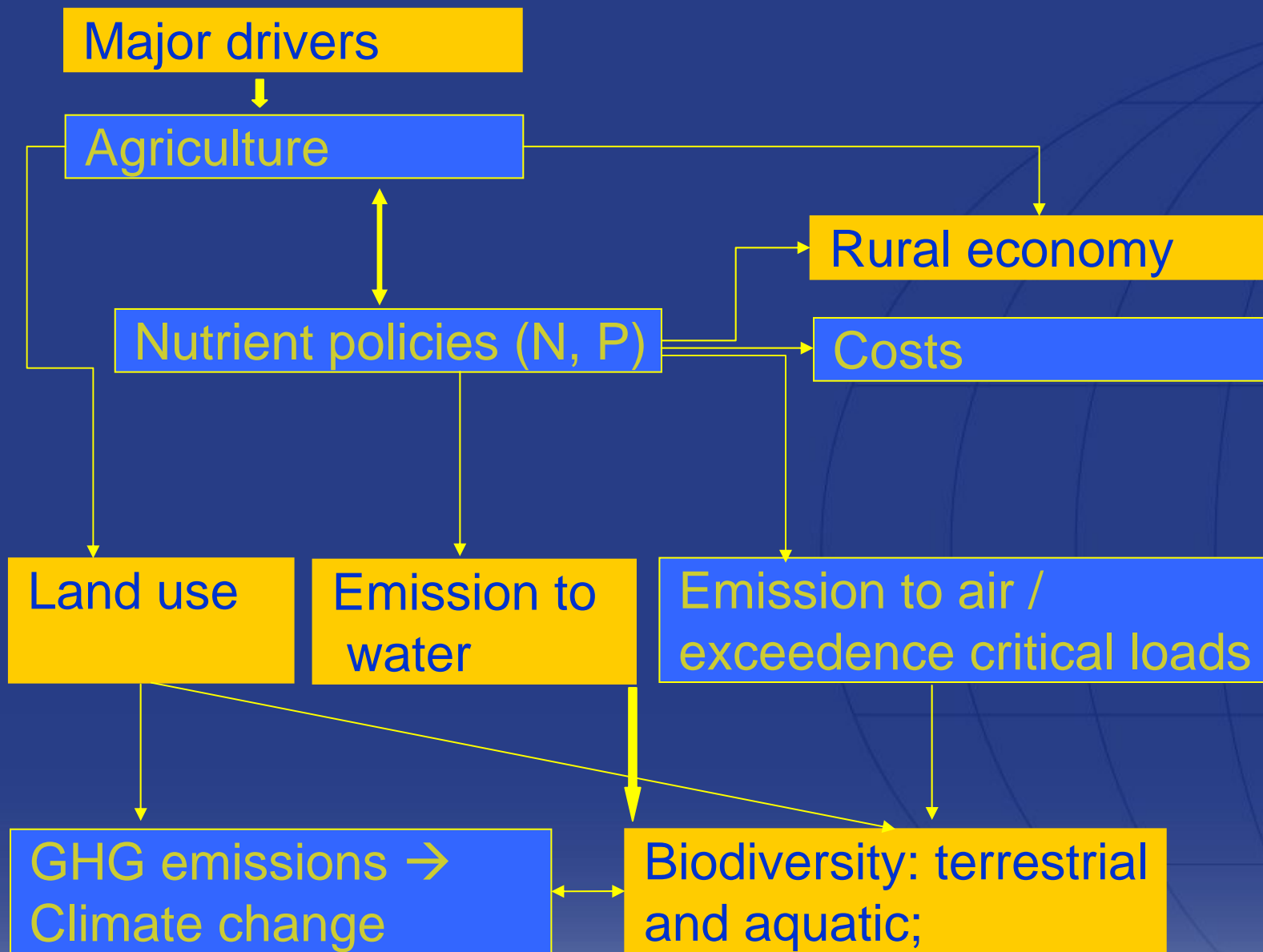
- Complex questions:
  - Assessment and balancing trade-offs in 3-P domain
  - from technical solutions to integrated policies, combining policy areas, scales and longer time horizons

# Examples of emerging questions

- Effect of liberalisation of the CAP on nutrient emissions and biodiversity;
- Effect of nutrient policies (including WFD) on agricultural production, rural economies, land use, GHG emissions and biodiversity;
- Effect of biofuel directive on food production/prices, fertiliser use, nutrient emissions and biodiversity (land use),
- Not only in Europe but also elsewhere.







# Drivers for biodiversity and health effects

Population & GDP

Agriculture

**CAP, WTO**  
**EU N – dir's**

- land use
- N-intensity
- technology

- area
- NH<sub>3</sub>
- NO<sub>3</sub>

Effects

**Targets**

**Biodiversity**

- terrestrial
- aquatic

**Health**

Energy&traffic

**Kyoto, LRTAP**  
**EU N - dir's**

- energy intensity
- energy source
- technology

- (infrastructure)
- NO<sub>x</sub>
- .....

*rural*

*remote*

*water*

*air*



# Eururalis 2.0

Discussing the future of rural Europe

[www.eururalis.eu](http://www.eururalis.eu)



[New policy scenario](#)
[A1 Global economy](#)
[A2 Continental markets](#)
[B1 Global cooperation](#)
[B2 Regional communities](#)

## New policy scenario

### Define your own policy

#### Choose a reference scenario:

 ⓘ

#### 1. CAP Market support ⓘ

full liberalisation   decrease   stable

#### 2. CAP Income support ⓘ

none   decrease   stable   increase

#### 3. Ambition to stimulate biofuels ⓘ

low   medium   high

#### 4. Stimulate less favoured areas ⓘ

none   limited   current

#### Show result as:

☒ map   ☐ spider   ☐ graph   [GO ▶](#)
[Save policy scenario](#)

Map detail:  ⓘ

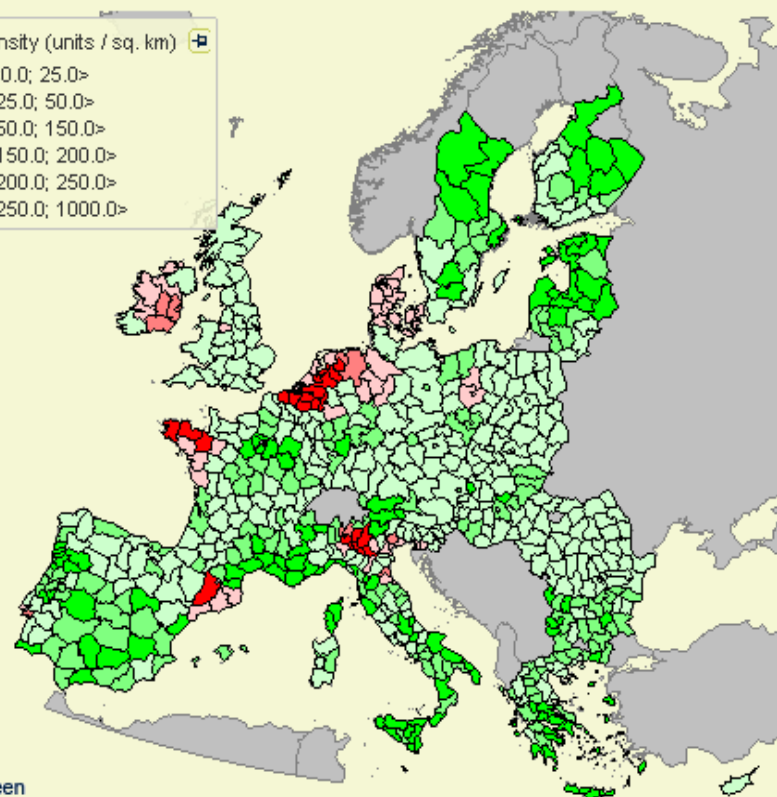
Timeslice:  ⓘ

Indicator:  ⓘ

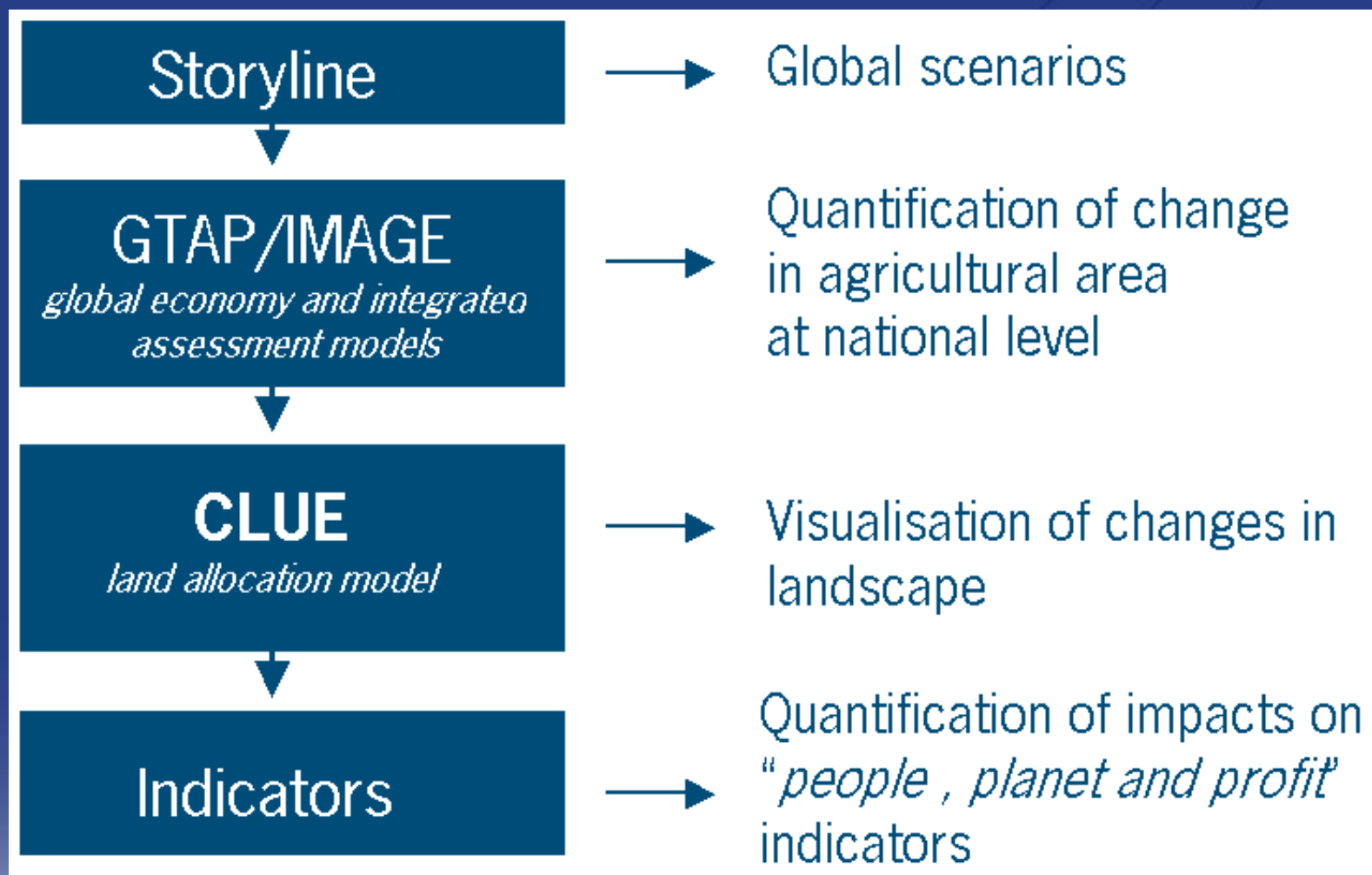
 ⓘ

Livestock density (units / sq. km) ⓘ

- <0.0; 25.0>
- [25.0; 50.0>
- [50.0; 150.0>
- [150.0; 200.0>
- [200.0; 250.0>
- [250.0; 1000.0>

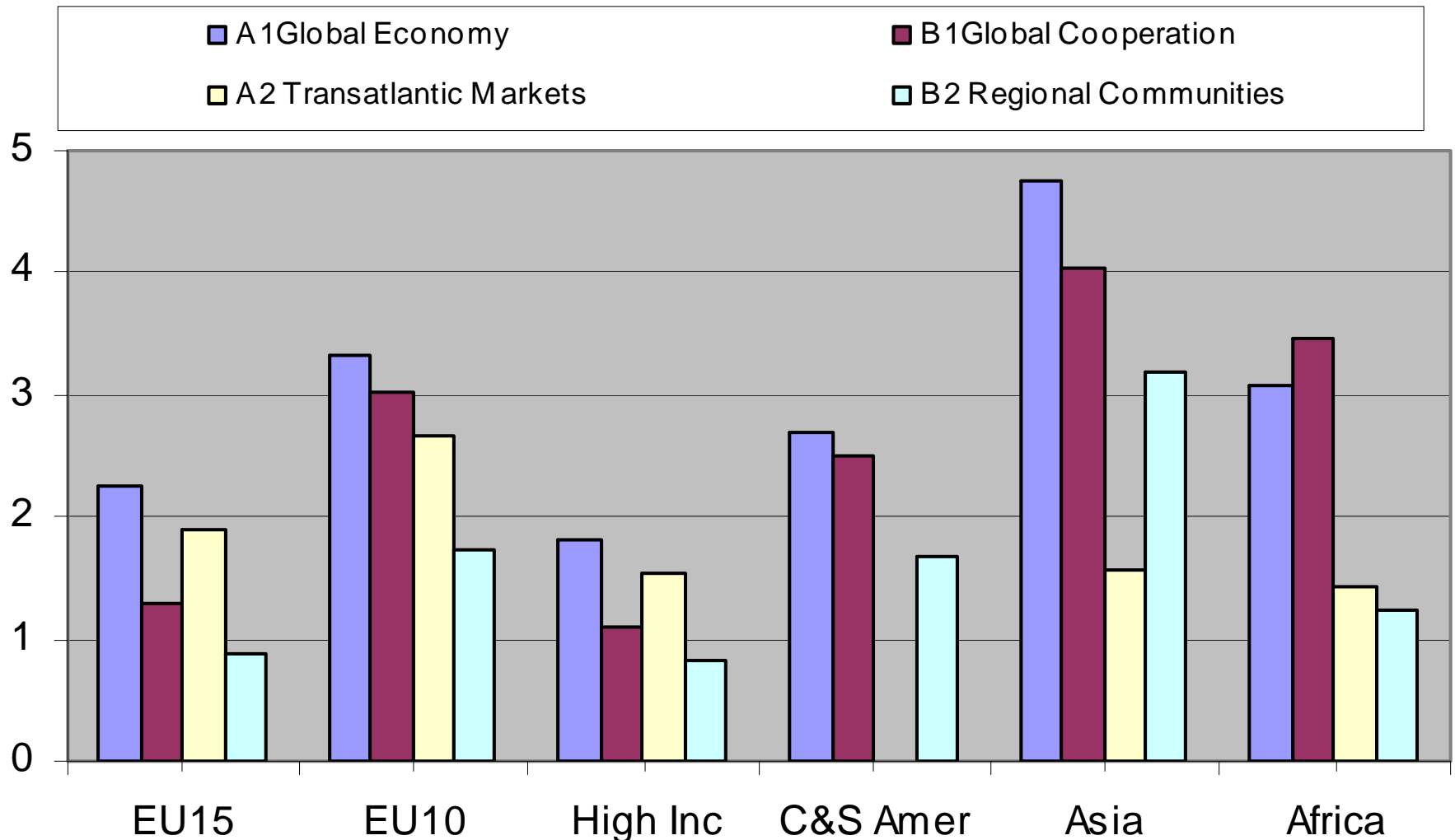

[Full screen](#)
☐ Map   ☒ Single map (and settings)   ☐ Comparison

# Model framework Eururalis

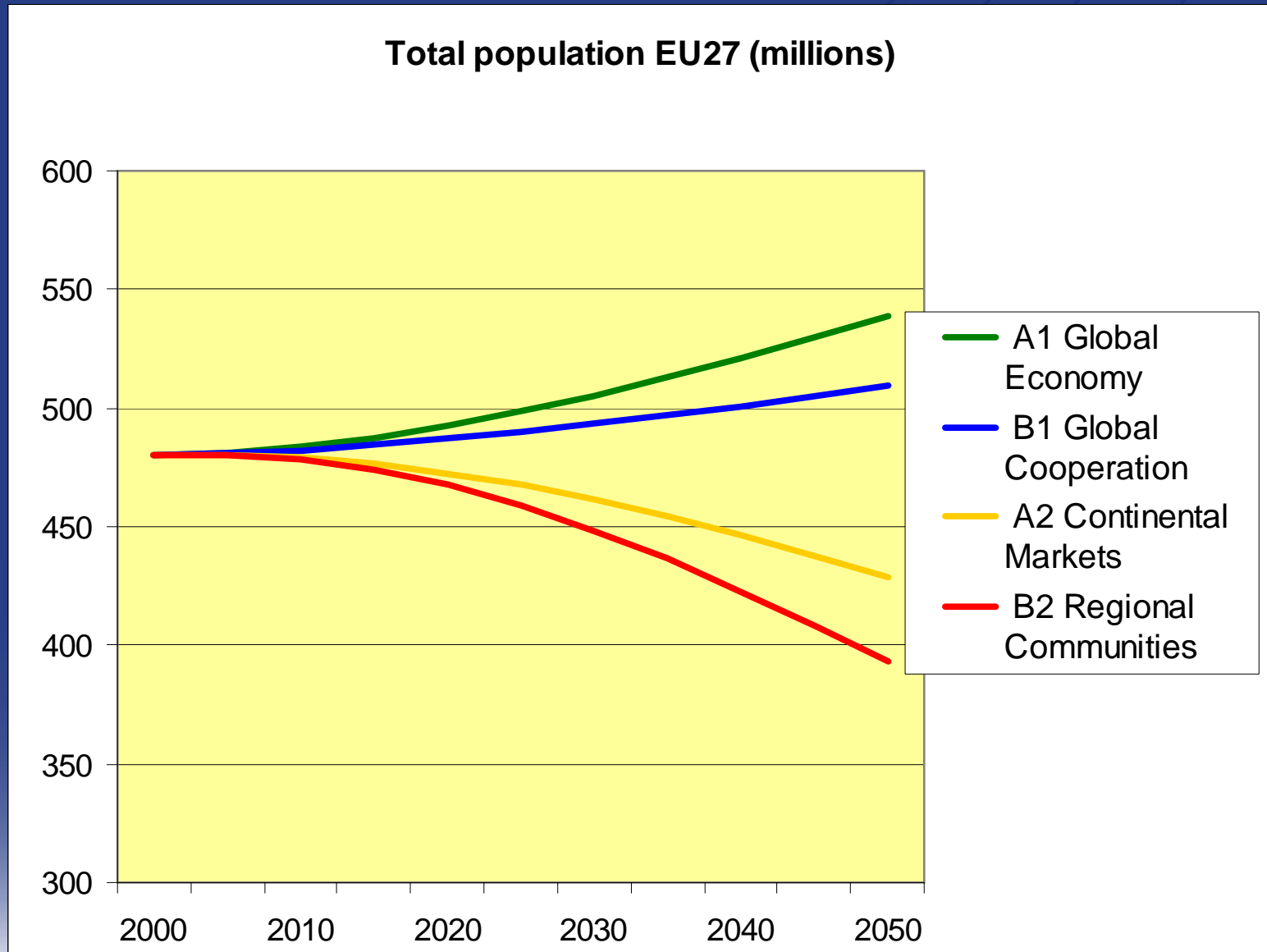


# Major driving force I: macro-economic growth

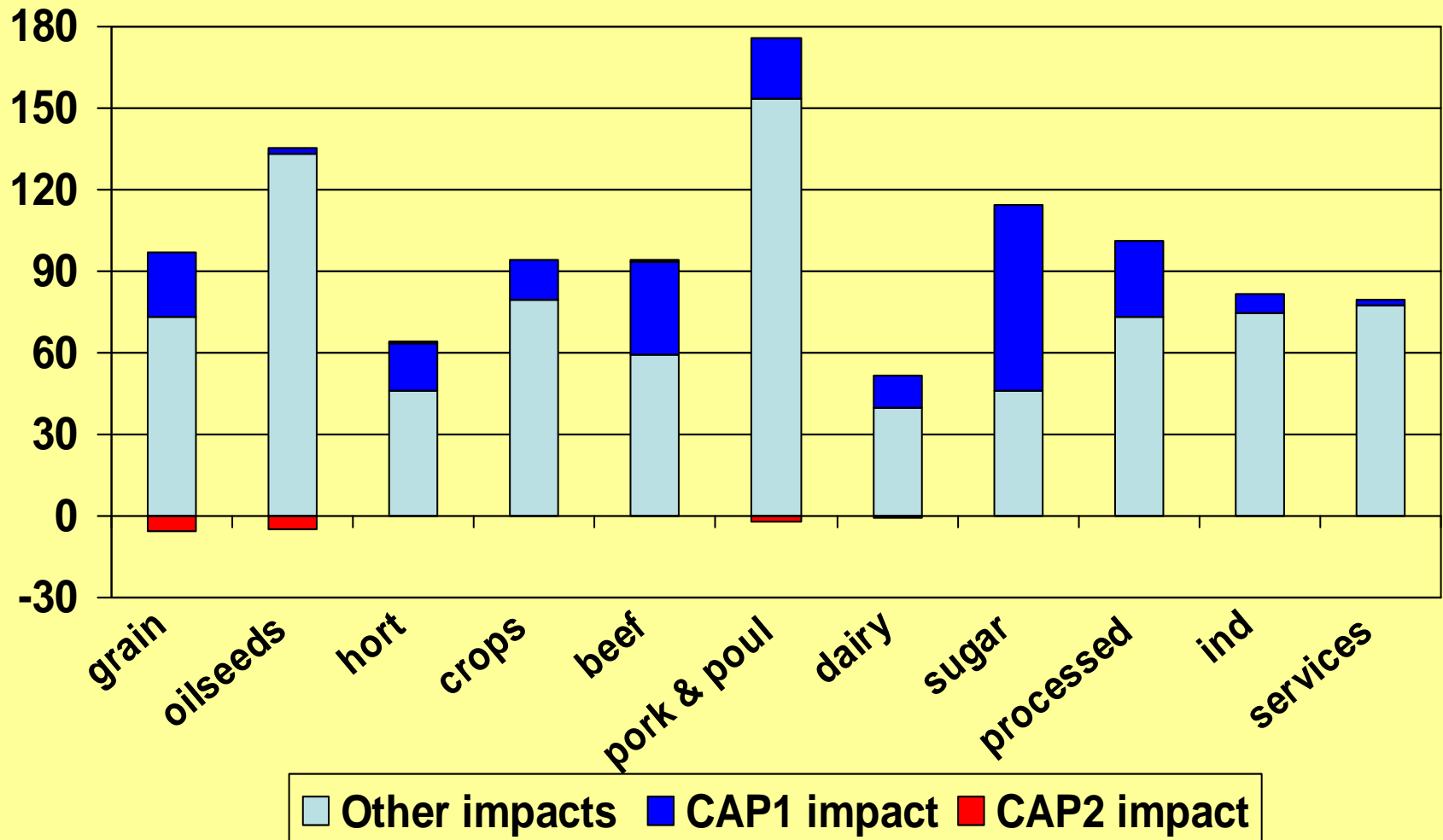
## GDP per capita growth: 2000-2030



# Major driving force II: EU population



# World Trade Growth in Global Economy (A1) scenario (% change, 2001-30)





## Changing role of farming: decreasing economical significance

Scenario 1: A1 Global economy

Scenario 2: A1 Global economy


Timeslice: 2000







GO ▶

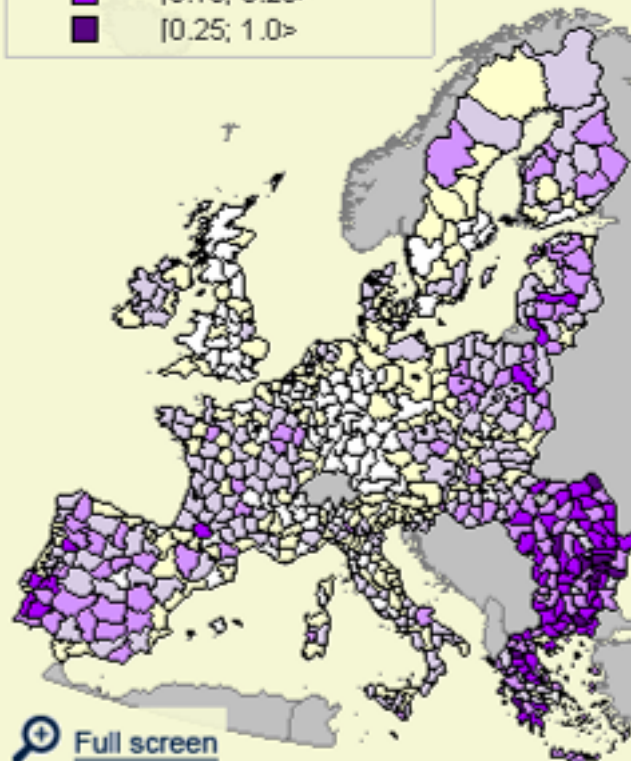
Timeslice: 2030

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Map 1







Agri-share in GDP (fraction) 

-  [0.0; 0.02>
-  [0.02; 0.04>
-  [0.04; 0.08>
-  [0.08; 0.15>
-  [0.15; 0.25>
-  [0.25; 1.0>



Map 2

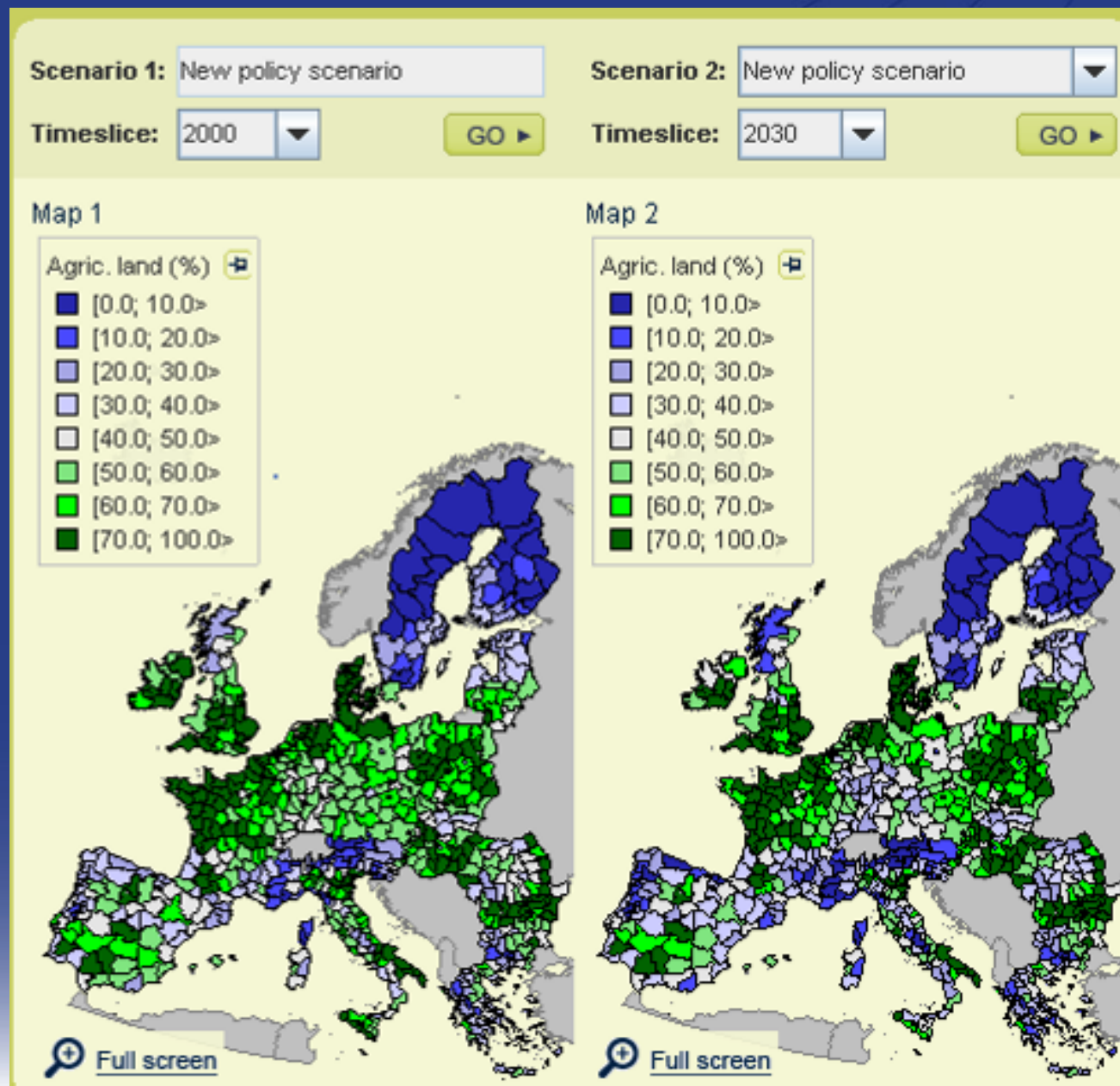
Agri-share in GDP (fraction) 

-  [0.0; 0.02>
-  [0.02; 0.04>
-  [0.04; 0.08>
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-  [0.15; 0.25>
-  [0.25; 1.0>



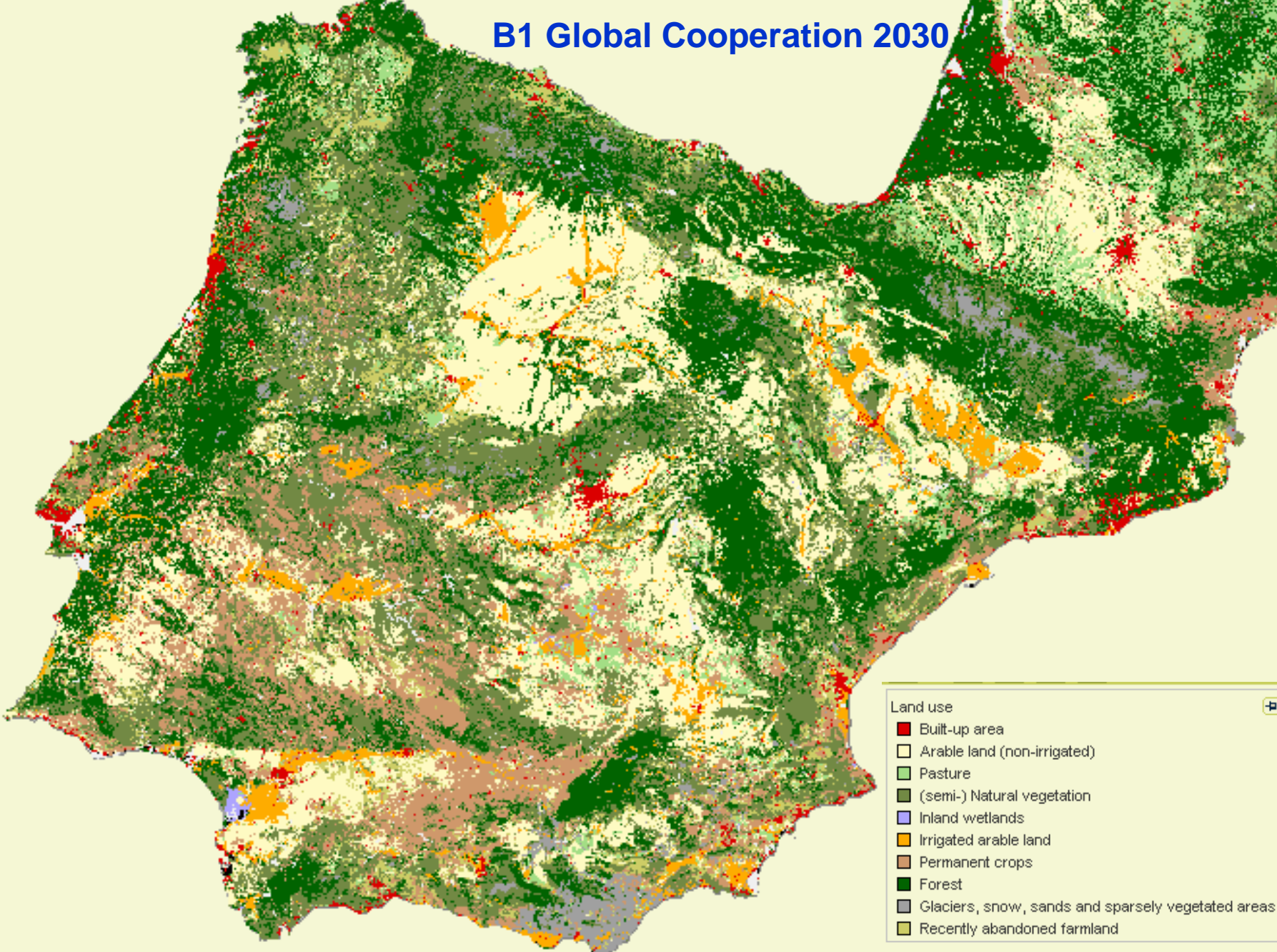
## Changing role of farming: importance for land use and landscape

- Agri land-use remains strong (>40%)
- High impact on carbon, erosion, biodiversity, nutrients, landscape

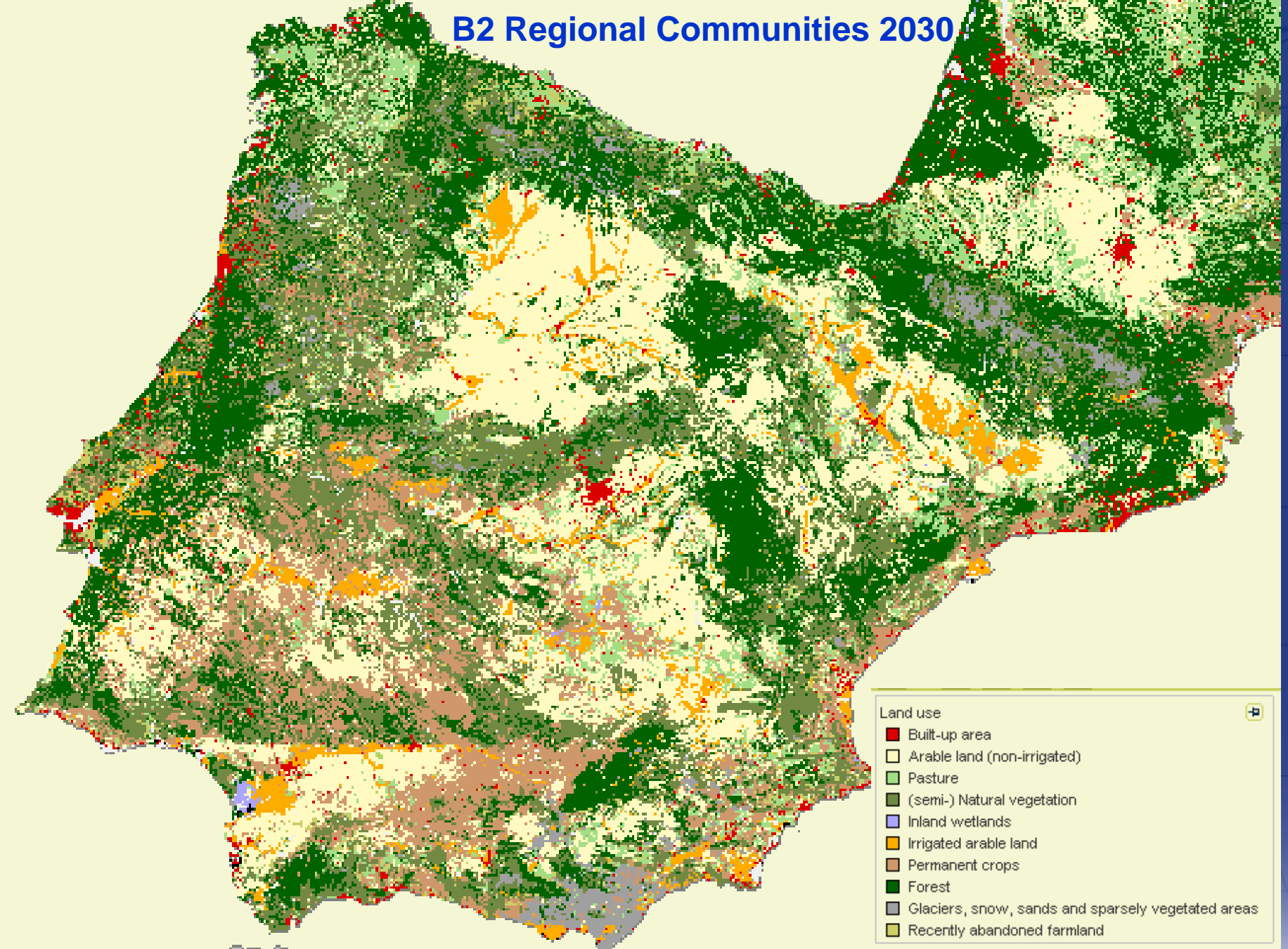




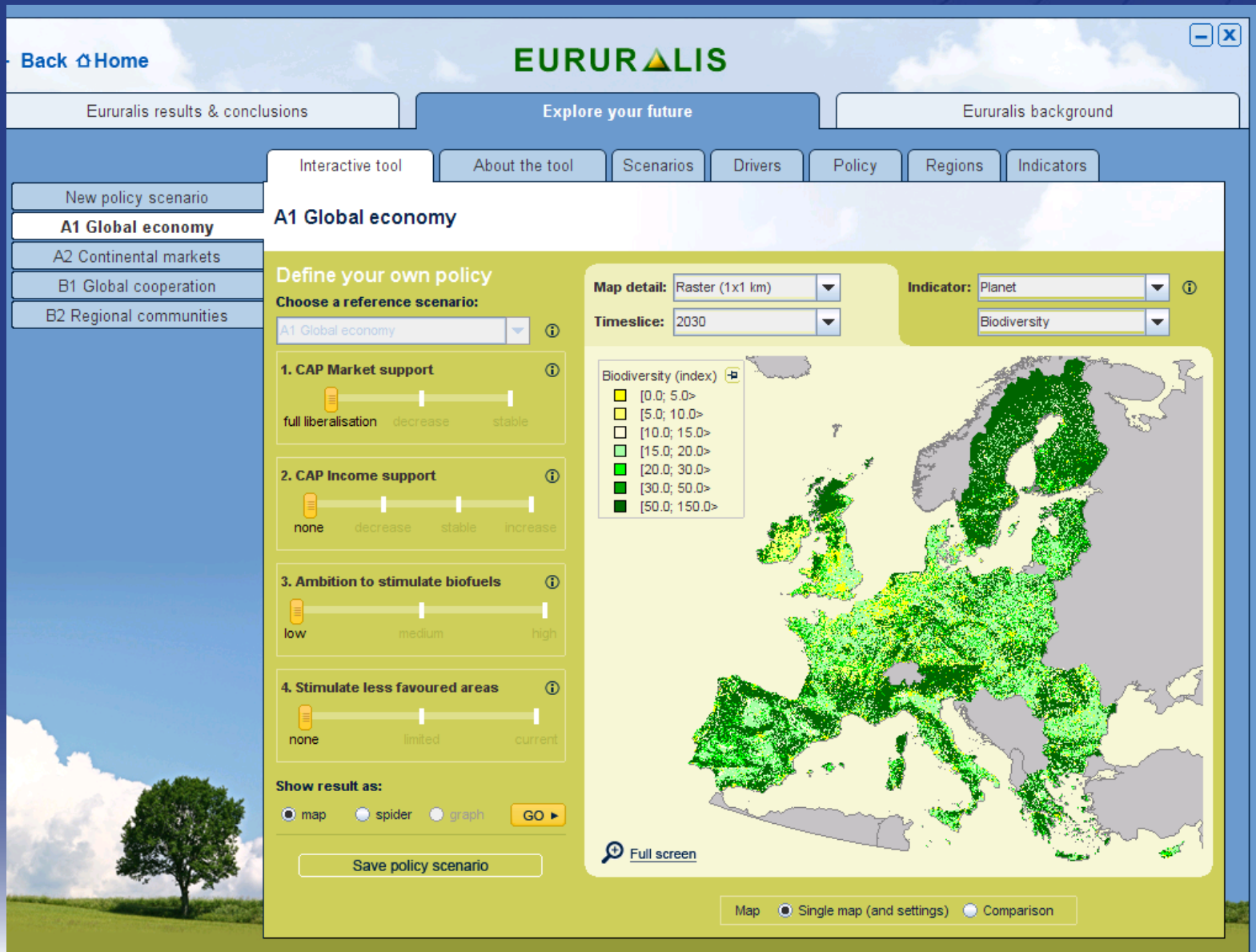
## B1 Global Cooperation 2030



## B2 Regional Communities 2030

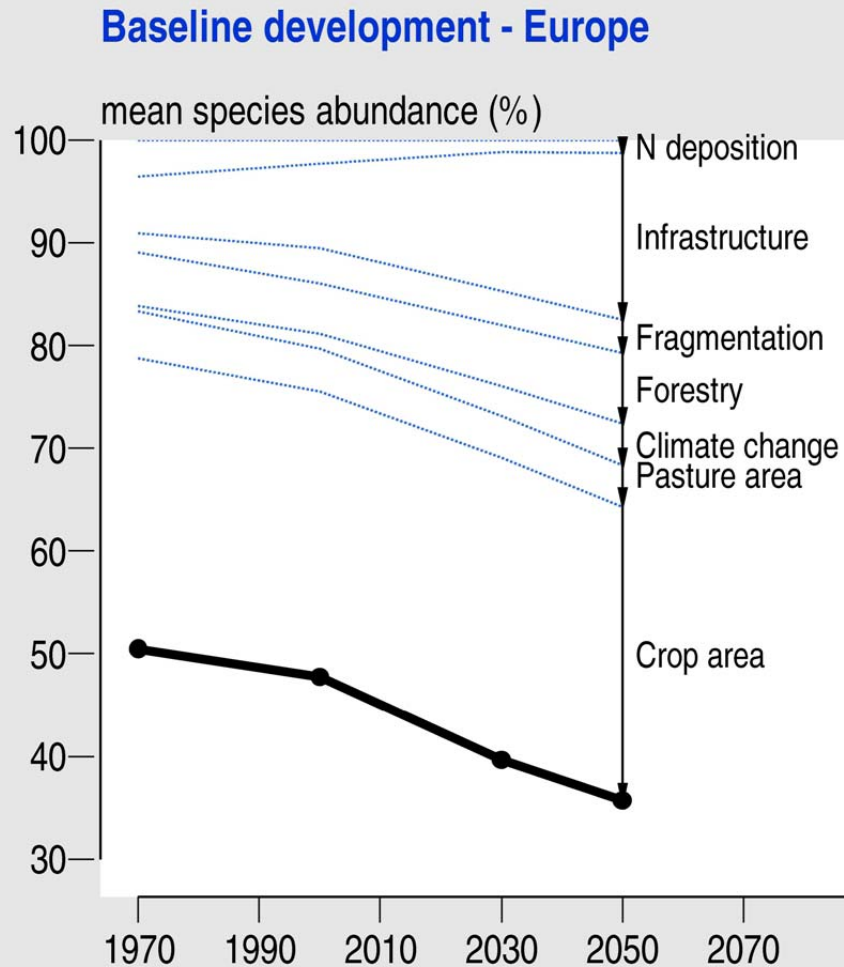


# Biodiversity indicator

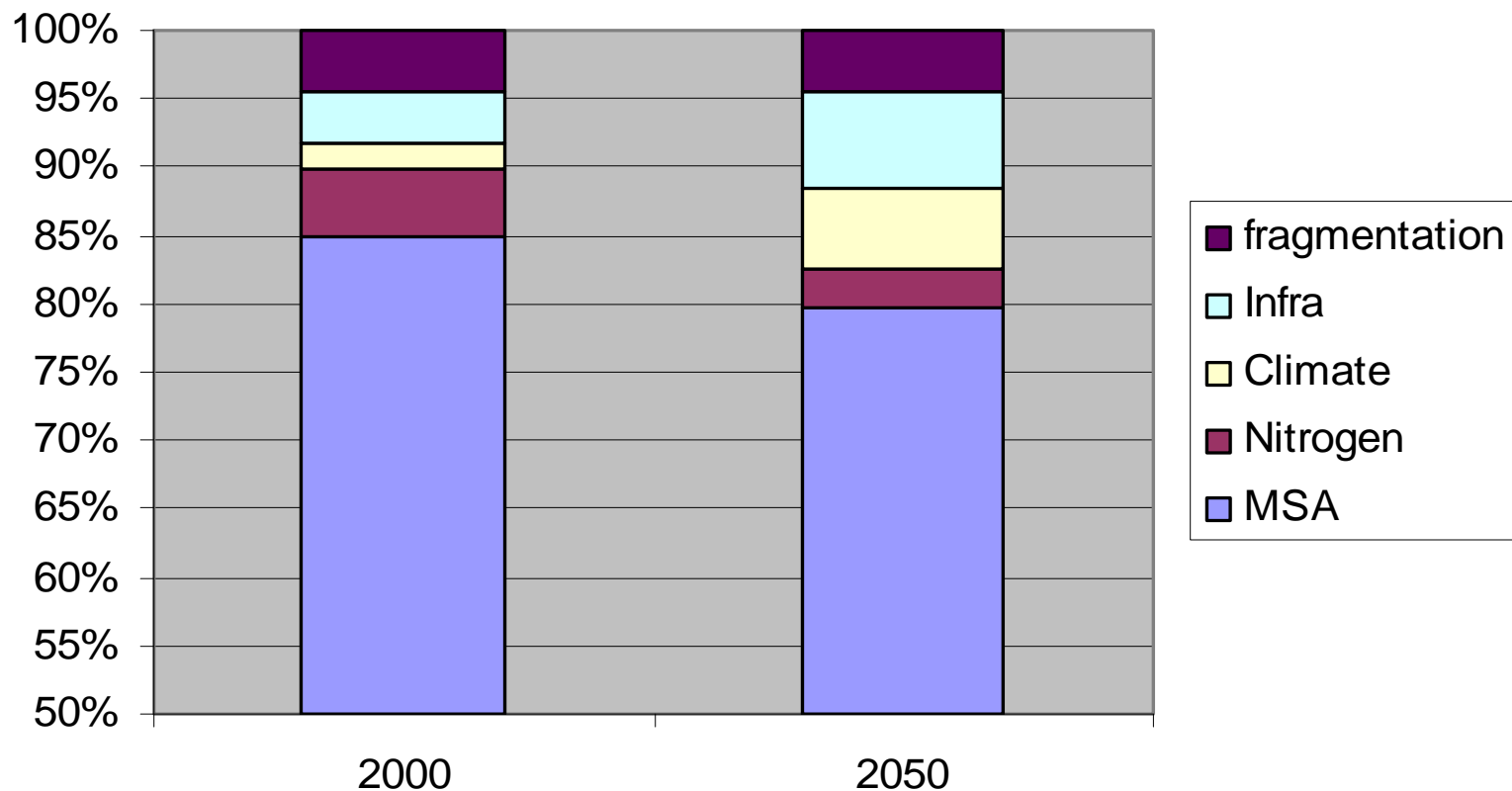


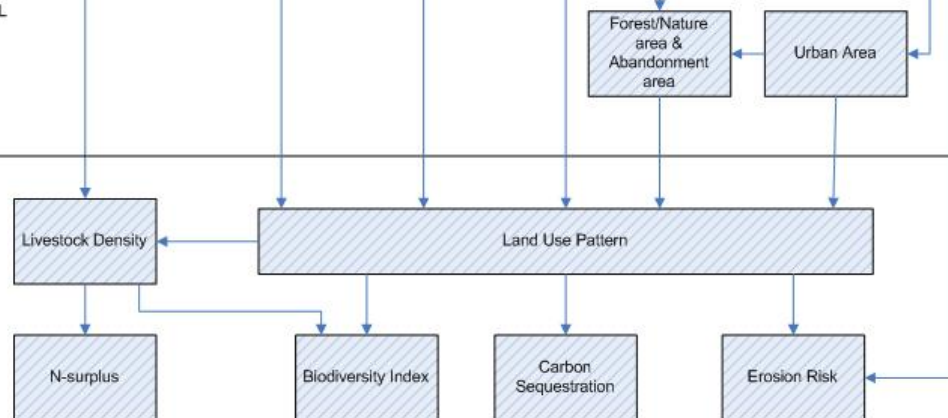
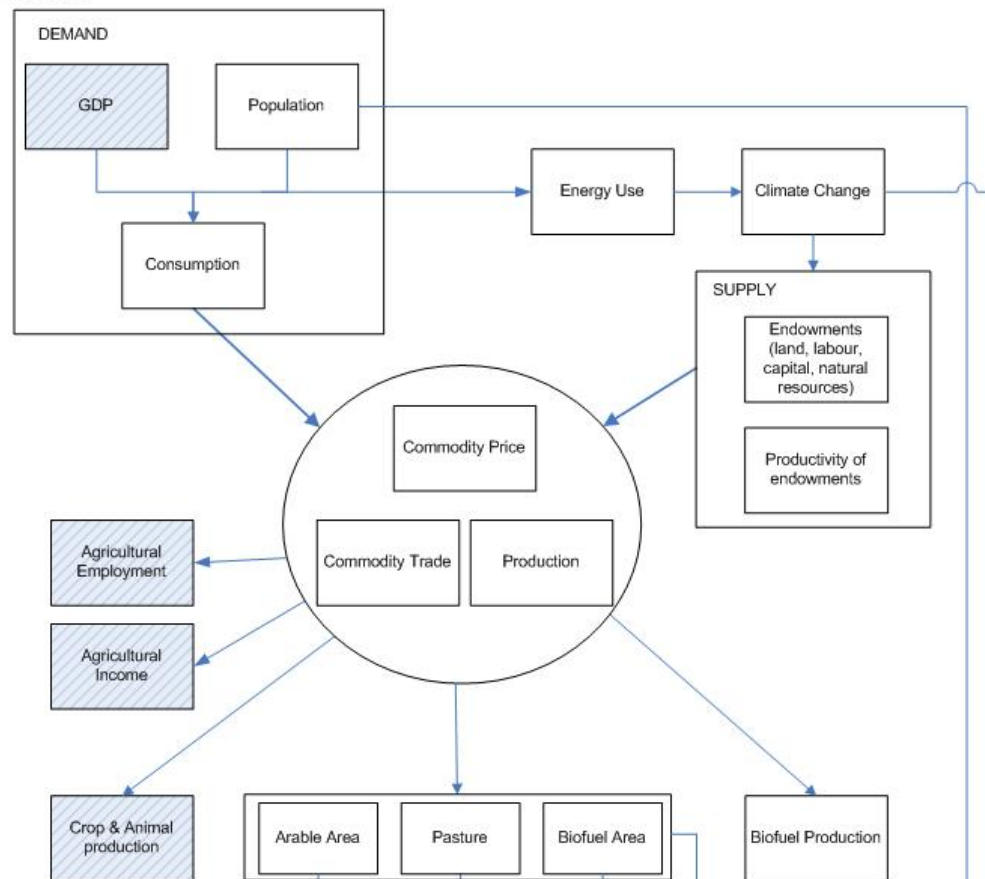


# Terrestrial biodiversity declines in baseline: fragmentation

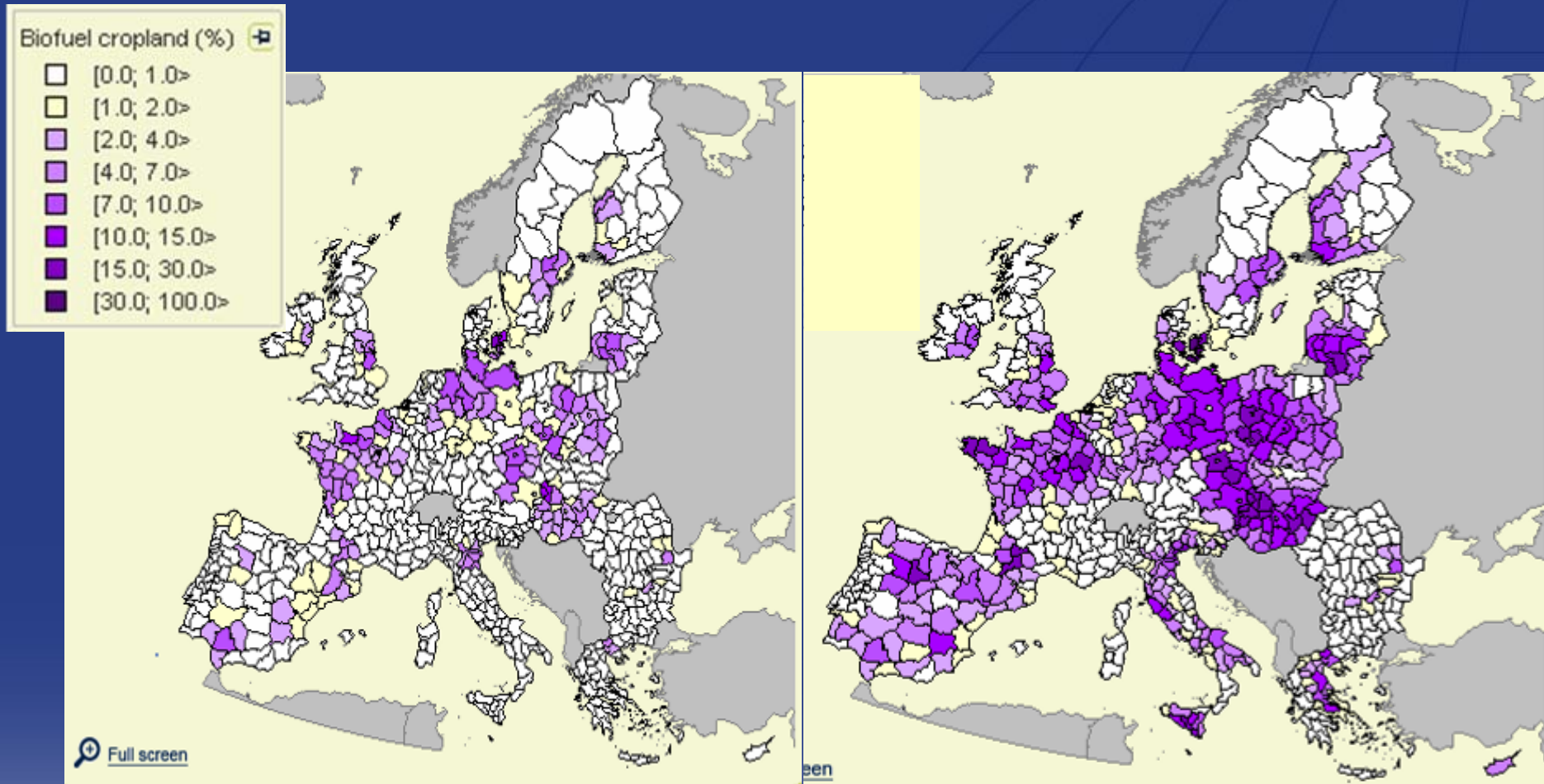


# Biodiversity loss in nature areas





# Policy matters: are biofuels the solution? 2030 (GE)



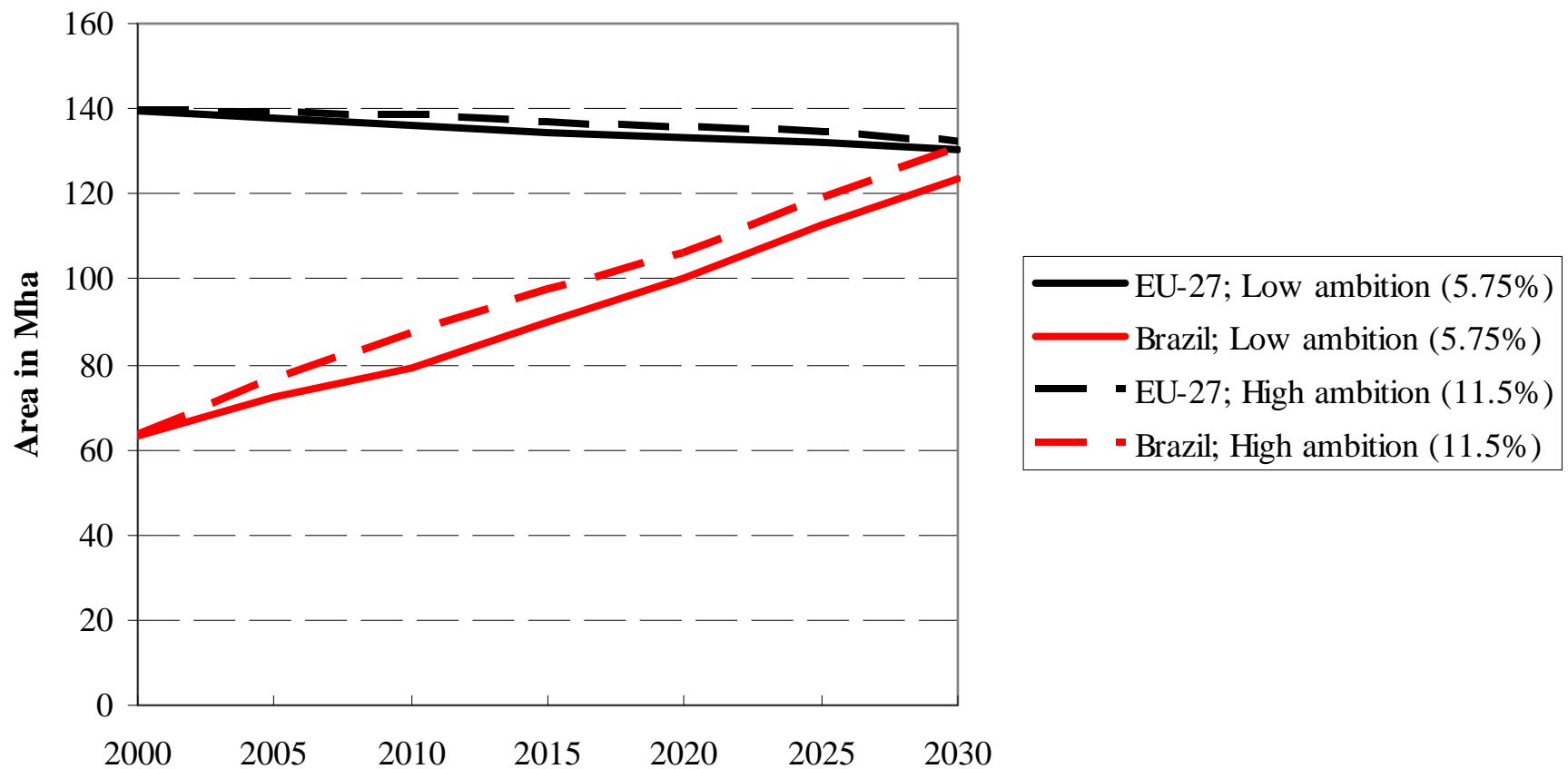
**Low ambition**

**High ambition**

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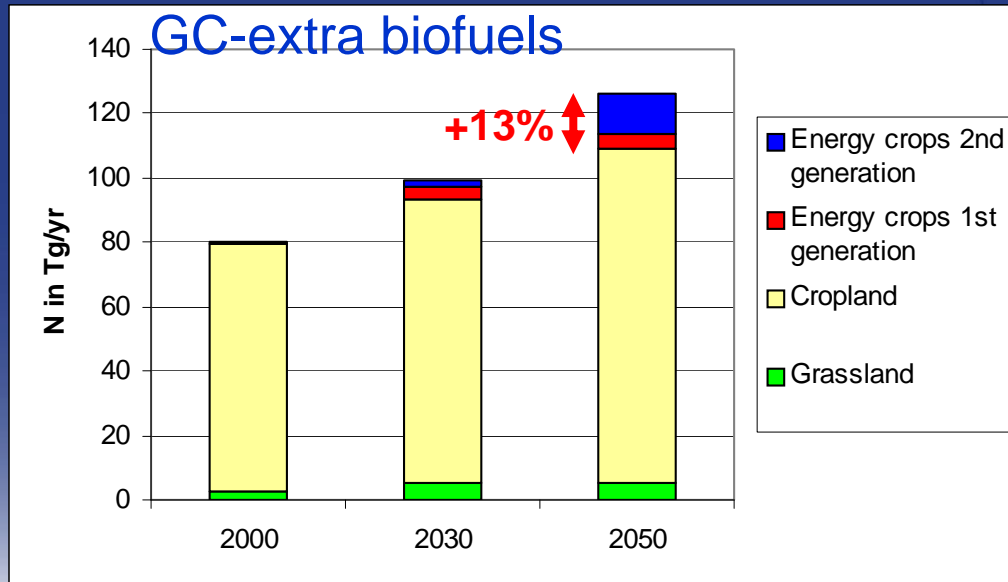
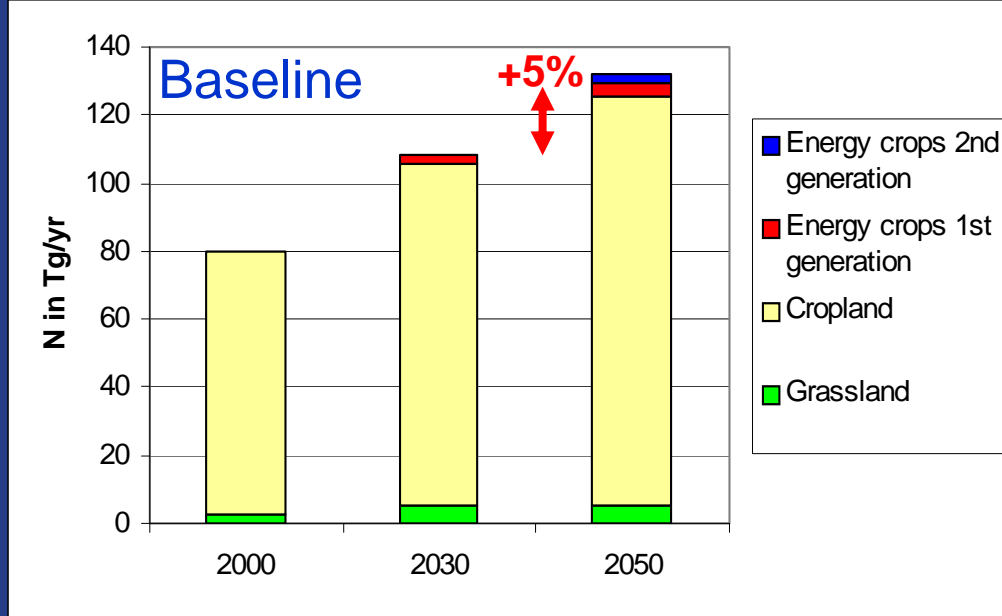
# Trade off: landuse change in Latin-America

Total arable land in Europe and Brazil





# More biofuels: more N needed



Source: IMAGE (Bouwman et al., 2006)

## Population & GDP

### Agriculture

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### Effects

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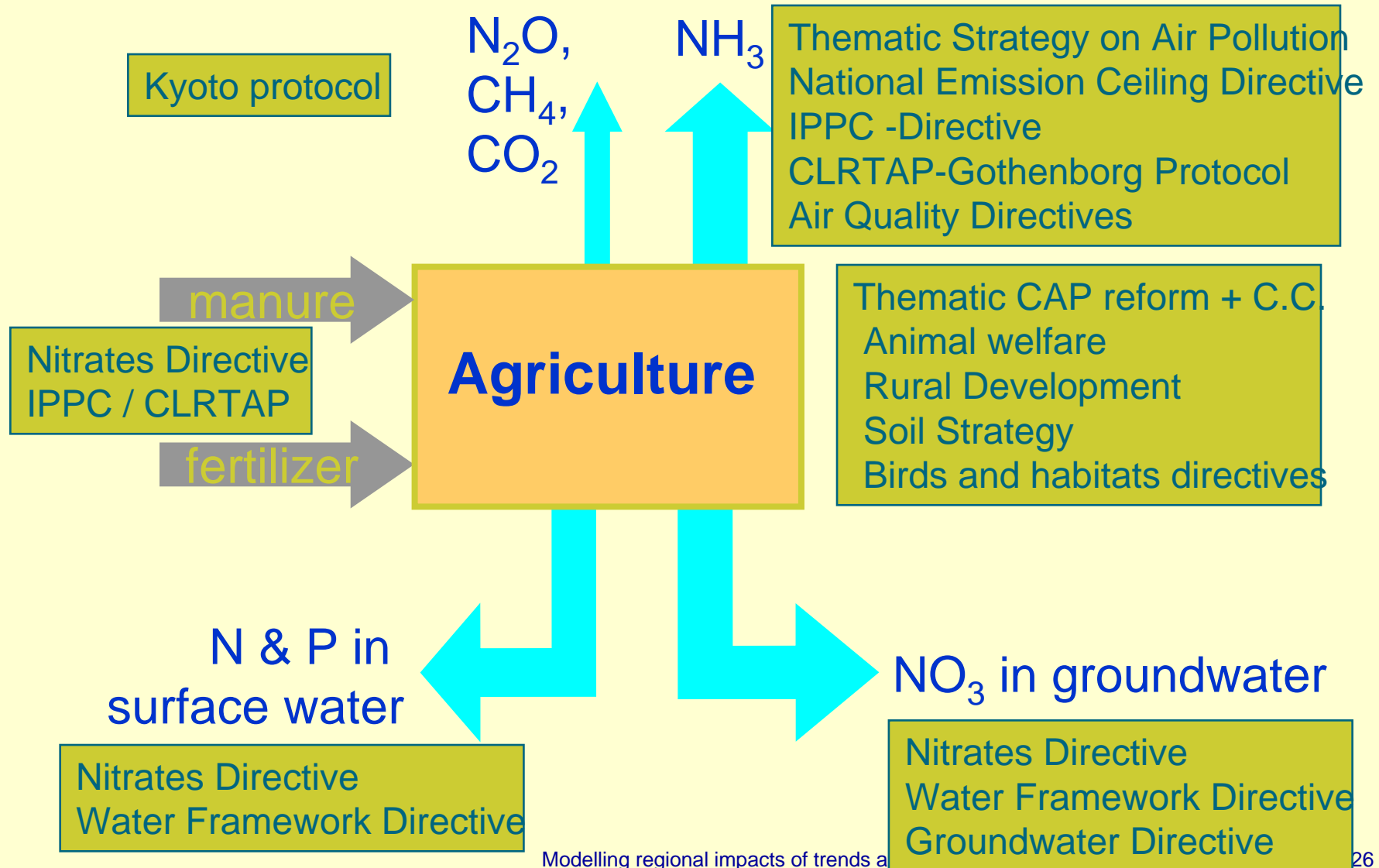
*rural*

*remote*

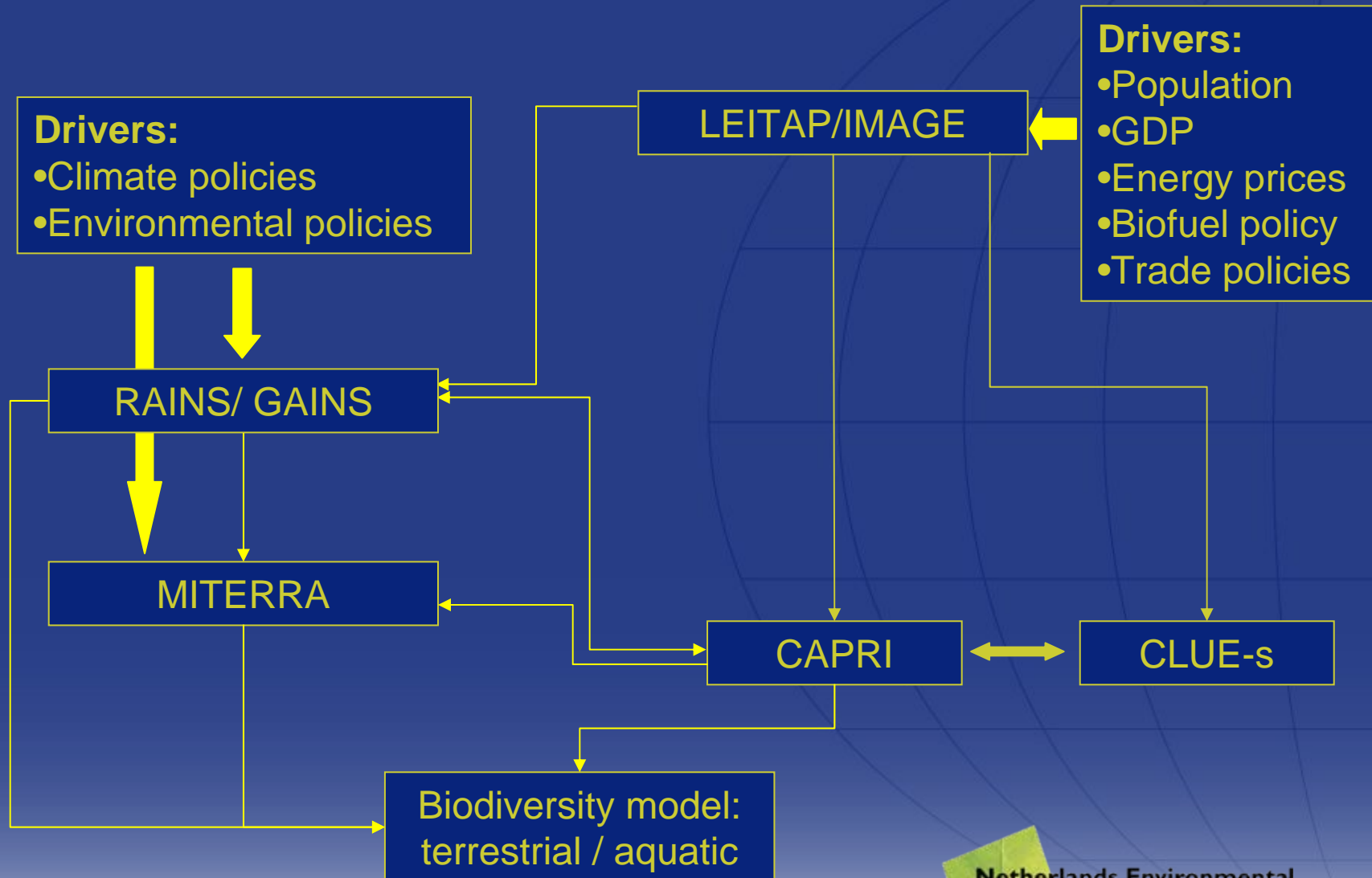
*water*

*air*

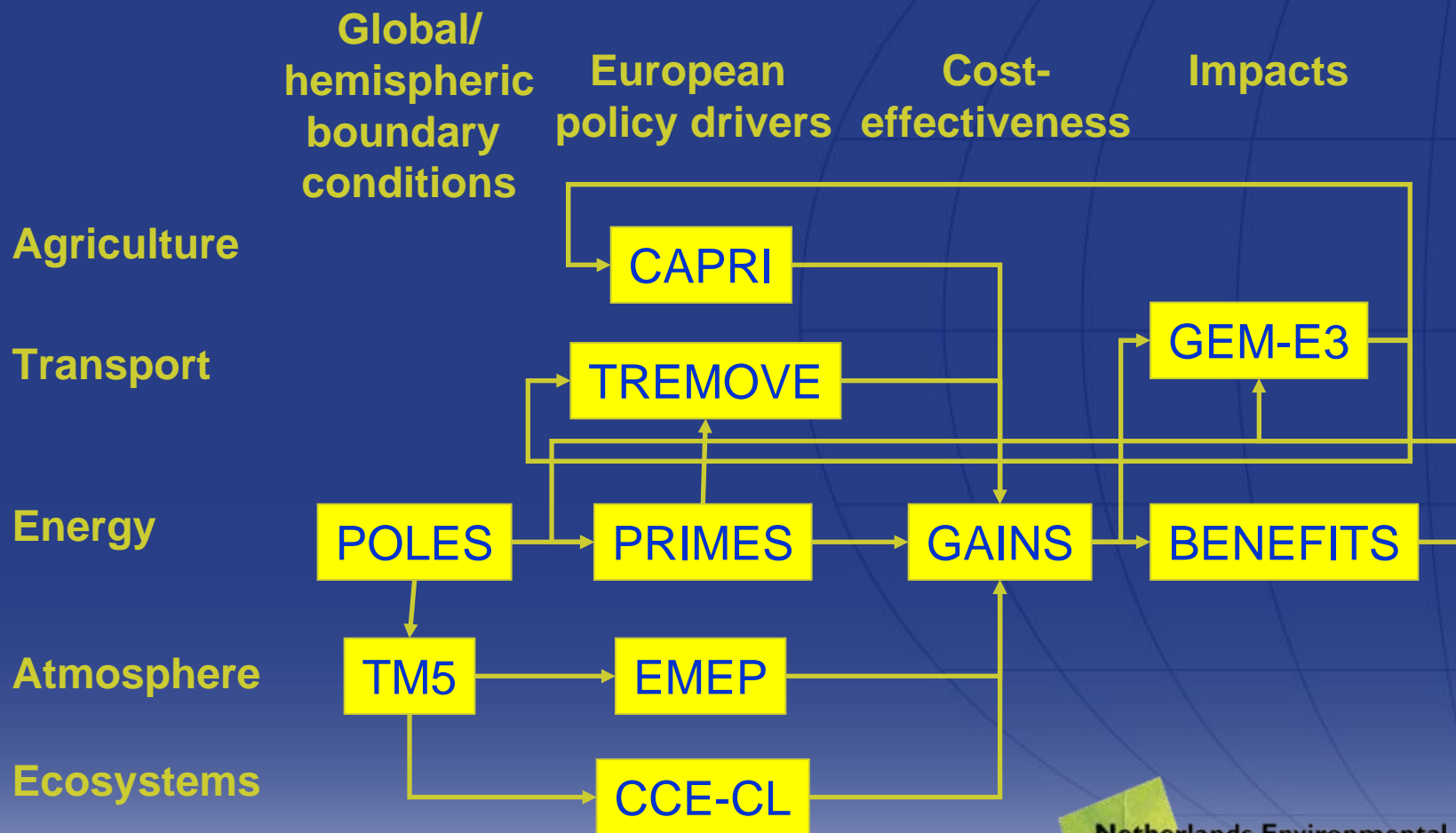
# EU: environmental legislation



# Possible linking of models



# The EC4MACS model system





# Complex questions → complex integrated models?

- Partly yes, but ...
- Questions link different policy or scientific areas
- For many areas models already exist
- Investing in combination of existing models probably more efficient than development of new models
- Policy questions are not always complex → also maintain less complex approaches

