Can we be certain about future land use change in Europe?

A multi-scenario, integrated-assessment analysis

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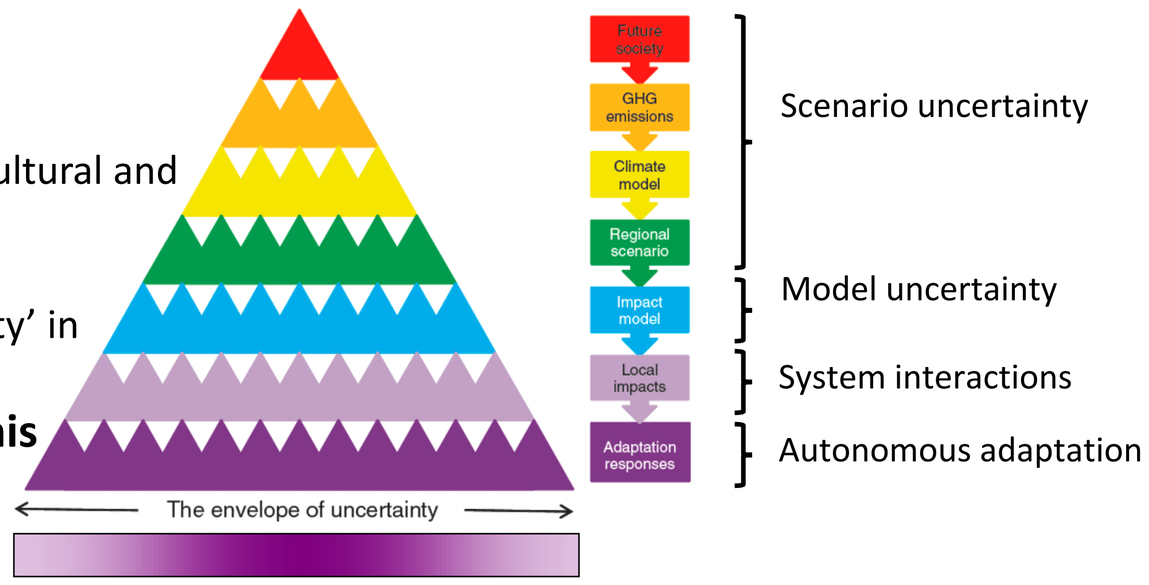
CONTEXT

- European landuse arises from complex interactions between agricultural and forestry policy, food demand, imports, productivity, climate etc
- The future behaviour of **all** of these are uncertain
- Implicit expansion of uncertainty within the 'Cascade of Uncertainty' in climate impact assessments
- **But can there be landuse change certainty within all of this uncertainty?**

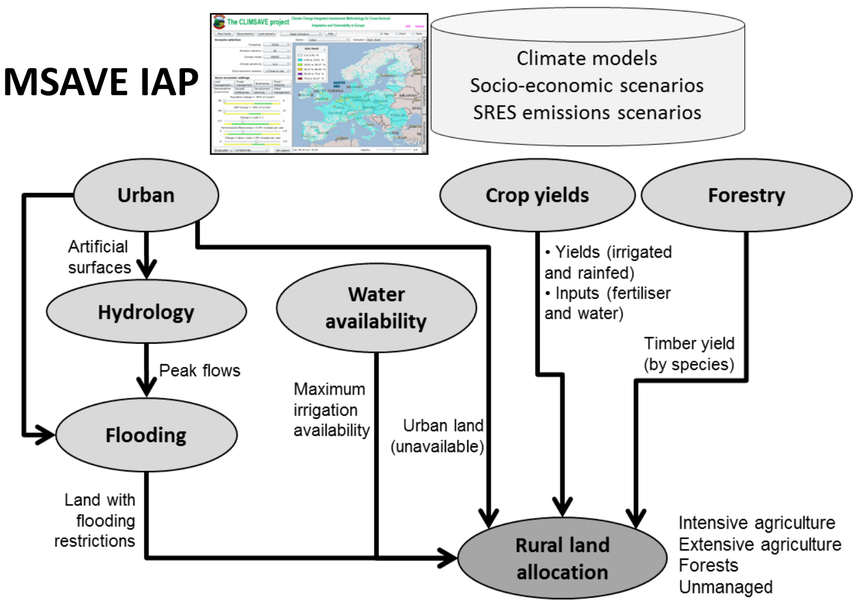


METHODOLOGY

- CLIMSAVE Integrated Assessment Platform (IAP)
- Multi-sectoral
- European scale (10' x 10' grid)
- Multiple futures for 2050s:
  - 4 emission scenarios
  - 3 climate sensitivity levels
  - 5 climate models
  - 5 socio-economic scenarios (4 CLIMSAVE scenarios + baseline)
- 60 simulations (climate change only)
- 300 simulations (with socio-economic change)

CLIMSAVE socio-economic scenarios

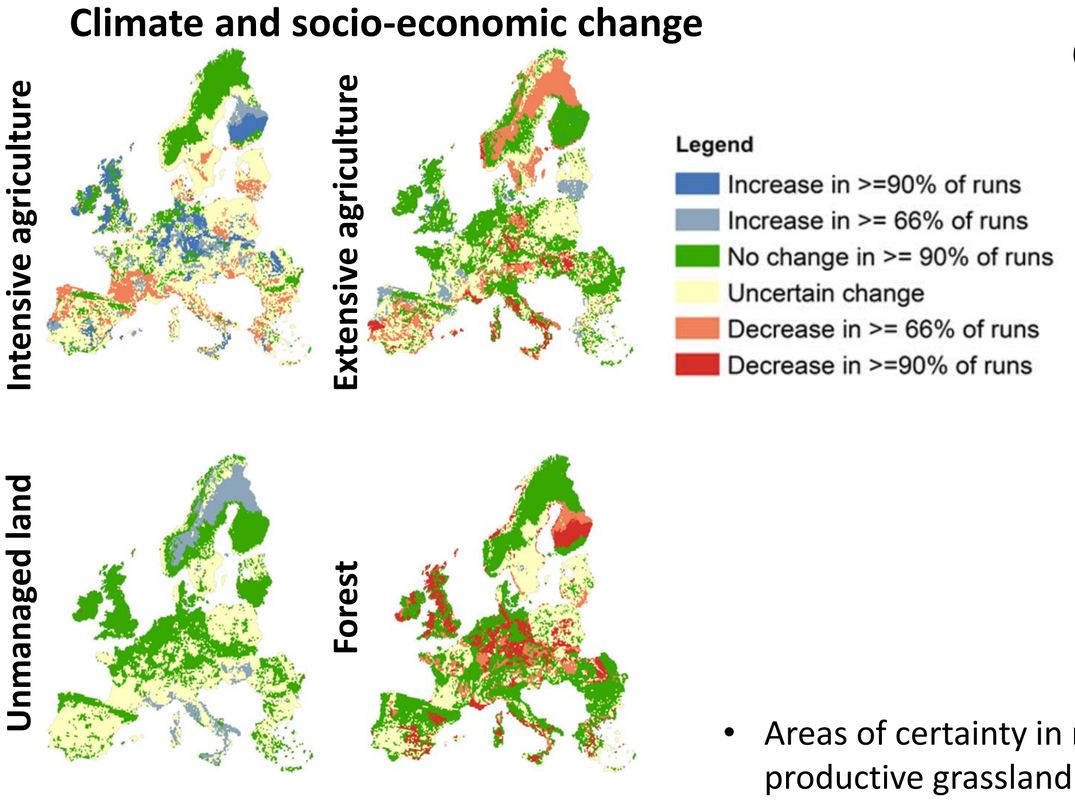
CLIMSAVE IAP



RESULTS

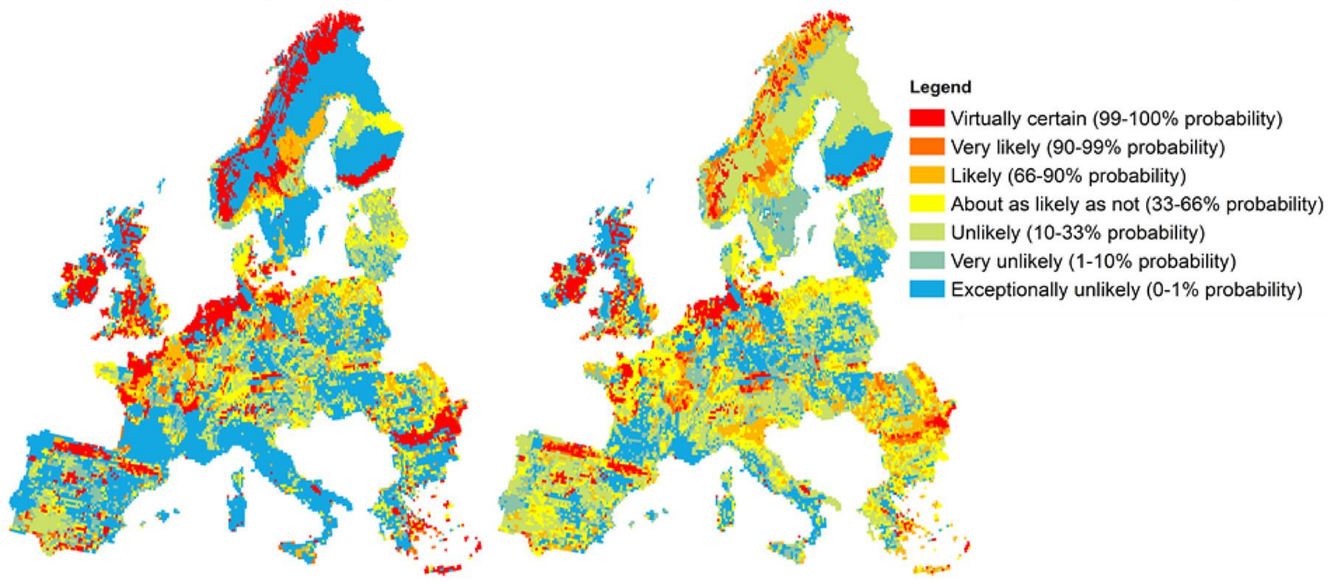
Certainty in direction of landuse change

Climate and socio-economic change



Certainty in maintaining current landuse proportions (±5%)

Climate change only | **Climate and Socio-economic change**



- Areas of certainty in maintaining current landuse mix (highly productive arable areas e.g. Netherlands; productive grassland areas (e.g. Ireland); highly constrained areas (e.g. Pyrenees)
- Socio-economic change reduces likelihood of no change (red, "virtually certain")
- Socio-economic change reduces likelihood of definite change (blue, "exceptionally unlikely")

CONCLUSIONS

- Substantial consistency in location and types of change, even under divergent conditions
- Climate change alone will lead to a contraction in European agricultural and forest area, particularly in southern Europe.
- Partially offset by socioeconomic changes that change both the demand for agricultural production and productivity.
- Simulated Mediterranean extensification and abandonment driven by reduced relative profitability
- Future policy should promote the multifunctional regional role of agriculture and forests, rather than focussing on increased productivity to maintain viability.

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