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WP1: Stakeholder dialogue and innovative governance

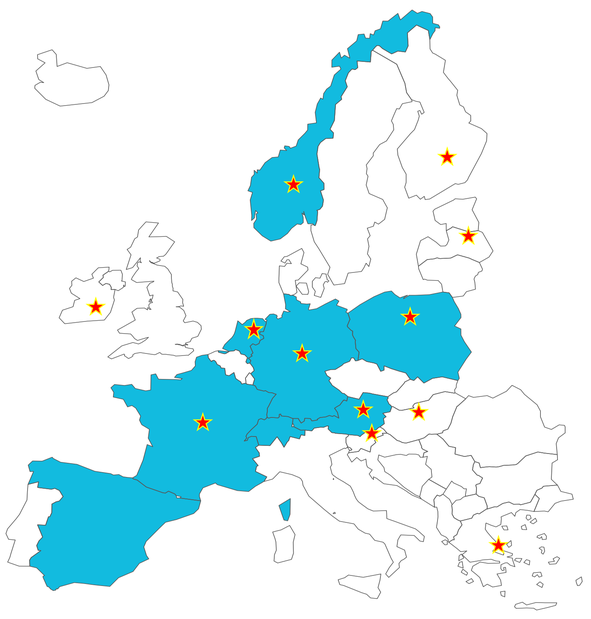
Lead: WIFO – Austrian Institute of Economic Research, Vienna
Institutions involved: WUR, BOKU, IIASA, INRAE, JRC, PBL, RURALIS, TI, VUA, UPS, ZAHW

Why?

- Better policies are needed to achieve the EU target of climate neutrality by 2050
- Outcomes of previous policies need to be better understood
- Policy scenarios and their results need to be communicated in innovative manners
- Multi-level stakeholder dialogue will contribute to making multi-level governance more effective

How?

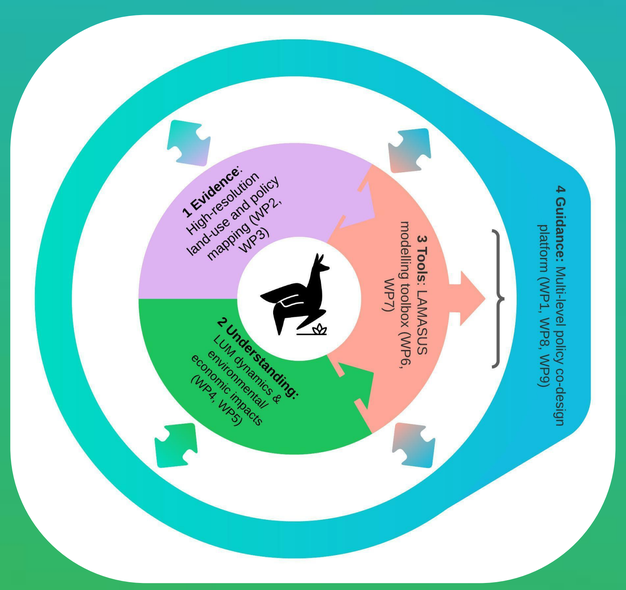
- Explore scope of future land use management policy needs
- Identify key stakeholders and set up consultation process
- Guide thematic resolution of land use management and policy databases
- Conduct multi-level stakeholder dialogue for sustainable land use governance
- Develop land use management policy scenarios for in-depth analysis

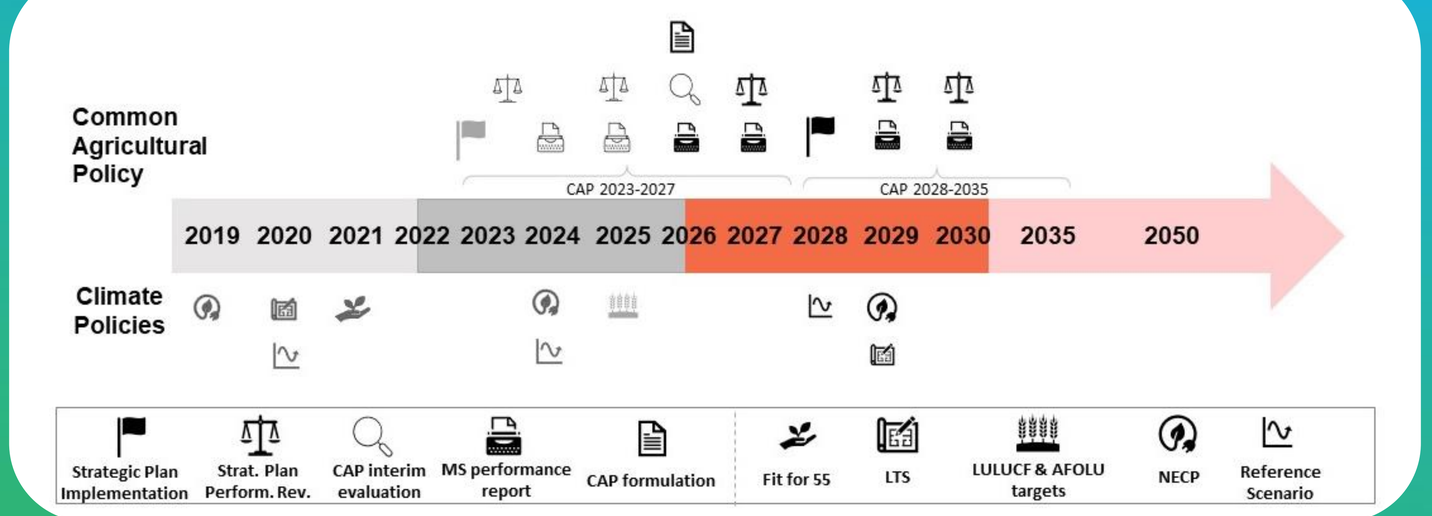


Geographic coverage of LAMASUS research groups and stakeholders

What?

- Literature review of existing policy documents
- Outcomes of land-management stakeholder workshops (Workshops 1, 2, 3) will
  - inform policy steering committee
  - be communicated via news-letters and other formats
  - give guidance to design of database and tool-box
  - contribute to the design of policy scenarios
- White paper on innovative governance of policies that affect land use decisions (Workshop 4)





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WP2: High Resolution Land Use Management Geodatabase

Lead: IIASA – International Institute for Applied Systems Analysis, Laxenburg, Austria
Institutions involved: UB, EC, WUR, INRAE, TI, BOKU, WIFO, PBL, VUA, JRC

Why?

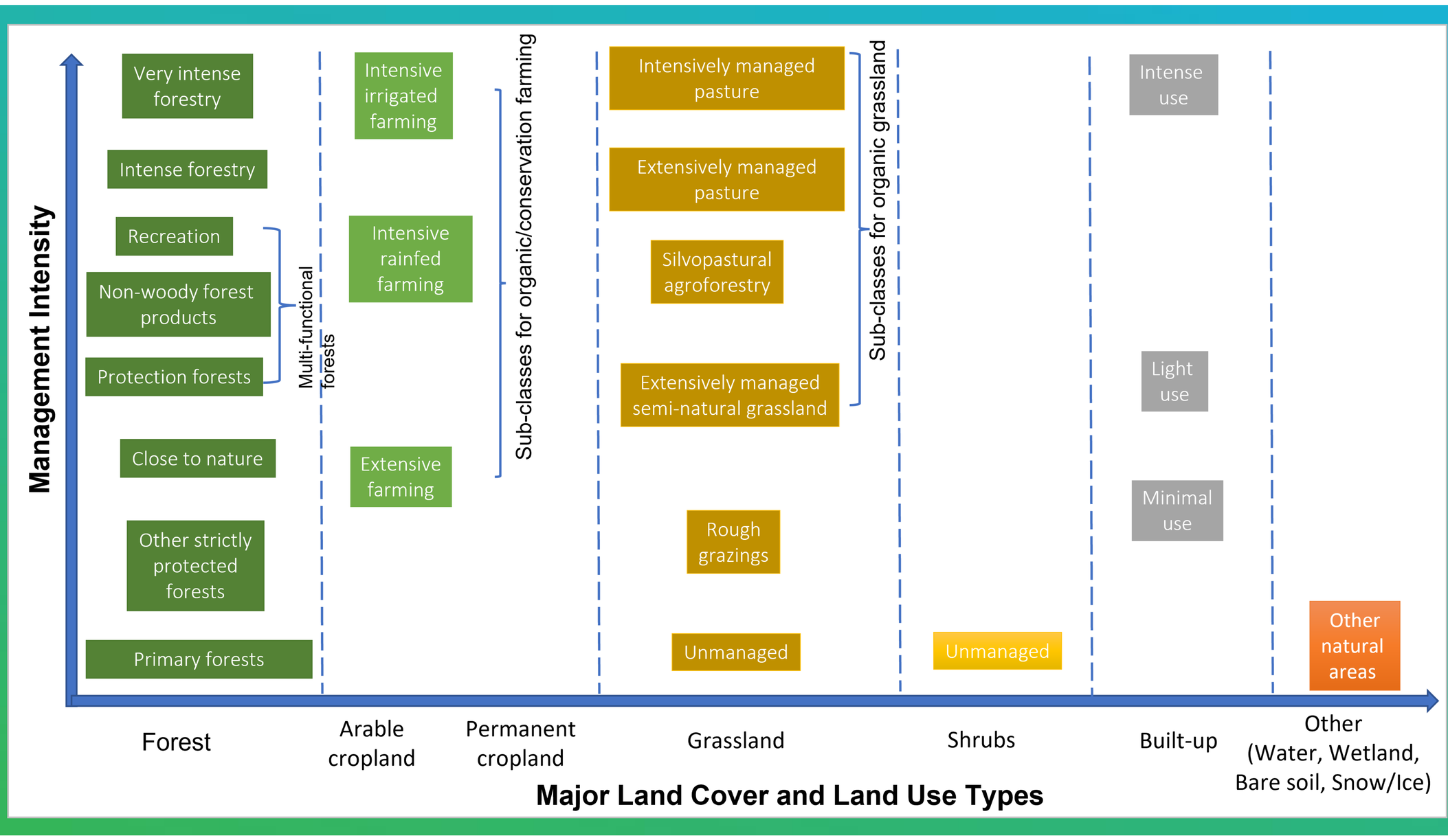
- There is a lack of spatially-explicit information on how land is currently being managed
- Where it is available, it is often only for one year and does not capture change over time
- Models need this management information for environmental impact assessments and to support the EU Green Deal and related policies

What?

- Requirements and technical specifications for the high-resolution land use management geodatabase
- The land use management geodatabase covering 2000 to 2020 (openly accessible)
- Updates to the land use management geodatabase

How?

- Build a land cover dataset from 2000 to 2020 by validating change over time
- Develop a set of land use management classes for modelling and policy support (see below)
- Create a set of rules for generating the land use management classes using the land cover dataset, other information from remote sensing, and statistical data on forest and cropland management
- Calculate area statistics over time to capture transitions in land use and land use management
- Provide information of certainty of the area estimates where possible
- Align the datasets with official statistics at an aggregated level



Major Land Cover and Land Use Types

Proposed Land Use Management Classes to be Mapped in the LAMASUS Geodatabase

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WP3: Spatially explicit agriculture and forest policy database

Lead: Thünen Institute, Braunschweig, Germany
Institutions involved: IIASA, WUR, INREA, RURALIS, BOKU, WIFO, UW, VUA, ZHAW

Why?

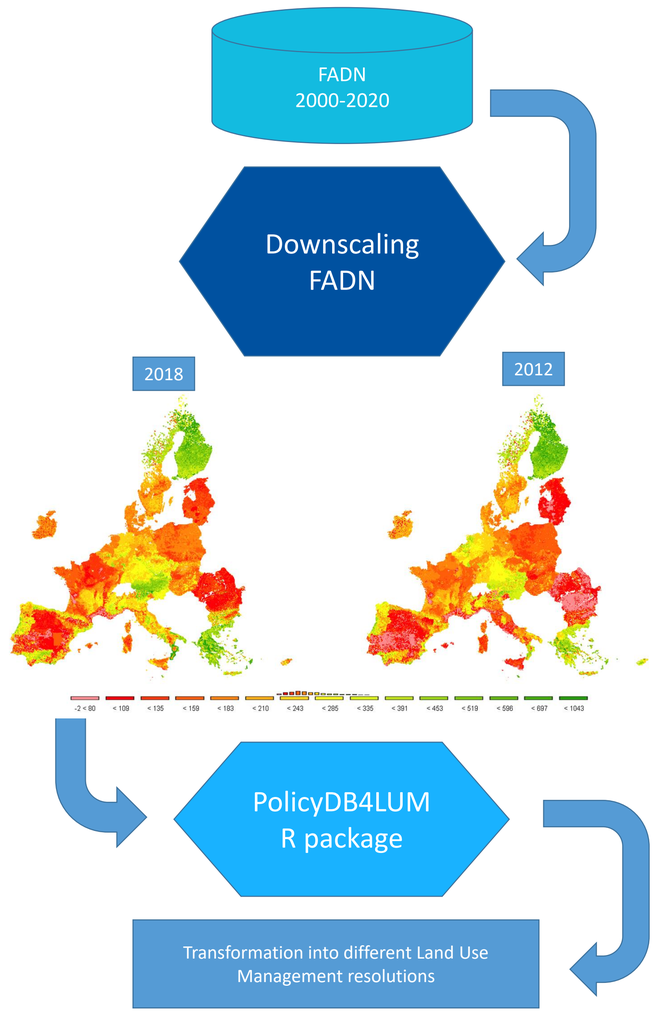
- Land use change is a major driver of greenhouse gas emission particularly in the form of deforestation, agricultural expansion, and urbanization
- Policy measures can influence land use change and it is important to understand how policies changed land use in the past
- Policy measures can take a variety of forms, including regulatory requirements, economic incentives, and public investments → need for a consistent database linking policies with outcomes

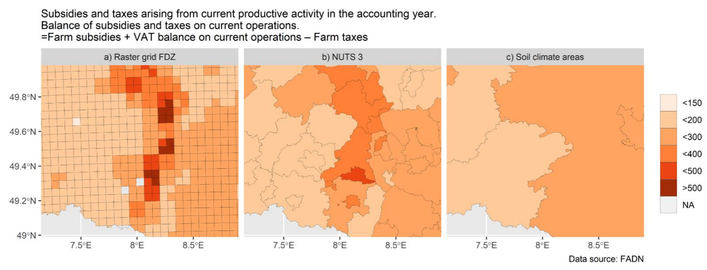
How?

- Review existing national and subnational funding and payment schemes and modelling needs
- Compile a spatially explicit agricultural and forestry policy and payments database
- Compile a spatially explicit non-policy related land use management drivers database

What?

- Report on the databases and variables to be collected
- Improve statistical methods to consistently harmonize spatial resolution (national, NUTS2, local scale) across Europe
- Database on EU policies and payments for agriculture, forest, and other land use management related drivers





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WP4: Development of ex-post econometric models for assessing land use management drivers

Lead: INRAE, Paris-Saclay, France
Institutions involved: IIASA, WUR, WIFO, ZHAW, RURALIS, RI, VUA, UV, UW, JRC

Why?

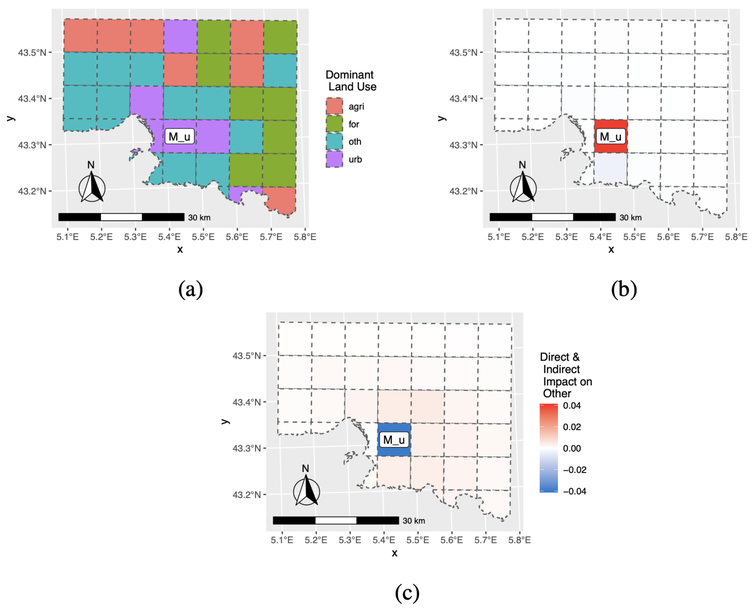
- Understanding the drivers of land-use and -management is crucial for informing public policies at both the European and national levels.
- These drivers can be economic, demographic, or pedoclimatic, and can vary across Member States and over time and spatial scales.
- Policymakers need to understand the drivers in order to evaluate the impact of past public policies and account for new climate challenges and economic contexts when formulating new policies.

What?

- Statistical/econometric models and associated papers discussing the drivers of land-use and -management and policy impacts at country, regional, and local resolutions
- Open-source code and documentation of the models (accessible for researchers and potential users)
- Three policy briefs on which policies and non-policy related drivers of land-use and –management matter at various spatial scales

How?

- Developing comprehensive statistical models for understanding the drivers of land-use and -management and evaluating policy impacts
- Analyzing the impacts of climate change on land use and how land-use and -management will adapt to future climate conditions
- Assessing the effectiveness of large-scale payments and prices on land dynamics at the national and subnational administrative scale (NUTS2 regions)
- Examining the impact of the Common Agricultural Policy (CAP) on the structure of holdings and their economic behavior at the farm level
- Understanding spatial patterns of land-use change and the impact of protection areas and zoning policies at a high-resolution level (5 km^2).



Region of Marseille: (a) Dominant land uses; (b) Local impact on “urban” share; (c) Local impact on “other” share

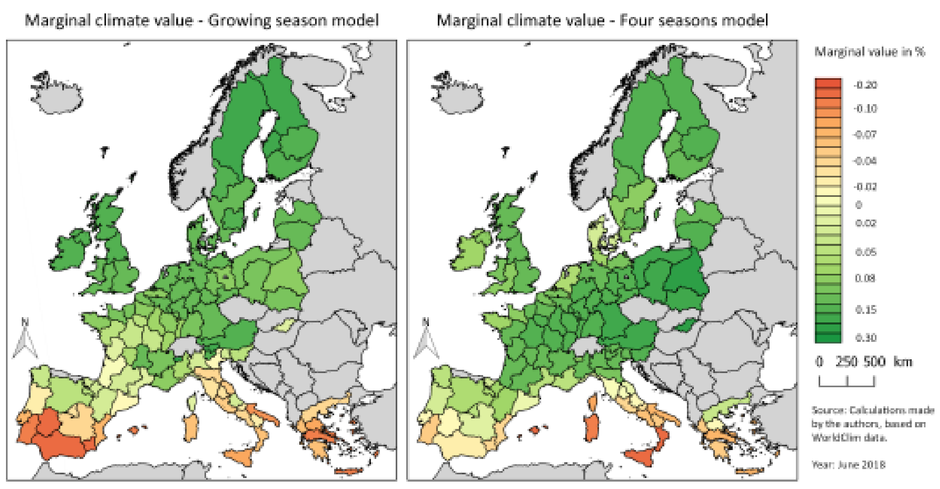
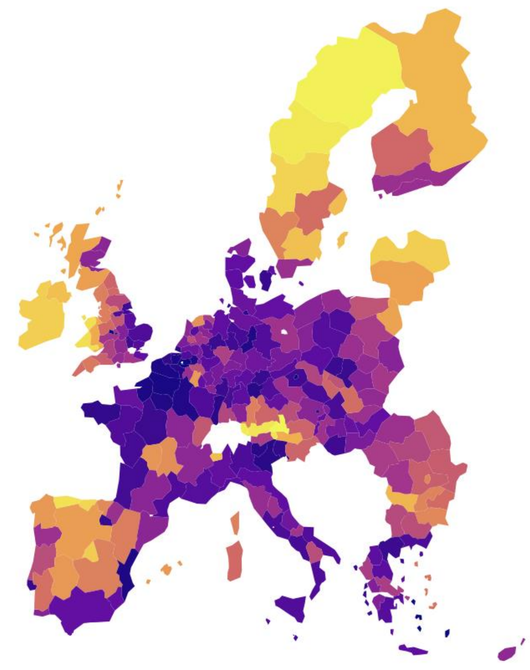


Figure 4: Total marginal effect of climate for the growing season and four season models (Models 1 and 3 respectively)



Illustrative impacts of policies on land-use change

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WP5: Improved understanding of environmental and economic impacts related to land use management

Lead: INRAE, Palaiseau, France
Institutions involved: UPS, IIASA, PBL, EC, WUR,

Why?

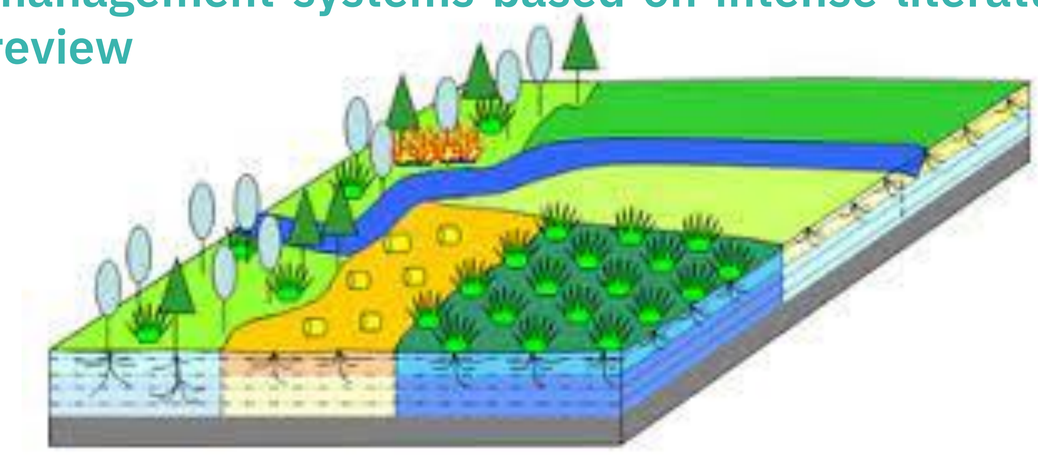
- We need improved tools to predict the climate impacts of land use management
- We need improved tools to predict the biodiversity impacts of land use management
- We need an improved database to better assess the economic costs of land use management, which play an important role in the decision making

What?

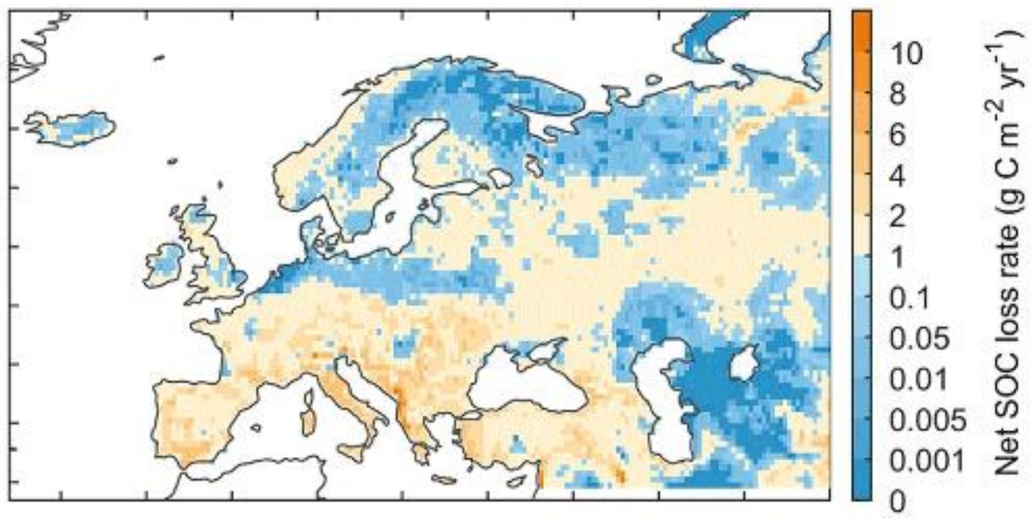
- Knowledge base that stores a comprehensive set of rules to estimate the impact of land use management on the climate system
- Maps of potential climate impact of various land use management classes
- Improved biodiversity models predicting biodiversity impact of land use management
- Identification of priority zones for biodiversity protection
- Database of economic costs related to various forms of land use management

How?

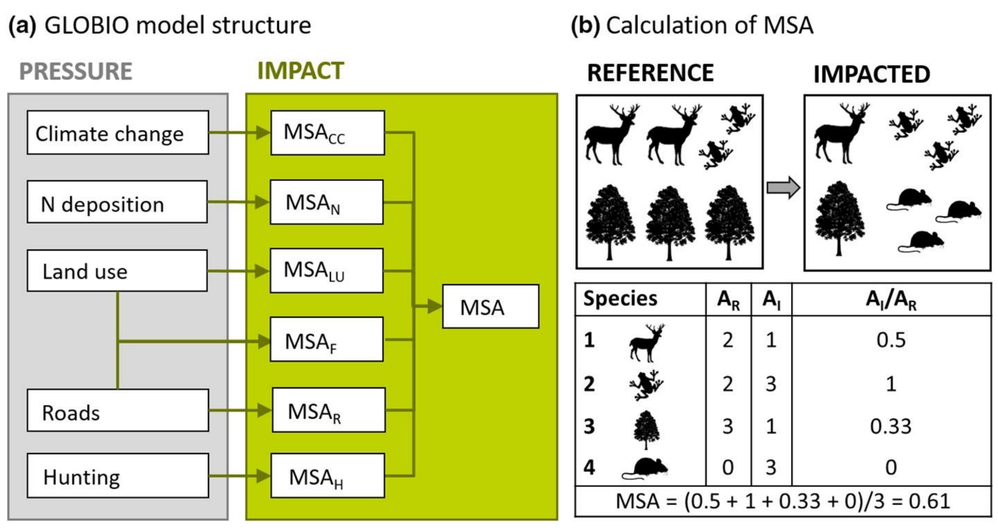
- Formulate rules to estimate climate impact of land management by synthesizing the knowledge from state-of-the-art land surface and cropping system models
- Create maps of potential climate impact of major land use management classes by applying the formulated rules to high resolution geodata
- Update two models, GLOBIO and PREDICTS, which predict the species composition and abundance of different land use management classes and compare those to the hypothetical natural state
- Create database of economic costs of different management systems based on intense literature review



Representation of landscapes in a Land Surface Model. Within a grid cell (~50km), various types of land cover exist side by side. For each land cover type, carbon, water and energy budgets are simulated separately.



Simulated soil carbon loss to erosion (ORCHIDEE) (Zhang, et al. 2022 – ESD)



How Mean Species Abundance (MSA) is calculated in GLOBIO (Schipper et al. 2019 – GCB)

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WP6: High resolution spatial land system and behavioural models

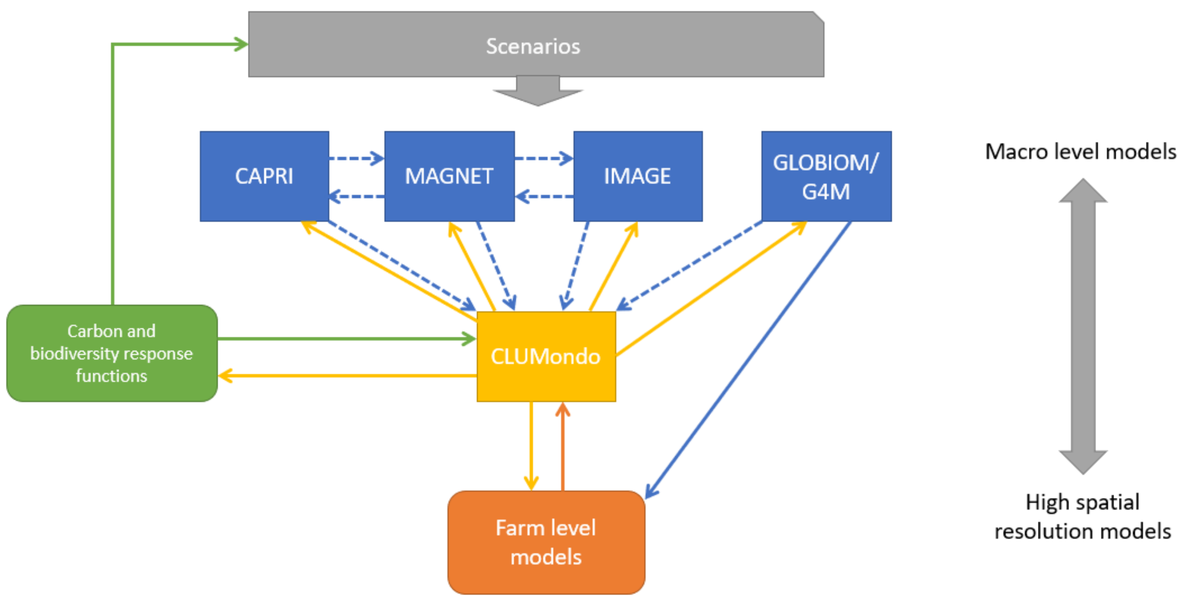
Lead: Vrije Universiteit Amsterdam, Amsterdam, The Netherlands
Institutions involved: IIASA, EC, WUR, BOKU, PBL, JRC, UB, RURALIS, ZHAW, INRAE

Why?

- Current policy impacts assessment on land use change and biodiversity commonly do not account for indirect policy effects:
  - EU/national/regional policies have local impacts
  - Zoning and farm-specific policies impact EU/national/regional goals
- We need to understand potential synergies and trade-offs between policy goals such as increasing organic agriculture and biodiversity in the EU

What?

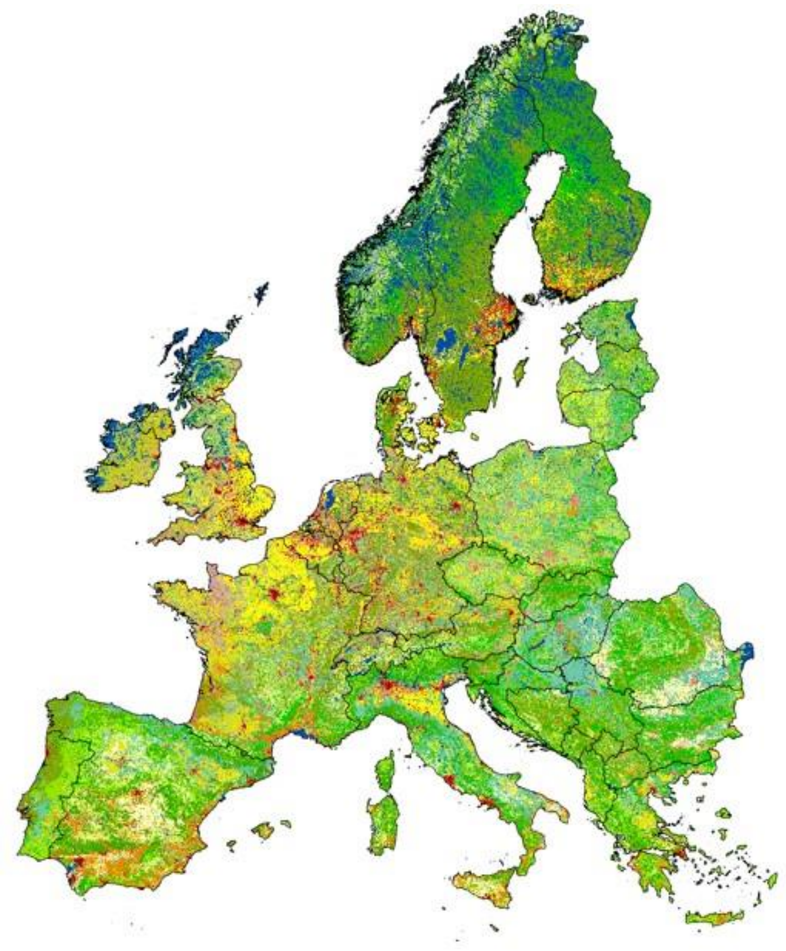
- Model coupling framework to capture cross-scale dynamics of land use change (bringing together large-scale, macro-level & high spatial resolution models)
- Improved high-resolution land use model that better reflects the policy outcomes
- Maps of future land systems based on different scenarios
- Regional case studies to capture potential farm level economic response to policies



Concept of the model coupling framework

How?

- Review existing linkages between GLOBIOM, CAPRI, MAGNET, IMAGE and CLUMondo high-resolution spatial allocation model
- Adapt CLUMondo to reflect state-of-the-art input data and land system legend, and improve linkages with macro models
- Run model scenarios in CLUMondo with inputs from macro-models



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WP7: Development of ex-ante macro-level models

Lead: IIASA - International Institute for Applied Systems Analysis, Laxenburg, Austria
Institutions involved: EC, WUR, PBL, UPS, UB, INRAE, TI, JRC

What?

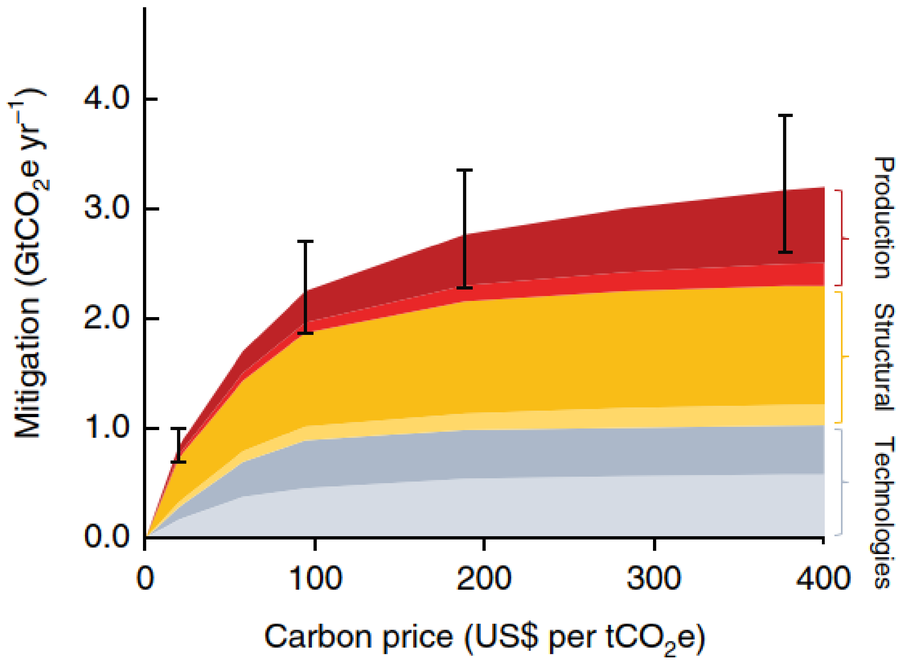
- Models: CAPRI, MAGNET, IMAGE, GLOBIOM
  - Agriculture, forest, other land use
  - Country level, NUTS2
  - Parameterized based on
    - Historical data
    - Biophysical (process-based) models
  - Forward looking (2020-2050/2100)
  - Impact Assessments (CAP, Climate policies), Pathway development, Solution space

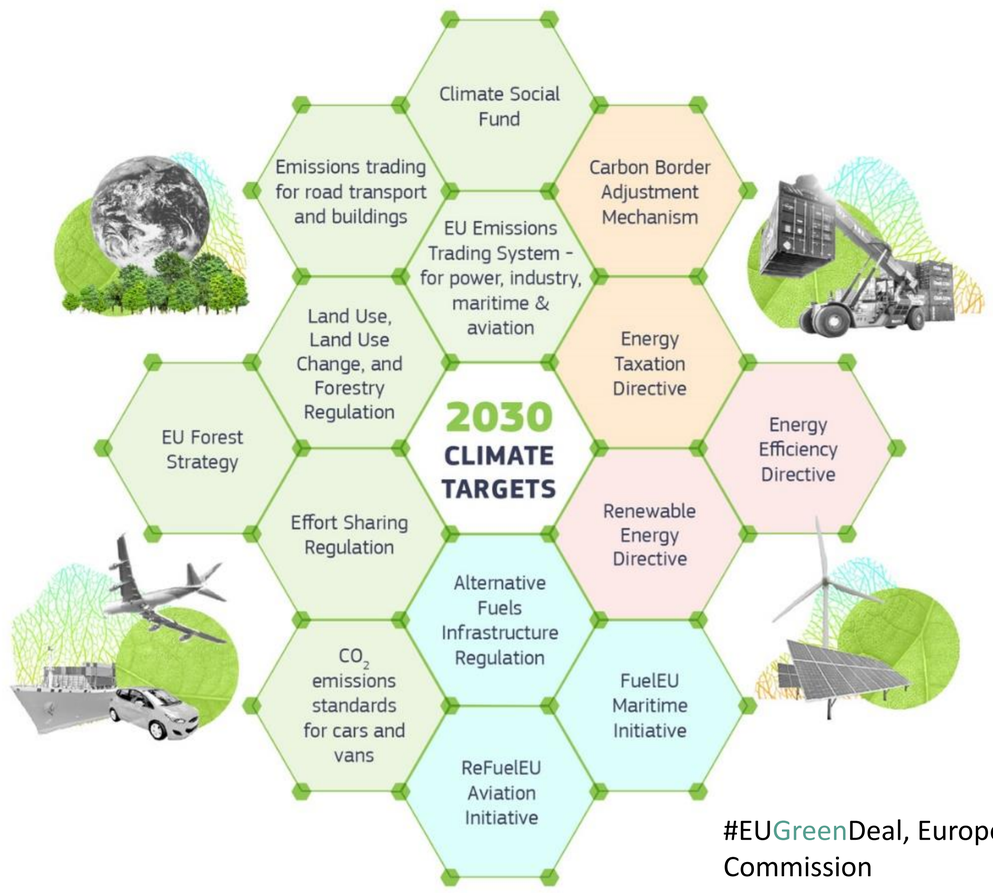
Why?

- Make ex-ante models fit for Green Deal policies
- Improve representation of management systems to include:
  - Organic farming
  - Climate-smart forest management
  - Peatland restoration
  - Grassland management
- Improve spatial representation of ex-ante models to link with high-resolution models

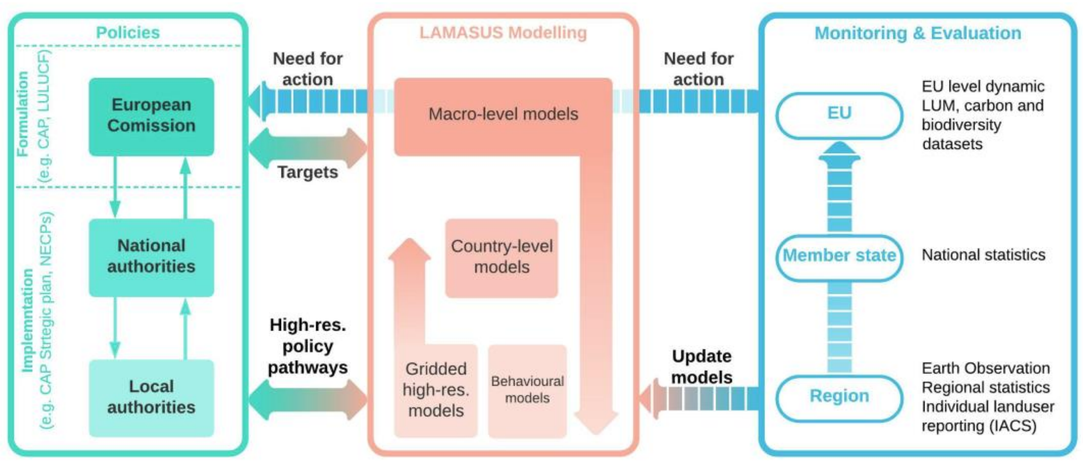
How?

- Bio-physical and ex-post models to inform large-scale models and parameterize new management systems (WP4/5)
- Integrate newly developed land use and management database (WP 2)
- Develop interfaces within the LAMASUS toolbox for model coupling (WP6)





#EUGreenDeal, European Commission



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WP8: Sustainable land use management pathways and policy evaluation

Lead: PBL Netherlands Environmental Assessment Agency – The Hague, the Netherlands
Institutions involved: IIASA, EC, WUR, TI, PBL, VUA, JRC, UB, RURALIS, BOKU, ZHAW

Why?

Multi-scale:
Global and regional policies → local actions

Mid- and long-term policies

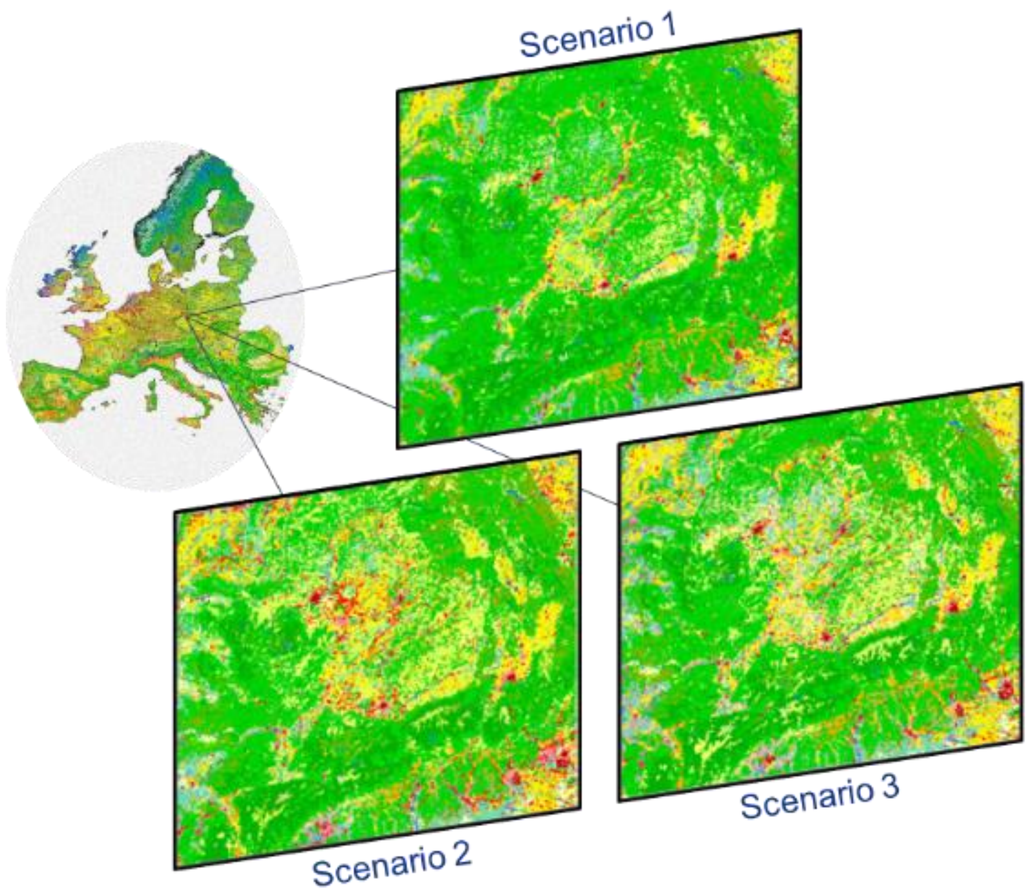
Multiple models = multiple assumptions on baselines → harmonisation needed

What?

Harmonized baseline

Explore futures using scenarios
(CAP, Green Deal, Fit for 55, Farm to fork, EU biodiversity strategy)

Integrated view on policies for land use sector



How? Building on previous WPs...

- ...apply ex-ante economic land use models (CAPRI, GLOBIOM, MAGNET/IMAGE) + harmonised reporting templates
- ...design, implement and simulate exploratory (sectorial) scenarios
- ...together with stakeholders

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WP9: Dissemination, Communication and Exploitation

Lead: ARTTIC Innovation GmbH, Munich, Germany

Institutions involved: IIASA, all partners

Why?

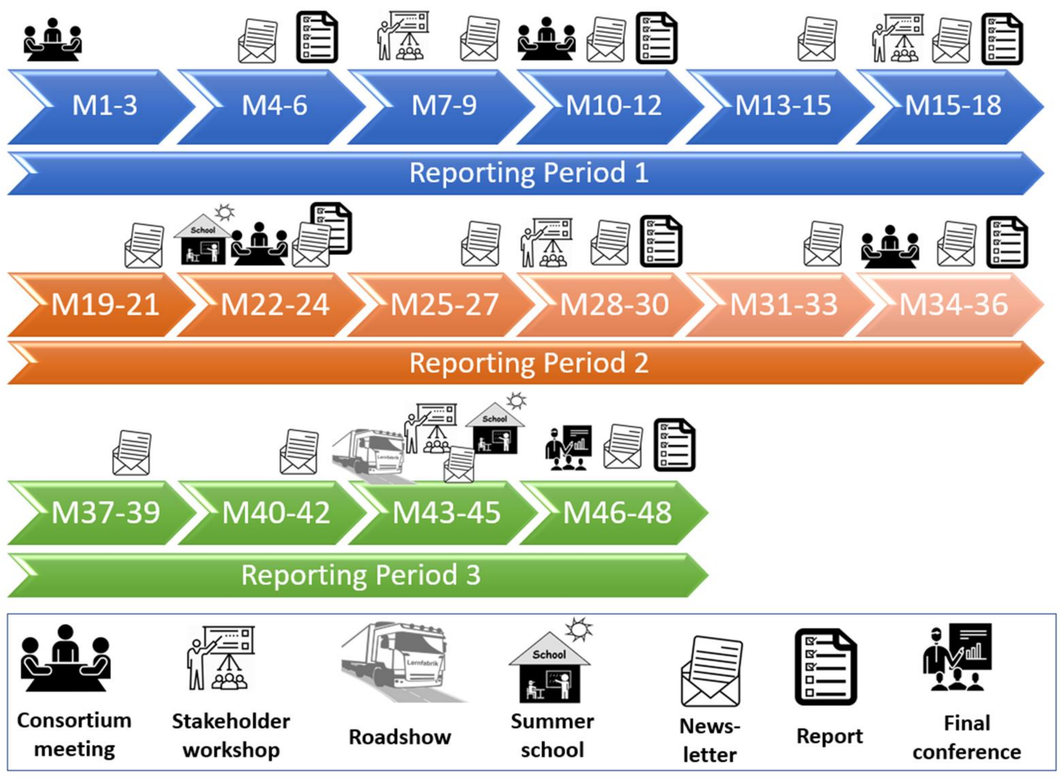
- Effective dissemination and communication are key to ensure the LAMASUS project will have
  - impact on modelling land use and land use management, and
  - inform European, national, and regional decision-makers, key stakeholders and the wider public
- The aim is to raise awareness of the LAMASUS project and to maximise its impact

What?

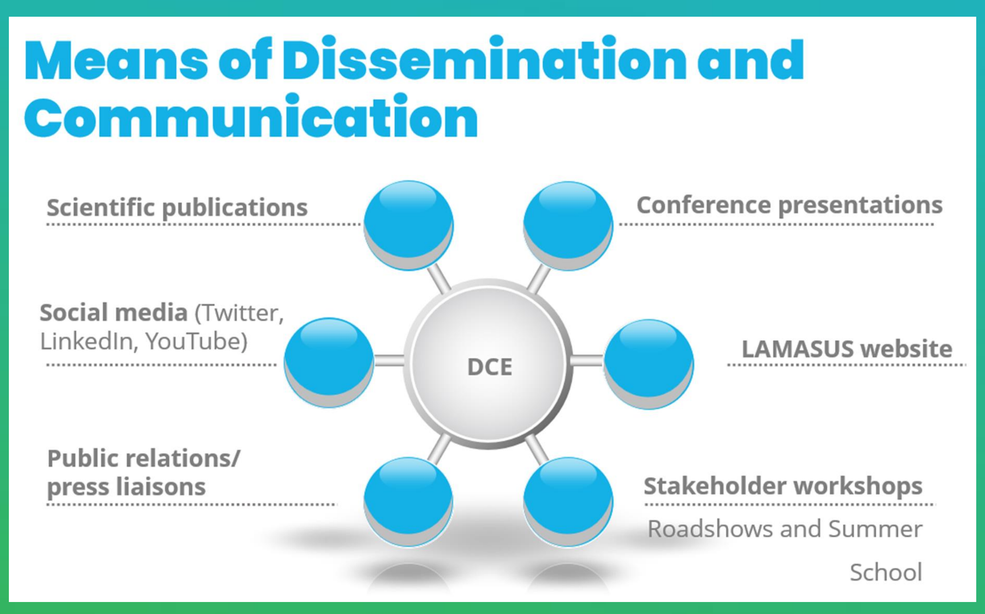
- Communication toolkit
- The LAMASUS Portal for user-friendly stakeholder engagement (providing access to the Data and Model Repository and to additional analytic and visualization capabilities)
- Documentation of training activities

How?

- Publications in scientific journals
- Conference presentations
- LAMASUS web portal
- Stakeholder workshops
- Roadshows
- Training courses
- Newsletter
- Social Media



Means of Dissemination and Communication



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