Newsletter 03_2025

connect partners
share information
gain insights

Welcome to the third edition of the Europe-LAND newsletter!

With 2025 ending, Europe-LAND is reflecting on a year full of momentum, milestones, and growing impact across the work packages. Whether you're a researcher, land manager, policymaker or citizen concerned with the environmental future of Europe — we hope this newsletter informs and inspires you toward more sustainable land use across Europe.

The Europe-LAND project (2023–2027), funded by the Horizon Europe program, aims to support the development of sustainable land-use strategies across Europe in the context of climate change and biodiversity loss. To learn more, visit europe-land.eu.

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A Letter to the Editor

By Franziska Wolf (Hamburg University of Applied Sciences, Germany)

Dear Readers,

In this issue, learn how our key ongoing tool development, a novel open-access, browser-based Web-GIS platform, is designed especially for use by policymakers, planners, researchers, NGOs, and land managers - and how you can get involved. Our latest modelling results represent a practical entry point for stakeholders, researchers, and decision-makers who need to quickly understand available modelling options. A third research result just published, the Europe-LAND telecoupling framework, offers an innovative tool for comprehending land-use change as one of biodiversity challenges by integrating quantitative and qualitative research approaches and adopting an agent-oriented approach. Finally, we share some recent results from our sister projects with whom we join forces to achieve more sustainable and equitable land use and land management across the EU.

Enjoy the read!

Your Europe-LAND project consortium

An Update on the Europe-LAND Toolbox: A Web-GIS Platform for Sustainable Land-Use Strategies in Europe

By Konstantinos Plataridis (Aristotle University of Thessaloniki, Greece)

One of the key outputs currently under development is the **Europe-LAND Toolbox** , a novel, open-access, browser-based Web-GIS platform being developed under Work Package 6. Once completed, the toolbox will enable evidence-based spatial planning by allowing users to visualize, analyze, and compare geospatial data on land use, environmental pressures, and socio-economic conditions.

The platform integrates a wide range of datasets from sources such as

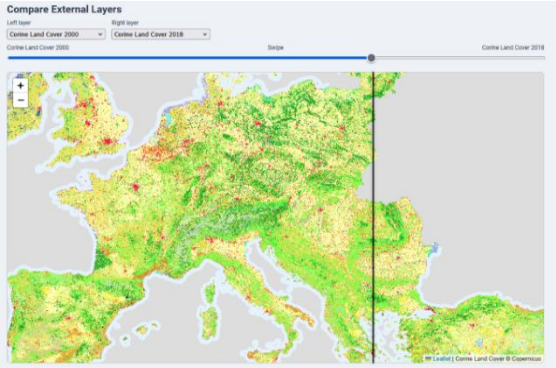

Figure 1: A Europe-LAND toolbox user compares two external layers: Corine Land Cover 2000 and Corine Land Cover 2018.

Corine Land Cover, Copernicus, Eurostat, and national agencies, with special emphasis on high-resolution agricultural data from the Integrated Administration and Control System (IACS). Built with the Leaflet JavaScript library, the Toolbox offers user-friendly functionalities, including:

- Interactive maps and comparison tools

- Time slider and thematic layers
- Region selection via NUTS (Nomenclature of Territorial Units for Statistics) filters or custom uploads
- Indicator calculations (e.g., urbanization, flood risk, land conversion)
- Exportable outputs in maps, tables, and reports

It is designed to serve policymakers, planners, researchers, NGOs, and land managers. Unlike conventional platforms, it will also incorporate AI-powered predictive models, allowing users to explore future land-use scenarios and identify spatial conflicts and synergies.

The current version of the Toolbox was recently presented at the **7th International Conference of the Hellenic Hydrotechnical Association**, held in Xanthi, Greece, in May 2025. The conference brought together over 150 participants from academia, industry, and government. Our presentation introduced the platform's features and use cases, highlighting its potential to support sustainable land-use decision-making across Europe. The Europe-LAND Toolbox aligns with key EU policy frameworks such as the European Green Deal and the Common Agricultural Policy, ensuring both relevance and long-term applicability.

Interested in an early view into the toolbox? Contact us at info@europe-land.eu to become a test user!

Modelling Cards: A Practical Gateway to Spatial Modelling in Europe-LAND

By doc. RNDr. Lucie Kupková, Ph.D. (Charles University, Czech Republic)

As part of **Deliverable D4.1 – Databases of existing LU/LC patterns and spatial modelling tools**, prepared and led by **Charles University team** with contributions from project partners, a set of **modelling cards** was developed to make complex spatial modelling tools more accessible. These cards were created as a complementary, user-friendly extension of the main deliverable outputs, and **published openly via the Europe-LAND Zenodo account.**

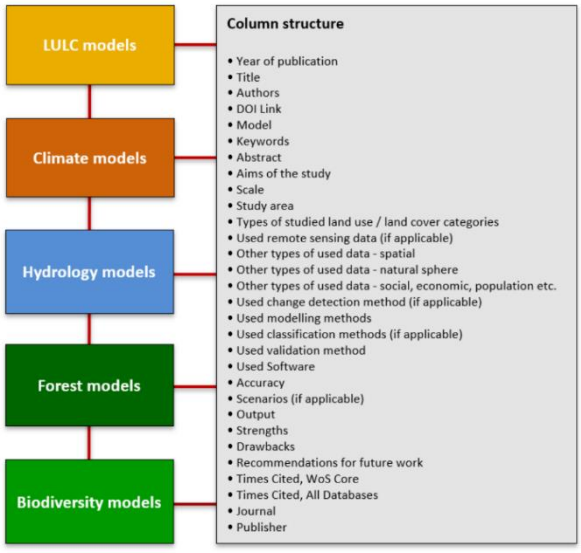

Figure 2: Overview of Europe-LAND's modelling tool database structure.

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Deliverable D4.1 provides a consolidated resource base for analysing land-use dynamics and related environmental impacts across Europe. It consists of two main components:

1. **A comprehensive database of LULC datasets**, covering global, European, thematic, and national land-cover products, alongside orthophotos. The database includes harmonised metadata on spatial resolution, classification schemes, temporal coverage, and data accessibility.
2. **A database of spatial modelling tools**, documenting models across five domains: LULC, climate, hydrology, forest, and biodiversity was created from a systematic review of peer-reviewed European studies (2015–2025). For each study, key information on model type, datasets, methods, software, scenarios, and main findings was extracted into a structured Excel dataset, providing an overview of how spatial models are applied in environmental research across Europe.

Complementing the deliverable, we developed user-friendly, hands-on guidance tools for selected models in the form of compact information cards, and related success stories that illustrate how the respective model can be applied in both research and practice. These tools are provided to our stakeholders through Europe-LAND project ZENODO account. The modelling cards transform complex modelling knowledge into short, structured, and accessible guidance materials as a **practical entry point** for stakeholders, researchers, and decision-makers who need to quickly understand available modelling options.

Each modelling card provides:

- A concise summary of the **model's purpose** and conceptual background.
- **Input data requirements**, including LULC layers, climate variables, or socio-economic datasets.
- An outline of the **methodological basis** (e.g., transition matrices, cellular automata, machine learning, biophysical processes).
- Typical **application domains**, such as land-use forecasting, urban expansion modelling, hydrological assessment, forest dynamics, or biodiversity analysis.
- **Strengths and limitations**, guiding users toward appropriate model selection.
- Practical information on **software availability**, documentation, and licensing.
- A link to relevant **success stories** that illustrate how the model has been applied in real-world contexts.

This standardised template makes tools comparable across modelling domains and supports consistent analysis workflows across project partners.

The modelling cards provide several key benefits:

- **Accessibility:** They help non-experts navigate modelling options without needing deep technical knowledge.
- **Capacity building:** They introduce modelling concepts to new users, making advanced tools more approachable.
- **Transparency:** Clear summaries of inputs and assumptions support reproducibility and informed decision-making.
- **Efficiency:** Users can rapidly evaluate which tools align with their data availability, objectives, and case-study needs.
- **Integration:** By clarifying each model's capabilities, the cards guide model selection for scenario development and integrated land-system assessments.

The **modelling cards stand out as practical, user-oriented product**, enabling wider uptake and more effective application of spatial models throughout the Europe-LAND project and beyond.

Telecoupling and other couplings in Europe-LAND project

By Danka Moravčíková and project team (Slovak University of Agriculture in Nitra, Slovakia)

Why coupling?

Telecoupling frameworks were inspired by theoretical and practical foundation for research on Coupled Human and Natural Systems (CHANS) developed by Liu et al. in 2007. The concept of telecoupling (developed later in 2013) expanded the scope of the analysis and allowed links to traditions in the natural sciences and social sciences that emphasized actions at a distance across the world.

To capture interactions within and among adjacent and distant CHANS, a new integrated framework of metacoupling (human-nature interactions within as well as between adjacent and distant systems) has been developed by the same author in 2017.

The framework of telecoupled human and natural systems was developed to facilitate primarily quantitative analyses of such linkages and telecoupling was also designated as a research priority by the Global Land Programme and featured in important reports such as the Global Assessment of Biodiversity and Ecosystem Assessment (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) and Global Environment Outlook.
In Europe-LAND, we perceived the telecoupling approach as an appropriate paradigm for examining human–environment interactions in contemporary societies and communities.

Our Europe-LAND telecoupling framework offers an innovative tool for

comprehending land-use change as one of biodiversity challenges by integrating quantitative and qualitative research approaches and adopting an agent-oriented approach. It addresses significant deficiencies in existing climate and biodiversity policy formulation while thoroughly comprehending socio-spatial systems and interrelations.

The framework integrates system, flow, and agent views to examine the effects of governance, socio-economic systems, and policy interventions at various scales, providing a comprehensive approach to sustainable land management.

What was done?

The Deliverable 5.3 has proven crucial in integrating existing data and datasets from other WPs and enhancing methodological principles applicable across many socio-spatial situations. The amalgamation of quantitative and qualitative variables facilitates a comprehensive understanding of coupling interactions, considering environmental, socio-cultural, and economic issues that affect land-use choices.

Based on discussions within our WP5 team, we have revised and clarified the original proposal drafted in D5.2 in line with the umbrella concept of metacoupling. The regional and local levels are levels of our case studies, and the environment in which they operate, and the contextual covering level is understood as the EU level.

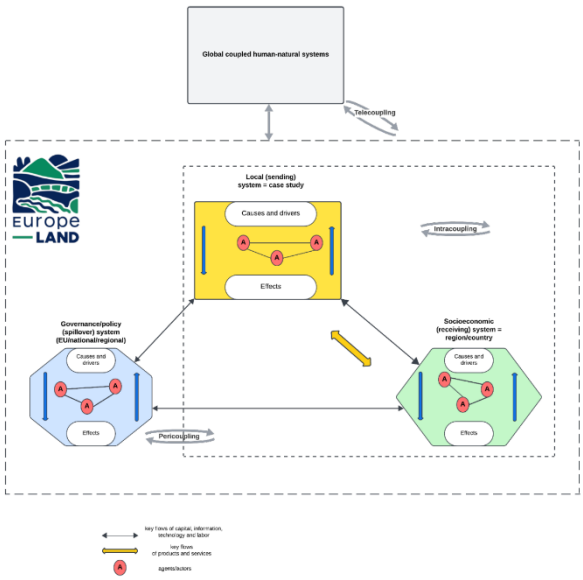

Figure 3: Europe-LAND's revised coupling framework.

We defined the Europe-LAND case studies as the local CHANS that constitute local agents, and as the focal system of our analyses, they can be part of a pericoupled or telecoupled system. Our case studies interact with other systems through flows of capital, technology, labour, information, and products and services. Local CHANS are always a part of a larger system (pericoupled and/or telecoupled system).

The SUA team (based on contributions of case studies leaders) has generated distinct datasets for each of Europe-LAND case studies which serve as the basis for testing and improving the framework's applicability and robustness. **These are available openly via the Europe-LAND Zenodo account.**

What is next?

The new Europe-LAND framework will be reflected in further research undertaken , e.g. in the frame of a comparative study on land-use causes

and transitions via modelling tasks and comparison of eight Europe-LAND case studies, and the guiding framework will be considered also in modelling future land-use and land-cover changes related to the modelling tasks within Europe-LAND.

The Power of Partner Collaboration

By Martin Rudbeck Jepsen (University of Copenhagen (UCPH), Denmark)

Two team members from Poland's Bialystok University of Technology (BUT), Andrzej Kamocki and Alicja Antochów are visiting the Geography team at University of Copenhagen from 17 November to 19 December to work on a common study between Leibniz Institute of Agricultural Development in Transition Economies (IAMO), UCPH, BUT, and Humboldt University of Berlin in Europe-LAND's WP2.

The study focuses on carbon emissions from drained peatlands in Europe, utilizing the Eurpean peatland map and mission factor database compiled by BUT, and the IACS database compiled by IAMO/UCPH to estimate where and how large emissions can be attributed to cultivation of drained peatlands.

Photo 1: Andrzej Kamocki and Alicja Antochów at the University of Copenhagen.

Updates from Our Sister Projects

By MOSAIC and PlusCHANGE project teams

MOSAIC

Private land conservation is a voluntary effort to protect and restore biodiversity on private land complements legal nature conservation measures, such as national parks or nature reserves, by closing spatial and ecological gaps. The latest MOSAIC booklet provides a roadmap for transforming private land conservation into a leading, respected and powerful force in biodiversity conservation.

Plus-CHANGE

Check out PLUS Change's latest deliverable, D4.3 – Report on the impacts of behavior changes on biodiversity, climate and well-being indicators, where we explore how behavioral changes in food provisioning, in in particular shifts toward local food systems, alter land use patterns and their implications for sustainability.

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Upcoming Events

April 2026 (Online) Save the Date for our 3rd Science Policy Dialogue

10-17 August, 2026 (Tartu, Estonia) ACT! Summer School Series: Observation, Modelling and Acting for Sustainable Land-Use in the Context of Climate Change and Biodiversity. *Registration opening soon!*

Thank you for reading. We hope that you have enjoyed this latest edition of the Europe-LAND newsletter and that you will stay in touch with us. Please follow us on LinkedIn, subscribe to our newsletter, and visit our Zenodo repository.

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