



Transformation for sustainable nutrient supply and management

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## trans4num Newsletter #5

In **trans4num**, we are working across Europe and beyond to develop practical, farmer-friendly Nature-Based Solutions (NBS) that improve soil health, nutrient management, and resilience to climate change. Our research is happening across multiple countries, with farmers at the center of innovation. Here's a look at what's happening and how you can get involved!

### trans4num scientific work

#### *Research, Modelling and Innovation*

In trans4num, science is the foundation of our mission to transform nutrient management in intensive agriculture. Through cutting-edge research, modelling, and decision-support tools, our interdisciplinary teams are developing Nature-Based Solutions (NBS) that help farmers, policymakers, and researchers optimize resources while protecting the environment.

At the core of trans4num's research is **Work Package 1 (WP1)**, which lays the theoretical groundwork for integrating **NBS into real-world agricultural systems**. Our interdisciplinary team is working on:

- **Literature reviews** mapping global best practices in nutrient management.
- **Transformation pathways** to guide farmers and policymakers toward **circular agriculture**.
- **Comparative analysis of nutrient cycles** in European and Chinese farming systems.

***Why it matters:*** This research helps bridge **scientific knowledge with practical solutions**, ensuring that policy and on-farm practices align for long-term sustainability.

One of the most exciting developments in **Work Package 3 (WP3)** is the creation of a **Decision Support System (DSS)**, a digital tool designed to **optimize nutrient use** at farm, regional, and watershed levels.

The DSS is currently being **tested in Denmark**, integrating:

- ✓ **Soil analysis data** to recommend optimal fertilizer application.
- ✓ **Remote sensing & GIS mapping** for precision nutrient management.
- ✓ **Economic modeling** to evaluate the financial impact of NBS adoption.

***Next steps:*** Expanding DSS testing to **Hungary, the Netherlands, and the UK**, with workshops planned to train farmers and advisors on its use.

How do farmers make decisions about nutrient management?

What incentives drive NBS adoption? In **Work Package 4 (WP4)**, our team is answering these questions through **Agent-Based Modeling (ABM)** and **Biomass Flow Modeling**.

**Key findings so far:**

- **ABM simulations** show that farmers are more likely to adopt NBS when given **financial incentives + advisory support**.
- **Food system modeling** reveals that integrating crop-livestock systems can **reduce synthetic fertilizer dependency by up to 30%**.

***Why it matters:*** These models provide **data-driven insights** for policymakers, helping them design **effective incentives & regulations** for sustainable farming.

A key aspect of trans4num's work is the **collaboration between European and Chinese researchers**. Our partnership with **HAAS, CAU, and TU** is generating valuable cross-regional insights into:

- **Nutrient efficiency in Chinese rice-aquaculture systems** vs. European arable farming.
- **Comparing policy approaches** to incentivizing NBS adoption.
- **Exploring joint modeling approaches** for nutrient cycles across different landscapes.

## trans4num field work

### *Testing Nature-based solutions on the ground*

In **trans4num**, scientific research **comes to life in the field**. Across our **four European and three Chinese sites**, we are working closely with **farmers, advisors, and researchers** to test **Nature-Based Solutions (NBS)** in real-world agricultural settings.

**What does this mean?** It's about turning **theory into practice**—measuring soil health, refining nutrient cycles, and finding the most effective ways to improve **farm sustainability and productivity**.

Field trials across Europe & China

DENMARK

Northern Jutland, Limfjord catchment

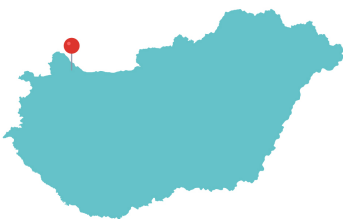


Biorefinery-Integrated Crop Rotation



HUNGARY

Szigetkoz Region



Data-Driven Sustainable Farming



NETHERLANDS

1. Kollumerwaard  
2. Ebelsheerd



Organic Fertiliser Innovation



UNITED KINGDOM

1. Harpenden  
2. Brooms Barn  
3. North Wyke



Circular Nutrient Innovation



Chongqing  
Southwest China  
organic fertiliser amendment

Organic Fertilizer Integration



Henan Province  
North China Plain  
straw treatment

Mushroom-Based Nutrient Recycling



Northeast China  
soybean

Rotational Soil Restoration



In trans4num, **research and fieldwork mean nothing without communication**. That's why we are dedicated to making our findings **accessible, engaging, and impactful** for farmers, policymakers, and researchers alike.

**How do we share our work?** Through **our website, social media channels and open access platforms**, ensuring that Nature-Based Solutions reach the people who need them most.

### Find & Follow trans4num on

- Website - [Transformation for sustainable nutrient supply and management](#)
- LinkedIn - [Our main social media channel](#)
- BlueSky - [New-comers to the platform - follow us!](#)
- YouTube - [Webinars and many more](#)
- Zenodo - [Our open access results can be found here](#)
- EU-Farmbook - [trans4num project page](#)
- Nature Based Solutions platform - [trans4num project page](#)

## trans4num events

### *Sharing NBS knowledge*

The **trans4num INSPIRE Hackathon 2024** brought together **67 participants from Europe and China** to tackle real-world challenges in sustainable nutrient management. Competing across five thematic areas, **interdisciplinary teams** co-developed solutions ranging from **AI-powered crop monitoring to agent-based modeling of Nature-Based Solutions (NBS) adoption**.

🏆 Fundamentally different case studies of nature-based solutions - how can they be integrated into a common agent-based modelling approach? ([Report](#) & [video](#))

🥈 AI-Enhanced Geospatial Analysis for Rural Development Challenge ([Report](#) & [video](#))

🥉 Development of spectacular experimental and demonstration tools and content to establish and spread the use of NBS ([Report](#) & [video](#))

The hackathon proved a powerful platform for innovation and international collaboration, setting the stage for future research, tools, and exchange. Explore all the challenges and proposed solutions on the dedicated page: <https://trans4num.eu/en/hackathon-2024/>



## trans4num INSPIRE Hackathon Results

Check out the results of the trans4num INSPIRE Hackathon!

SCAN ME



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## trans4num network

In this new section, we **highlight projects, platforms, and initiatives** connected to Nature-Based Solutions (NBS) from across Europe and beyond. Our aim is to showcase synergies, spark collaboration, and amplify shared impact.



Learn more

Funded by Horizon Europe, ECONUTRI develops innovative NBS to reduce nutrient losses and emissions from agriculture. With 30 partners across Europe and China, the project promotes precision tools and stakeholder engagement to support climate-resilient farming.

# trans4num library

This library presents all the documented results of the trans4num project at one place.



Deliverables



Videos



Publications



Practice  
abstracts



Communication  
materials



Online  
inventory

The project library offers access to a variety of materials that we invite you to discover. As the project progresses, we will add more information and resources so make sure to check back...

[Go to the library](#)

In **trans4num**, we believe that **real change happens through collaboration**. Whether you are a **farmer, researcher, policymaker, or sustainability advocate**, your engagement helps drive the transformation toward **more resilient and nature-friendly farming systems**.

## How can you support trans4num?

**Share this newsletter** with colleagues, farmers, and networks interested in **sustainable agriculture & nutrient management**.

**Follow us on LinkedIn** to stay updated on the latest research, fieldwork, and farmer-focused events.

**Engage with us!** Comment on our posts, share your insights, and let us know how **Nature-Based Solutions** are working in your region.

**Join our upcoming events** — whether it's a webinar, a workshop, or a field demonstration, we'd love to see you there!





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Follow us on social media!



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