



Newsletter #6 - June 2023

Optimising bio-based fertilisers in agriculture –  
Providing a knowledge basis for new policies

**Get to know us!**

LEX4BIO aims to identify and quantify nutrient-rich side-streams and evaluates technologies for producing safe, efficient and regionally targeted bio-based fertilisers in the EU. LEX4BIO will provide policy recommendations for achieving a higher use efficiency of bio-based fertilisers and socioeconomic improvements for the rural population.

[Click here to discover our project objectives](#)



### **Word from Kari Ylivainio, LEX4BIO coordinator**

Last year of the project has started and results from laboratory, greenhouse and field scale are currently being evaluated. Furthermore, information about potential drivers and barriers for replacing conventional mineral fertilizers with bio-based fertilizers has been acquired with questionnaires during the recent months. Evaluating all these data will provide us the tools to better utilize BBFs from environmental and economical point of view. This will also support the industry to invest in the most promising BBFs, targeted to various climatic and soil conditions across the EU.

Interesting results of LEX4BIO will be presented for the various stakeholders during the last year of the project. By following us on social media, including LEX4BIO's webpage ([www.lex4bio.eu](http://www.lex4bio.eu)), you will stay up to date with our on-going and future activities.

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## **LEX4BIO FIELD DAYS**

With weather warming up and days growing longer, LEX4BIO partners started organizing planned field days. The idea behind these events is to demonstrate to interested stakeholders the potential of bio-based fertilizers for agriculture. Two field days were conducted in May.

### **Julius Kühn Institut Field Day, Germany**



On May 12, LEX4BIO partner Julius Kühn Institut hosted a field day in Germany dedicated to studying the potential of biobased fertilizers in agriculture. A fertilizer trial where different organic fertilizers were tested for their agronomic performance was presented. Local organic fertilizers, such as composts (biowaste, green waste, sewage sludge), digestates (mixed and from pig manure), sewage sludge and poultry dung were tested in comparison to straw as a control and mineral fertilizer control.

In another trial, different fertilizers from wastewater treatment plants (three different struvites –  $\text{MgNH}_4\text{PO}_4 \times 6\text{H}_2\text{O}$ ) were tested in comparison to mineral phosphorus (P) fertilization and plots without P application, or without P and magnesium (Mg) application to differentiate between P or Mg effects on crops.

**Follow the link to discover more about the first results <https://lex4bio.eu/2023/06/06/potential-of-biobased-fertilizers-bbfs-in-agriculture/>**

## **Field Visit hosted by Research Institute of Organic Agriculture (FiBL), Wallbach, Switzerland**

The Research Institute of Organic Agriculture (FiBL) organized a field visit to their long-term recycled fertilizer field trial in Wallbach, Switzerland. It is part of WP4 validation trials in LEX4BIO project and took place on May 23, 2023. The event was attended by 15 participants, representatives of federal offices (Swiss Federal Office of Energy, Swiss Federal Office for the Environment), private companies involved in fertilizer production, transportation and application, farmers (Association of Swiss Organic Farmers), (applied) universities and agricultural research institutes.



After an initial inspection of the trial, to compare the performance of the different recycled fertilizer treatments, the applied recycled fertilisers and their composition were presented in greater detail and their application methods were demonstrated.

Read more about the event [here](#)

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## Work Progress



# Get Involved!



[Do LEX4BIO Survey](#)

As part of WP7 activities, Lex4BIO conducted a public survey in order to study the crucial **drivers** and **barriers** regarding the replacement of conventional fertilizers by biobased fertilizers (BBFs). The questionnaire was dedicated to four groups of main stakeholders in the value chain – farmers, consumers, fertilizer producers and companies from the food and beverage sector. It was accessible from the project's website as the survey for farmers was available in 7 languages, while the one for consumers, fertilizer producers (or future producers) and companies from the food and beverage industry - in 3 languages.

Check out LEX4BIO website to discover the findings of the survey through the Report on drivers and barriers regarding the replacement of conventional fertilisers by BBFs for all stakeholders – an official **deliverable**, which will be published soon.

## 7<sup>th</sup> Consortium Meeting

**Lex4bio Project 7th consortium meeting** took place online, 14 months before the project ends in May 2024. Partners are happy with the achieved results in studying the **agronomic N and P efficiency** of BBFs and the potential of the latter for replacing mineral P **fertilizers** in Europe.

A lot has been achieved with regard to risk assessment and ecotoxicological study, lifecycle assessment and social acceptance of biobased fertilizers. At this stage of work, the discussion was naturally focused mostly on data analysis and planning of upcoming dissemination and communication activities. Many scientific publications are currently in the making, along with exploring opportunities for joint paper production with some of Lex4Bio related projects.

It will be a busy period for Lex4Bio partners in their preparation for the second reporting period, followed by our next physical meeting in Seville this fall.

Follow our LinkedIn page to stay informed about the events we are planning and the deliverables we are going to publish soon.



The poster features the Lex4Bio logo at the top left, which consists of a circular emblem with a sunburst at the top, two leaves at the bottom, and the text 'LEX4BIO' in the center. To the right of the logo is a photograph of hands holding a small green plant seedling. Below the logo, the text '7TH PROJECT MEETING' is displayed in large, bold, green letters. To the right of this text is a screenshot of a video conference grid showing several participants. Below the meeting title, the text 'We talk:' is followed by a bulleted list of topics. At the bottom left, the website 'www.Lex4Bio.eu' is listed next to a smaller version of the Lex4Bio logo. At the bottom right, there is a photograph of a field of green plants with a play button icon overlaid on it.

**7TH PROJECT MEETING**

**We talk:**

- data analysis
- dissemination activities planning
- collaboration opportunities
- scientific publications
- results

[www.Lex4Bio.eu](http://www.Lex4Bio.eu)

## LEX4BIO e-booklet

We are happy to share that we produced an electronic booklet with two signature for LEX4BIO scientific publications, constituting key project outputs. They evaluate the potential for replacing mineral fertilizers with bio-based fertilizers, relying on renewable phosphorus and nitrogen sources, such as nutrient-rich side-streams.

[Click here to download the e-booklet](#)

**E-Booklet**

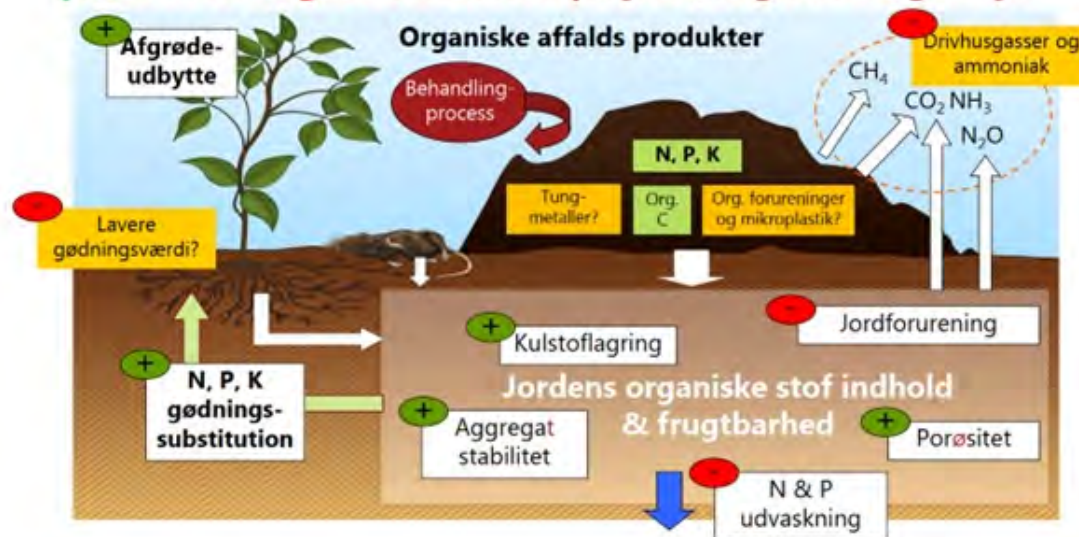


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## **Conference Presentations**

UCPH presenting LEX4BIO outputs at the Danish Plant Congress  
2023

## Bio-baserede gødninger kan potentielt have både positive & negative effekter på jord, afgrøder og miljø



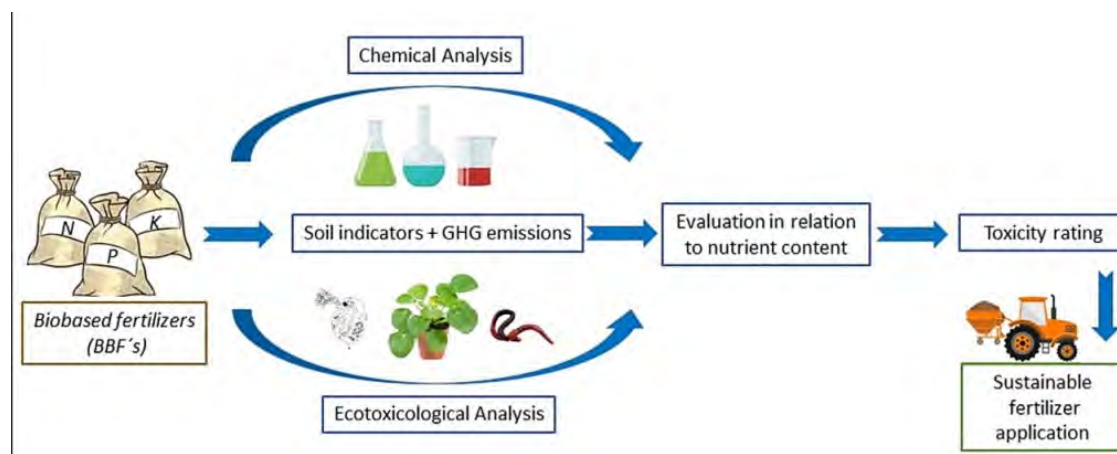
The leader of LEX4BIO research activities on the agronomic efficiency of bio-based fertilisers as N source for crops, Lars Jensen, UCPH, was invited to the Danish Plant Congress 2023 ("Plantekongressen 2023"), held 11 – 12 January in Herning, Denmark to talk about bio-based fertilisers, new EU Fertilizing Products Regulation (FPR), and results on potential ammonia loss and fertiliser value from such bio-based fertilisers. The large 2-day annual event welcomed more than 2000 participants from the areas of Denmark, Sweden and Norway, to include farmers, advisors, researchers, public authorities and students.

[Read more](#)

## Scientific publications by Lex4Bio

Ecotoxicological methods to evaluate the toxicity of bio-based fertilizer application to agricultural soils – A review

Authors: Sophia Albert, Elke Bloem, Julius Kühn-Institut (JKI), Federal Research Centre for Cultivated Plants, Institute for Crop and Soil Sciences, Germany



*Review Highlights:*

- Bio-based fertilizers (BBFs) can contain a multitude of contaminants.
- Test batteries of ecotoxicological tests are suitable for the evaluation of BBFs.
- A combined approach of chemical & ecotoxicological evaluation and soil indicators is recommended.
- Ecotoxicity rating helps to advance a sustainable BBF production and to implement circular economy.

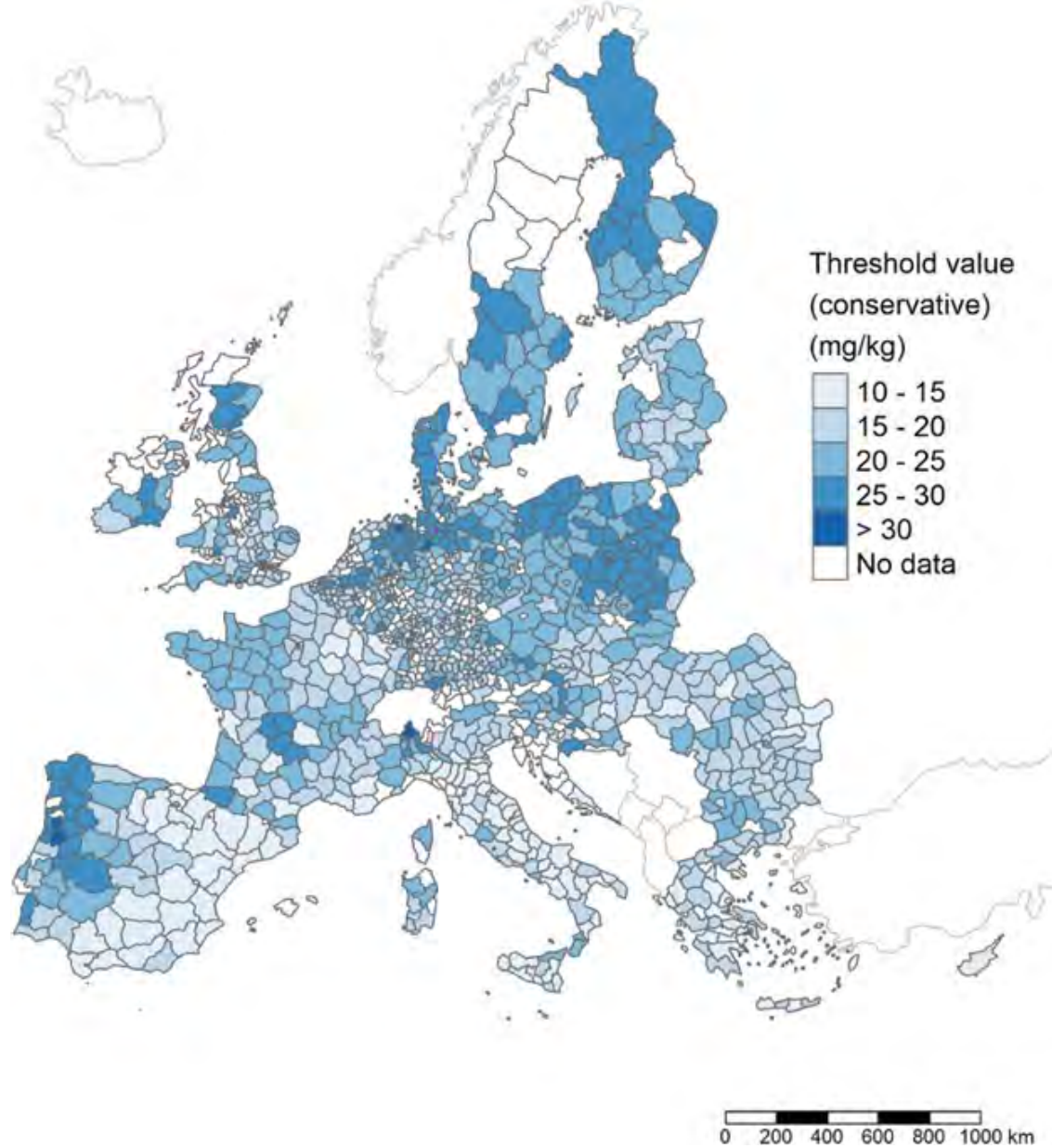
Read the full paper [here](#).

## Assessing the phosphorus demand in European agricultural soils based on the Olsen method

This paper, available in [LEX4BIO e-booklet](#) as well, came out as a result of the work of a joint team of LEX4BIO soil scientists and discusses that a more precise allocation of Phosphorus is possible by identifying sites where agricultural production can be increased with phosphorus fertilizers, and also that most of the European demand for the mineral could be covered by recycling P from manure, wastewater, and municipal solid waste.

Europe is highly dependent on imported P. Circular economy strategies and better allocation of the resource is thus critical for ensuring agriculture sustainability.





The University of Seville also featured the work of Professor Antonio Delgado and team on their website.

*"We have also verified that most of the European demand for phosphorus could be covered by #recycling this element from manure, wastewater and urban solid waste"*  
Professor Antonio Delgado

[Read the paper](#), recently published in the prestigious Journal of Cleaner Production.

## Lex4Bio in the spotlight

TV interview

Soil Scientist Elke Bloem, Julius Kühn Institut, Germany about bio-based fertilizers and how to fertilize a private garden best

# TV INTERVIEW

GERMAN  
ZDF  
WISO



## BIO-BASED FERTILIZERS AND HOW TO FERTILIZE A PRIVATE GARDEN BEST

The analysis of bio-based fertilizers of different origin, and the processing for different contaminations performed within LEX4BIO caught the attention of a TV team from the program WISO of the German ZDF. They were interested to learn which bio-based fertilizers were advisable to be used in private gardening and what were the advantages in relation to mineral fertilizers.

The interview focused on what contaminations can be expected in the different fertilizers that are available on the market for consumers. From the very start a point was made that “bio-based” is not an equivalent to free of contamination but is referring to organic secondary raw materials that can be used to produce fertilizers, such as plant or food residues, products derived from animals, sewage sludge, bio-wastes or organic wastes of industrial origin. Depending on the origin of the material, different contaminants can be expected in bio-based fertilizers, and so as in mineral fertilizers. Quite often, the description of input materials on products is rather vague and it is not clear if animal-derived products are derived from conventionally grown animals or from organic farming.

Read the [full story](#) and watch the [interview](#).

LEX4BIO featured on **LUKE's website article entitled** „Luke in the forefront accelerating efficient and safe use of recycled fertilisers in Europe“.



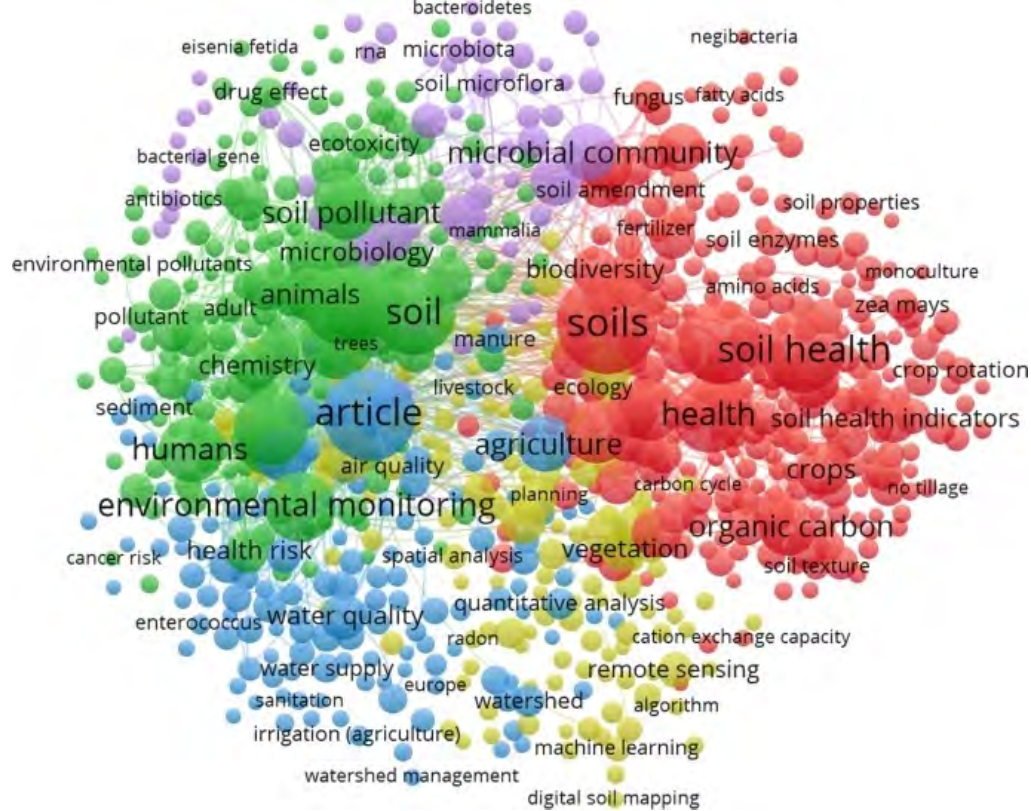
*"Manure, sludge and many other side streams do contain nutrients, but can they replace imported fossil fertilisers in Europe? This is what European researchers are finding out in a research project of 20 partners, led by the Natural Resources Institute Finland (Luke) from its research centre surrounded by experimental fields"*

Find out more insights about accelerating efficient and safe use of recycled fertilisers in Europe in the [article](#) of the Natural Resources Institute Finland (Luke) / Luonnonvarakeskus (Luke)

## **What's more...**

### **Opportunities and challenges of bio-based fertilizers utilization for improving soil health**

As part of her PhD studies at the Fesetics Doctoral School, University of Agriculture and Life Sciences, Hungary, Ari Kurniawati, *et al.* explores the potential of bio-based fertilizers (BBFs) to facilitate the management of bio-waste and improve soil health conditions. The work takes a look at the opportunities for bio-based fertilizer utilization to sustain plant productivity but also investigates the present challenges before BBFs for being widely accepted as alternative sources to support the circular economy paradigm.



*Soil health indicator network visualization. Legend: Color, represents big cluster of disciplines in the research field; nodes, represents keywords (the size of node represents the keywords frequency); links, represent relations between keywords (keywords mentioned together in published articles); colors, represent the temporal orders of appearance of keywords; link thickness, represents the words strength. Source: Researcher, derived from VOSviewer*

The review acknowledging LEX4BIO is published in the prominent Organic Agriculture Journal of the International Society of Organic Agriculture Research.

Download the research paper: <https://doi.org/10.1007/s13165-023-00432-7>

## In the Policy Making

On the invitation of the European Sustainable Phosphorus Platform, LEX4BIO joined nutrient recycling researches in coining a definition for biobased fertilizers.

Gaining a common understanding of the meaning of “Bio-Based” in the context of fertilizers and plant nutrients seems to be important for a future European Standard on defining and measuring “Bio-Based nutrient” content to support environmental claims and #EU Fertilising Products #Regulation certification.

Following the European Commission's communication on the use of the term “Bio-Based Plastic”, the ESPP European Sustainable Phosphorus Platform notes that the term Bio-Based Fertiliser is already in use in a number of R&D activities and sees a need for a similar discussion regarding “nutrients of solely biological origin” in the EU #Fertilising Products Regulation.

**Check out the developed consensus Position Paper on the definitions of “biobased fertiliser” or “bio-based nutrient”:**

<https://www.phosphorusplatform.eu/images/download/Proposed%20ESPP%20position%20Bio->

## Networking as key to maximising Lex4Bio impact

Since the beginning of LEX4BIO project, networking activities have been undertaken to ensure cross-cooperation with relevant projects and clusters at EU scale. We are glad to have had the chance to participate in December 2022 in a second cross-seminar with FERTIMANURE, discussing the bio-based fertilizers of the future. Another initiative LEX4BIO joined as a sub-group leader was the Nutrient Recycling Community established by Biorefine Cluster Europe and Fertiamnure project.

## NEXTGEN BIO-BASED FERTILIZERS – from components to products

### Webinar

LEX4BIO's Coordinator Kari Ylivainio was invited as guest speaker to a webinar organized by SUSFERT - SUSTainable FERTilisers project on next generation bio-based fertilizers, which took place on May 23, 2023.

**SUSFERT** **WEBINAR**  
Meet the speakers

**NEXTGEN BIO-BASED FERTILISERS**  
"from components to products"

**Kari YLIVAINIO, Ph.D.**  
Scientific Coordinator  
Lex4Bio

**Components for bio-based  
fertilisers in the EU**

**Tuesday, 23 May, 2023**  
**10:10am - 11:50am CEST**

**JOIN THE CONVERSATION**  
*click the link in message*

Kari joined the discussion to share insights derived from LEX4BIO about some of the most promising components and raw materials that are currently used in existing fertilisers and which appear to be having highest potential to contribute to sustainable bio-based fertilisers and a circular nutrient economy.

He noted the importance of farmers testing their fields for phosphorus so that the mineral is not needlessly applied.

*"We estimated that 72 percent of European farmland does not need phosphorus fertilisation at all. In addition, most of the need for phosphorus fertilisation can be replaced*

with recycled fertilisers. However, we will further refine this estimate as the project progresses."

The webinar enjoyed a great interest and was attended by more than 60 people.

## Where to find us?

### Wageningen Soil Conference 2023

LEX4BIO partner Dr. Boris Jansen, University of Amsterdam will be giving a presentation about LEX4BIO at the fifth edition of the Wageningen Soil Conference in The Netherlands, taking place from August 28 – September 1, 2023.



The conference is interactive in nature, comprising conference sessions as well as workshops on various soil-related topics. This year motto is **working together on solutions for a sustainable world**.

The topics that will be covered during the four conference days are listed below:

- Soils for Society
- Advances in Measuring and Modelling Soil Processes
- Mapping and Evaluating Soil Functions across Scales
- Soils for Nature-Based Solutions

More information about the Conference events [here](#).

Registration closes July 3 - [https://event.wur.nl/wsc\\_2023/subscribe](https://event.wur.nl/wsc_2023/subscribe)

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**LEX4BIO is online:** From its outset, LEX4BIO project has been benefiting from a large on-line visibility. The website dedicated to the project was launched in November 2019 to provide publicly accessible information on project's goals and objectives, work activities progress and results. Over the entire duration of LEX4BIO, you will be able to download directly from our web platform, **all public [deliverables and outcomes](#) LEX4BIO accomplished.**



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