



# CONTINUOUSLY UPDATED RISK MANAGEMENT PLAN

Deliverable 9.4 – D44 – WP9

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**RESPONSIBLE PARTNER: LUKE**

**AUTHOR: KARI YLIVAINIO**





## OPTIMISING BIO-BASED FERTILISERS IN AGRICULTURE – PROVIDING A KNOWLEDGE BASIS FOR NEW POLICIES

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### Deliverable 9.4 – D44 Work-package n°9

Nature of the deliverable		
R	Report	X
Dec	Websites, patents, filling etc.	
Dem	Demonstrator	
O	Other	

Dissemination Level		
PU	Public	X
CO	Confidential, only for members of the consortium (including the Commission Services)	



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LEX4BIO aims to reduce the dependence upon mineral/fossil fertilisers, benefiting the environment and the EU's economy. The project will focus on collecting and processing regional nutrient stock, flow, surplus and deficiency data, and reviewing and assessing the required technological solutions. Furthermore, socioeconomic benefits and limitations to increase substitution of mineral fertiliser for BBFs will be analysed. A key result of LEX4BIO will be a universal, science-based toolkit for optimising the use of BBFs in agriculture and to assess their environmental impact in terms of non-renewable energy use, greenhouse gas emissions and other LCA impact categories. LEX4BIO provides for the first-time connection between production technologies of BBFs and regional requirements for the safe use of BBFs.

The project runs from June 2019 to May 2024. It involves 20 partners and is coordinated by Luke (Luonnonvarakeskus - Natural Resources Institute Finland).

More information on the project can be found at: <http://www.lex4bio.eu>



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## D9.4: CONTINUOUSLY UPDATED RISK

### MANAGEMENT PLAN

#### 1. INTRODUCTION

The objective of risk management was to make all known project risks explicit before they become problems and lead to delays. Risk management was primarily placed under the responsibility of the WP leaders and coordinated by the coordinator. Risk information was translated into decisions and mitigating actions (both present and future). During the Executive Board meetings potential risks were discussed and solutions to overcome these risks were determined. Potential risks included technical, operational, but also economic risks. During the project lifetime critical risks were reviewed and updated if needed.

#### 2. IDENTIFIED CRITICAL RISKS

During the preparation of project proposal potential risks were identified based on the expertise of the consortium. Potential risks for each WPs, likelihood of the risks as well as proposed risk-mitigation procedures were determined. Table 1 shows the critical risks identified during the proposal preparation phase.

Table 1. Identified critical risks during the proposal preparation phase.

<b>Description of risk – likelihood</b>	<b>WPs</b>	<b>Proposed risk-mitigation procedures</b>
Inadequate resources - <i>medium</i>	all	While efforts have been made to correctly budget the project, unexpected difficulties might arise. They have to be identified as quickly as possible through frequent interactions as described above. The EB will propose solutions to emerging resource challenges, if necessary in consultation with the EC. All partners are prepared to temporarily commit more resources if needed.
Little commitment and engagement of relevant stakeholder groups - <i>medium</i>	1,2,3,4,5	Experts within the consortium have an extensive network of personal contacts they can put to use and organisations act as multipliers. Additional communication channels can be employed if necessary.
Data are inaccessible/poor quality or not sufficient data can be collected – <i>medium</i>	1,2,3,4,5,6,7	EUROSTAT/OECD data on NRSS/BBF are publicly available online. For soils LUCAS datasets from previous soil sampling campaign are already available and can be utilised. For satellite data task lead partner (FS) has access to and will acquire additional data from proprietary satellites. Between partners mutual exchange of information indispensable (face-to-face meetings, on-line meetings) and intensive clustering with other projects and platforms to obtain as much data as possible



Ensure confidentiality of data/ results - <i>low</i>	1,2,3,4,5,6,7	SOPs for dissemination, training of partners and DEC manual at the beginning of the project. Periodically updated DMP will also include details on confidentiality of data.
Sufficient amounts of BBFs for field experiments not available - <i>low</i>	2,3,4	Field experiments will be conducted only with those BBFs for which sufficient amounts of BBFs are available and if possible, multiple sources/suppliers can will be identified a priori, whereas novel – pilot scale – BBFs are tested primarily in pot experiments.
Extreme weather conditions cause crop failure - <i>medium/high</i>	2,3,4,5	Pot trials will be conducted either in growth chambers or in greenhouses to avoid extreme heat (Spain) or heavy rainfall. Field trials experience natural weather conditions and risks failure due to extreme weather; however, field trials are spread over different countries and climates to minimise such risks. LEX4BIO utilises also other field trials conducted by other projects as well as past trials to ensure data collection.
Unable to conduct laboratory analyses due to malfunction of equipment/reagents unavailable/ state-of -the art methods may have sudden drawbacks - <i>medium</i>	2,3,4,5	Soil and plant samples can be stored and analysed later. If results are needed fast, commercial laboratories, with known quality assurance, can be utilised for many analyses; alternatively, several partners in the consortium have similar equipment and can do analyses. All partners will be required to have back-up plans in case of these events.
Results of laboratory analyses are not reliable - <i>low/medium</i>	2,3,4,5	Project partners have a long history in conducting the full range of analyses planned. The same in-house reference sample is used in pot/field trial plant nutrient analyses among all partners and sample exchange between partners (e.g. DGT analyses) improves results reliability. If preliminary assay tests for BBFs are negative or not satisfactory, the range of assays will be expanded accordingly to the difficult types of BBF
Conversion/relationship between soil testing methods soil type/region/laboratory specific - <i>medium</i>	2,3,4,5	Additional (detailed) soil tests conducted. Grouping soil samples (e.g. by soil texture, pH) provides more accurate conversion.
Season dependent analyses - <i>low</i>	3,4,5	Field trials and outdoor pot trials are dependent on the growing season; careful planning will be undertaken to maximise utilisation of the growth period and ensure high-quality results. Some toxicity tests have a seasonality, e.g. earthworms grow very slowly in winter - however, this risk can be accounted for by smart planning.
Simulation model not applicable to all experimental datasets of the project - <i>medium</i>	4	Recalibration of soil or crop modules will be done on additional data from the country/region in question - local partners ensure data availability for this.



Difficulties in finding collaborative farms in EU - <i>medium</i>	5	If collaborative farms are not found, studies can be conducted in partner Universities research farms.
BBF technology suppliers cannot or refuse to supply plausible process data - <i>medium</i>	6	Data from comparable BBF production processes are used for the LCA evaluation; alternatively, system expansion may be done/restructured to take account of the missing data.
Anonymity of personal data broken - <i>low</i>	7	Questionnaires will not allow identification of participants.
Transport costs and times become outdated due to changes in road infrastructure and traffic taxes - <i>low</i>	7	Updated information on transport times will be obtained from google maps. A sensitivity analysis will be performed on the unit cost of transport to include the effect of possible effect of new road transport taxes.
Possible lockdowns/restriction measures caused by COVID-related pandemic - <i>medium/high</i>	all	All the possibly measures for securing human health, e.g. working remotely. Securing availability of BBFs in good advance prior to start of the laboratory/greenhouse/field trials. Analysing the harvested plant materials/soils/BBFs by other partners if applicable. If total lockdown prohibits conducting field trials, greenhouse trials will be conducted instead by the partner having facilities (without lockdown) for conducting these trials.

Since the start of LEX4BIO (1<sup>st</sup> of June 2019) main obstacle for reaching the targets set in the DoA was outbreak of COVID-19 in Europe in February 2020. The overall objective of LEX4BIO is to realise the potential of bio-based fertilisers (BBFs) and decrease European dependency on finite and imported, apatite-based phosphorus (P) fertilisers and energy-intensive mineral nitrogen (N) fertiliser. For reaching these objectives, selection of available BBFs in the EU and their transportation to the field sites across the EU as well as finally conducting field test, was endangered by the lock-downs caused by COVID-19 among several partner institutes. This was not anticipated during the proposal preparation and it was added on the list of critical risks (Table 1). Originally project duration was four years, but due to COVID-19, project duration was extended to five years. This was mandatory as we could not start the planned field trials in growing season 2020 but forced to postpone them for one year.

### 3. MATERIALIZED CRITICAL RISKS

During the project lifetime (until M48) only few critical risks were materialized. Following is the list of identified critical risks and their materialization.

***Inadequate resources:*** Although project duration was extended to five years, partners had enough resources to conduct all the dedicated activities





Little commitment and engagement of relevant stakeholder groups: Commitment of all stakeholder groups were adequate. Partners organized National Dissemination Fora (NDF) and stakeholders engagements during these events was high.

Data are inaccessible/poor quality or not sufficient data can be collected: During the second reporting period this critical risk materialized as not enough data for national legislation (Task 1.2) or national fertilisation statistics (Task 1.3) was provided by the partners. These risks were solved by leaving out those countries which did not provide any input until a certain deadline (Task 1.2, consulting project officer) or publicly available on-line data (Eurostat, FAO) was used to cover information needs (Task 1.3).

Ensure confidentiality of data: Confidentiality of the data was ensured throughout the project duration.

Sufficient amounts of BBFs for field experiments not available: Sufficient amount of BBFs for covering needs for both experimental years were secured at the beginning of the field trials. Some of the BBF producers provided the BBFs for free and transported the BBFs to the field sites at their own expense.

Extreme weather conditions cause crop failure: This risk materialized at some extent in both experimental years, but due to several field test locations, each year provided data about the performance of the BBFs. Extreme summer drought occurred in Finland in 2021 drought affected yields in both experimental years in Spain. This risk was mitigated by collecting soil samples and yield data from other past and on-going phosphorus response trials for determining critical soil P test values.

Unable to conduct laboratory analyses due to malfunction of equipment/reagents unavailable/ state-of-the art methods may have sudden drawbacks: All partners were able to conduct all the planned laboratory analyses

Results of laboratory analyses are not reliable: For ensuring reliability of laboratory analyses, both plant and soil reference samples were distributed among laboratories to ensure that results are comparable among different laboratories.

Conversion/relationship between soil testing methods soil type/region/laboratory specific: This risk has not materialized. Extrapolating of both EUF- and DGT-analyses to whole LUCAS dataset has not yet conducted. However, soil samples are grouped according to their properties (soil pH, texture, organic matter content, CaCO<sub>3</sub> content), providing more accurate conversion between soil P test methods.

Season dependent analyses: Protocol for conducting field trials as well for analysing harvested yields were prepared prior start of the field trials. This ensured comparable data among partners and this risk was not considered to materialize.

Simulation model not applicable to all experimental datasets of the project: This risk did not materialize

Difficulties in finding collaborative farms in the EU: Collaborative farms were found

BBF technology suppliers cannot or refuse to supply plausible process data: This risk has not materialized. Data collection is ongoing and input will be accepted until end of September (M52).



Anonymity of personal data broken: This risk has not materialized. Questionnaires will not allow identification of participants.

Transport costs and times become outdated due to changes in road infrastructure and traffic taxes: This risk has not materialized.

Possible lockdowns/restriction measures caused by COVID-related pandemic: Since the outbreak of COVID-19 in Europe in February 2020 several partner institutes had to stop their activities due to the lock-down. Most partners had to work remotely and field trials were forced to postpone for one year, starting in spring 2021 instead of 2020. All BBFs were secured to the field sites by spring 2021 and all field activities were conducted according to the DoA. Greenhouse trials were less affected by COVID-19 and were conducted as planned in the DoA by each partner. From spring 2021 onwards COVID-19 had no effect on the planned activities.