



Demonstration of circular bio-based fertilisers and implementation of optimized fertiliser strategies and value chains in rural communities

Deliverable 8.4:

Policy briefs - First edition

Project acronym	RUSTICA
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Revision following RP2

Requested correction	Description of the revision made	Page
The title of the deliverables on policy briefs and the content on different aspects of policy recommendations, also named Policy Brief # xx in the deliverables may create some confusion to the reader. Please revise as to make clear what the recommendations of the policy briefs actually are.	<ul style="list-style-type: none"> - Title of the deliverable is changed to "Policy briefs - First edition" - For each preliminary policy brief, recommendations to policy makers are added (paragraphs 4.1.1, 4.2.1, 4.3.1, 4.4.1) 	<ul style="list-style-type: none"> - Cover page - P 9, P 10, P 11, P12
Please clarify how do you ensure that your policy recommendations will reach the policy-makers, and in general, the appropriate audience to act on them.	A new heading has been added dedicated to the dissemination strategy (3. Policy briefs dissemination strategy). It includes the following: <ul style="list-style-type: none"> - General dissemination strategy - Collaboration with ESPP 	<ul style="list-style-type: none"> - P 9
	Table of contents has been updated	<ul style="list-style-type: none"> - P 2



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Summary

One of the main communication and dissemination objectives of the RUSTICA project is to define those activities necessary to engage policy makers and regulatory bodies during and after the project to pave the way for the exploitation of RUSTICA results. It is about to create a supportive policy, funding and regulatory environment for the project and its products; create partnership agreements; enhance territorial development opportunities also through new policies and programs.

Deliverable 8.4 “Policy briefs - First edition” aims to present the methodology, the plan and the draft of the 4 policy briefs that will be developed during the last 24 months of the RUSTICA project.






The RUSTICA Consortium

The RUSTICA consortium, which is composed of university researchers, academia, consultants, scientists, businesses, and farmers, is working together to achieve the project's common objective while stimulating an environment where each consortium partner shares and exchanges experiences to achieve the goals set-forth.

Table 1 - The RUSTICA Consortium

Logo	Name	Short name	Country
	Catholic University of Leuven	KU Leuven	Belgium
	DRANCO NV	DRANCO	Belgium
	Chambre Régionale d'Agriculture des Pays de la Loire	CRAPDL	France
	BioSabor, S.A.T.	BioSabor	Spain
	Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria	CREA	Italy
	Fundacion para las Tecnologias Auxiliares de la Agricultura	TECNOVA	Spain
	Avecom NV	AVECOM	Belgium
	Entomo Consulting S.L.	ENTOMO	Spain
	Particula Group d.o.o.	PAR	Croatia
	Wiedemann GmbH	WIED	Germany
	IDConsortium SL	IDC	Spain
	Stichting CropEye	CROPEYE	Netherlands
	Eigen Vermogen van het Instituut voor Landbouw, Visserij en Voedingsonderzoek	EV ILVO	Belgium



	The Netherland's Organisation of Applied Scientific Research	TNO	Netherlands
	Universiteit Gent	UGent	Belgium
	Centro Internacional de Agricultura Tropical	CIAT	Colombia





Acronyms and abbreviations

ESPP	European Sustainable Phosphorus Platform
EU	European Union
LCA	Life Cycle Analysis
TRL	Technology Readiness Level
WP	Work Package

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Project Abstract

The RUSTICA project provides a technical solution to convert organic residues from the fruit and vegetable sector into novel bio-based fertiliser products of high quality that address the needs of modern (organic) agriculture. The project's ambition goes beyond the simple recovery of nutrients, and includes the developments of economically viable and environmentally sustainable alternatives to mineral fertilisers with the same or improved agronomic value.

The technical solution consists of 5 conversion processes (carboxylic acid platform, microbial biomass production, electrodialysis, insect breeding and biochar production) which can be combined depending on the available waste streams and integrated with state-of-the-art technologies such as composting. Synergies between the individual conversion processes will be sought and optimised to maximise economic and environmental benefits, and the processes will be demonstrated at TRL7. The resulting ingredients (microbial biomass, mineral nutrient concentrates, insect biomass, insect frass, insect chitin, biochar) will be combined to obtain tailor made fertiliser products adapted to specific crop needs.

Parallel with this technological innovation and integration, a multi-actor approach guarantees the implementation potential of the technologies in the agro-food chain and will lead to sound business models. Several non-technical aspects (environmental and social LCA, legal framework, expected market developments...) will be evaluated in 4 European regions and 1 region in Colombia. Stakeholder involvement at each step guarantees the development of marketable end products for the fruit and vegetable sector, with a high replication potential to other agricultural sectors.

Cooperation with other EU funded projects working on nutrient recovery from other waste products will stimulate a joint solution to evolve towards a sustainable and circular fertiliser management to close nutrient cycles within and between regions.



1. Introduction

RUSTICA aims to foster the **technical validation, demonstration and implementation of bio-based fertiliser and soil improvement production techniques focusing on waste from the fruit and vegetable agro-food system to close nutrient cycles on a regional level**. Additionally, the project wants to **bridge the gap between the nutrient losses in the form of agricultural residues and the nutrient imports in Europe** by integrating and demonstrating 6 complementary technologies with high nutrient recovery potential to treat residues from the fruit and vegetable sector and turn them into a variety of fertiliser ingredients which will be formulated in tailor-made soil amendments and high effective fertilisers, with the aim to replace 5-10% of mineral fertiliser with bio-based alternatives by 2040.

Among the strategic objectives of the RUSTICA project are that results and insights from the 5 RUSTICA regions will be translated into business models for different archetypes of fertiliser recovery chains and comprised into a roadmap including recommendations for stakeholders and policy makers, to ensure replicability and applicability of the project's outcomes throughout Europe.

Therefore, the dissemination to policy makers and regulatory bodies has been considered as "Dissemination for Action". It is expected that policy makers and regulatory bodies will help pave the way for the implementation and exploitation of RUSTICA. One of the desired impacts of the RUSTICA project is to create a supportive policy, funding and a regulatory environment for the project and its products; create partnership agreements; enhance territorial development opportunities also through new policies and programs.

The objective of this deliverable is to present the methodology and the first draft of the policy briefs that will be developed in the last two years of the RUSTICA project.

2. Methodology to be followed for the development of policy briefs

Task 4.4 "European and global workshops on the replicability of the business models" consists of the organisation of two international workshops to discuss the replicability of the developed business models within the RUSTICA project.

One workshop was organised in Leuven, Belgium in May 2022. It brought together EU level experts to discuss the overall outcomes of the RUSTICA project, including the replicability of the business models. One of the main objectives was to identify the problems represented within the framework of public policies related to circular bio-based fertilisers and regional food systems.

One of the outcomes of the 1st EU stakeholder workshop has been the identification of 4 main policy briefs with their related action plans. These will include a detailed analysis of the problem, the limitations of the existing regulation and a clear definition of requirements for policy makers.

A timeline will be defined for each policy brief as well as the target groups to whom that policy brief will be communicated, both nationally and regionally.

Finally, policy briefs will be published in the main stakeholders' national languages to facilitate communication with national policy makers.

All policy briefs will serve as input for the final position paper which will explain to the target groups, key stakeholders and researchers, the role of bio-based fertilisers in a context of a transition towards a more sustainable food system.

3. Policy Briefs dissemination strategy

To ensure that the formulated policy recommendations reach the appropriate audience and stimulate action, a comprehensive dissemination strategy has been developed. Each Policy Brief will have a dedicated space on the RUSTICA website, prominently featured under the Policy Lens tab, providing easy access to the documents.

Promotion of these pages will be ongoing through RUSTICA's online channels, including newsletters, social media platforms, and news updates. Additionally, consortium members will actively promote the Policy Briefs at various scientific and industry events, enhancing visibility and engagement with stakeholders. RUSTICA ensured collaboration with European Sustainable Phosphorus Platform (ESPP) and other projects to develop a proposal on defining "Bio-Based Fertiliser," aiming to provide market clarity and establishing a potential European Standard for environmental claims under the EU Fertilising Products Regulation.

4. RUSTICA's preliminary policy briefs

4.1. Policy brief 1: Policy and legislation on bio-based and circular fertilisers

Europe emphasises the role of bio-based fertilisers for improving soil quality and resilience while making food systems more sustainable. Among others, this is reflected in the Farm to Fork Strategy, which calls for the urgent need to reduce nutrient losses to the environment.

Although technology development and validation are showing great potential for innovations towards bio-based fertilisers, legislation lacks behind. The former EU Regulation 2003/2003 mainly referred to mineral fertilisers, while for bio-based fertilisers, companies had to rely on national authorities. Today, the EU standards for the different fertiliser categories are not yet available and only a few conformity assessment bodies have been accredited.

In a context of circular economy, solutions are needed for leftover materials from food production. Hence, either new terms or routes would be needed and legally defined to pave the way for these materials into the fertiliser market or the rules for waste need to be changed and aligned to the innovative technology solutions from research.

4.1.1. Recommendations to policy makers

Four key challenges related to the current legislation on bio-based fertilisers and recommendations to address them are identified:

Difficult transition from the current EU regulation to the new Fertilising Products Regulation:

- Provide comprehensive guidance and support to stakeholders during the transition period, including clear timelines, training programmes, and resources.
- Establish a structured framework for the phased implementation of the new regulation, allowing for flexibility and adaptation based on stakeholder feedback and evolving circumstances.

Obstacles and uncertainties in defining new bio-based fertiliser products:

- Facilitate collaborative efforts between policymakers, industry stakeholders, and scientific experts to develop clear and standardised definitions and criteria for bio-based fertiliser products.
- Conduct thorough research and analysis to identify the most appropriate classification and certification standards for bio-based fertilisers, taking into account their unique characteristics and benefits.

Guaranteeing a level playing field for different EU member states:

- Harmonize regulations and standards across EU member states to create a consistent and transparent regulatory environment for bio-based fertilisers.
- Establish mechanisms for monitoring to ensure compliance with regulatory requirements and prevent unfair practices that may distort competition.

Need to strengthen the stakeholder dialogue:

- Foster ongoing communication and collaboration among stakeholders through regular meetings, workshops, and forums dedicated to discussing policy and regulatory issues related to bio-based fertilisers.
- Create platforms for sharing best practices, exchanging knowledge, and addressing concerns, with a focus on inclusivity and diversity of perspectives.

4.2. Policy brief 2: Reality check on the feasibility of circularity in the food system

The principles of circularity include the recycling of nutrients from residue streams through the development of bio-based fertilisers, and their application to improve soil health and crop production.

4.2.1. Recommendations to policy makers

Five key challenges are highlighted that need to be overcome to stimulate their development and use:

High production costs of bio-based building blocks:

- Provide financial incentives or subsidies for research and development efforts aimed at reducing production costs.
- Foster collaboration between government, industry, and research institutions to explore cost-effective production methods and scale-up technologies.

Reconciliation with impurities and the risk of contaminants:

- Invest in research and innovation to develop effective purification and quality control processes for bio-based building blocks.
- Establish strict standards and regulations to ensure the safety and purity of bio-based fertilisers, with clear guidelines for monitoring and compliance.

Aversion towards the use of residues in the food chain:

- Launch educational campaigns to increase awareness and understanding of the benefits and safety measures associated with using residues in the food chain.
- Provide incentives or support programmes for farmers and food producers to adopt sustainable practices, such as composting and organic waste management.

Principles of sustainable food production:

- Implement policies and initiatives that promote sustainable agricultural practices.
- Support research and innovation in sustainable food production technologies, such as precision agriculture and regenerative farming.

Regional differences:

- Foster collaboration and knowledge-sharing among regions to exchange best practices and lessons learned in implementing circular food systems.
- Tailor policies and support mechanisms to accommodate the unique needs and challenges of different regions, promoting a more inclusive and equitable approach to circularity.

Europe should align investment, regulation and support with its ambitions, as formulated in the Farm to Fork Strategy and the Green Deal. Economic reality and obstacles in legislation inhibit research and innovation towards more circular food systems. The opportunities for improvement do not only lie in incentivising bio-based fertilisers, but also in the harmonisation of guidelines, communication and sensibilisation about circular food systems, a decoupling of sustainability concepts to gain support for hybrid products and the recognition and valorisation of regional contexts.

4.3. Policy brief 3: Recognising various aspects of sustainability of the food system

While organic markets continue to grow and price premiums can make organic systems profitable, this represents only a very small part of the food system. The economic reality is that farmers are price takers subject to the world food market. Additionally, inequalities persist and not all farmers have the ability to invest in sustainable practices. Food production highly depends on regional characteristics. To find a good balance between resilient and sustainable intensification of farming systems on the one hand and the protection of natural habitats on the other hand, there is a huge potential in recognising the regional diversity across Europe.

International recognition of various sustainability approaches should encourage coexistence of practices, including the contributions made in the conventional agricultural sector. Furthermore, the economic reality of the agricultural sector and the global food system should be recognised. A great opportunity lies in stakeholder dialogue. Under the right circumstances, stakeholders are willing to provide their insights. This can help policy makers to develop policies that are close to the market and can contribute to realistic goal setting.

4.3.1. Recommendations to policy makers

Address economic constraints:

- Provide financial incentives, subsidies, or support programmes to farmers to encourage adoption of sustainable practices.
- Explore market mechanisms, such as price premiums or certification schemes, to reward sustainable farming practices and create economic incentives for farmers.

Promote equity and access:

- Implement policies and programmes aimed at reducing inequalities in access to resources and opportunities for farmers, particularly smallholders and marginalised groups.
- Offer training, technical assistance, and capacity-building programmes to support farmers in adopting sustainable practices, regardless of their economic status.

Support regional diversity:

- Develop region-specific agricultural policies and strategies that take into account the unique environmental, social, and economic characteristics of different regions.
- Promote research and innovation in regionally adapted farming practices and technologies to enhance resilience and sustainability in diverse agroecosystems.

Foster recognition and coexistence:

- Encourage dialogue and collaboration among stakeholders to promote understanding and acceptance of various sustainability approaches in agriculture.
- Establish platforms or networks for knowledge exchange and sharing of best practices among farmers, researchers, policymakers, and other stakeholders.

Enhance stakeholder dialogue:

- Create opportunities for meaningful engagement and participation of stakeholders in the policy development process, including consultations, workshops, and forums.
- Foster trust, transparency, and inclusivity in stakeholder engagement processes to ensure that diverse perspectives and insights are considered in policy decisions and goal setting.

4.4. Policy brief 4: Circular bio-based fertilisers in an international context

National authorities in the EU member states need to implement the Fertiliser Products Regulation. Misinterpretation of this regulation could lead to inconsistencies in the implementation of the guidelines and rules. Regulation should allow for fair competition between member states as well as non-EU countries. Discrepancies in regulation can make international trade and cooperation more difficult.

In the Global South, food prices are what matters most. Circular bio-based fertilisers may work if they tackle the waste issue at a profitable price. Separate collection of waste is the first big requirement, but this lacks behind. Small-scale solutions are often very expensive as well. Nevertheless, since transport of biomass often seems to be a big hurdle, it will be important to develop local solutions.

These solutions have to take the size and the location of the system into account. To achieve this, there must be a focus on developing cost-efficient solutions for different needs. However, the local food system's needs might not match its residue availability and expertise. Therefore, regulation should ensure a level playing field to encourage international cooperation and trade of bio-based building blocks and fertiliser blends.

4.4.1. Recommendations to policy makers

Clarify regulation interpretation:

- Provide guidance and training to national authorities to ensure consistent interpretation and implementation of the Fertilizer Products Regulation.
- Establish mechanisms for ongoing monitoring and evaluation to identify and address any inconsistencies in regulation enforcement.

Harmonise international regulation:

- Facilitate dialogue and collaboration between countries to harmonise regulations and standards for circular bio-based fertilisers, promoting fair competition and facilitating international trade.
- Strengthen international cooperation platforms and agreements to address regulatory discrepancies and streamline trade processes.

Support economic viability:

- Provide financial incentives, subsidies, or support programmes to promote the adoption of circular bio-based fertilisers in the Global South, particularly focusing on addressing economic constraints and waste management challenges.
- Invest in research and innovation to develop cost-effective solutions for small-scale waste collection and utilisation, tailored to the needs and contexts of different regions.

Promote local solutions:

- Encourage the development of local solutions for biomass transport and waste management, considering the size and location of the systems.
- Support capacity-building and knowledge exchange initiatives to enhance local expertise and infrastructure for circular bio-based fertiliser production and utilisation.



Ensure regulatory equity:

- Establish regulatory frameworks that ensure a level playing field for international cooperation and trade of bio-based building blocks and fertiliser blends.
- Promote transparency and fairness in regulatory processes to encourage participation and investment from both local and international stakeholders.

