FERTIMANURE

Deliverable

Project Acronym: FERTIMANURE

Project full name: Innovative nutrient recovery from secondary sources – Production of high-added value Fertilizers' from animal MANURE

Grant Agreement No. 862849

D6.1. Plan for exploitation and dissemination of results – 1st version

Project start date	January 1st, 2020
Duration in months	48
Deliverable due date	June 30th, 2020
Actual submission date	June 30th, 2020
Reviewed version submission date	February 1st, 2022
Work package concerned	6
Author(s) and Co-author(s)	Barbara Dukic (author)[1], Ana – Marija Špicnagel Ćurko (author)[1], Evan Marks (co-author)[2] and Laia Llenas (co-author)[2].
Contributor(s)	[1]IPS and [2]UVIC

Disclaimer: This deliverable a. Reflects only the authors view; and b. Exempts the Commission from any use that may be made of the information it contains.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Preface

FERTIMANURE can contribute significantly towards a situation where optimal application of manure with minimal loss of nutrients can be achieved in all regions. The EU N fertiliser industry is an energy intensive industry and contributes directly and indirectly to GHGs emissions. FERTIMANURE sustainable production of N-fertilisers from animal manure will contribute to the challenging EU 2030 framework for climate and energy policies.

The main objective of the planned dissemination activities is to raise awareness and efficiently transfer knowledge of FERTIMANURE achievements to end users, industries and SMEs, academic community, and policy makers, to ensure replicability across Europe and CELAC countries.

The report includes an overview of the concepts of Communication, Dissemination and Exploitation relative strategies and action plans that the consortium will follow to promote the project, to foster the knowledge of its results and to ensure their uptake for future business opportunities. All these activities aim to help maximize the impact of results.

This document will be structured in two sections: (i) Communication and Dissemination Strategy and (ii) Exploitation. Dissemination activities then must be tailored in such a way to reach the audiences most efficiently through appropriately selected dissemination channels and dissemination tools. The Exploitation segment is designed in order to multiply the impact of the proposed solutions and prepare the transition towards industrial and commercial uptake in order to fully achieve the expected impact.

The overall aim is to maximize the utilization of the dissemination potential of FERTIMANURE consortium. In order to convey the right message to the right stakeholder, the most appropriate channels have to be used. The FERTIMANURE audience is manifold: (i) key agriculture and industry players, (ii) research and education community, (iii) policy makers and authorities, (iv) investors in bioeconomy, (v) industry of equipment supply, and (vi) rural communities and society.

The report effects numerous other deliverables and work packages. Special focus and correlation is established with WP6 and WP7.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Document History

Date	Author	Action	Status
May 31st, 2020	Barbara Dukic (IPS) Ana – Marija Špicnagel Ćurko (IPS)	1st draft revision	Draft
June 15th, 2020	Evan Marks (UVIC)	2nd draft revision	Draft
June 18th, 2020	Laia Llenas (UVIC)	3rd draft revision	Draft
June 30th, 2020	Laia Llenas (UVIC)	Approved by UVIC	Final
January 31st, 2022	Ana – Marija Špicnagel Ćurko (IPS)	1st draft including reviewers' comments	Draft
February 1st, 2022	Laia Llenas	Reviewed version, approved by UVIC	Approved by the PC

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Summary

The **Preliminary Plan for the Exploitation and Dissemination of Results (PEDR**) is a strategic document for setting the impact pathway of FERTIMANURE since the project beginning. The main objective of FERTIMANURE project is to develop, integrate, test and validate innovative Nutrient Management Strategies to efficiently recover mineral nutrients and other relevant products with agronomic value (organic amendments and biostimulants) from animal manure, to finally obtain reliable and safe fertilisers that can compete in the European fertilizers market.

FERTIMANURE project will demonstrate the efficiency and effectiveness of the obtained BBFs and TMFs and their ability to replace current mineral fertilisers, including:

(i) **Tests under controlled conditions (incubation and pot-tests):** Assessment of: (1) N release patterns; (2) P plant availability; (3) Biological activated organic amendments as plant growth promoters; (4) Biostimulants assessment as plant growth promoters for the nutrient uptake and tolerance against hydric & saline stress. Crops under assessment: Wheat, barley, maize, fodder maize, grass, ray grass.

(ii) **Field validation in real environment**: Agronomic performance in quadruplicate-randomized block design; Environmental performance, including nutrient efficiency vs losses. Crops under assessment: Wheat, barley, maize, grass, corn, spinach, potatoes, tomatoes, vines.

FERTIMANURE project specifically provides **3 innovative nutrient management strategies**:

1) Direct use of the BBFs obtained by treating manure with innovative technologies;
2) Centralised TMFs production and
3) On-farm TMFs production.

This document is the first version (M6) of the **Plan for Exploitation and Dissemination of Results (PEDR) of FERRTIMANURE project**. The contents of the first release include an overview of the concepts of Communication, Dissemination and Exploitation relative strategies and action plans that the consortium will follow to promote the project, to foster the knowledge of its results and to ensure their uptake for future business opportunities. All these activities aim to help maximize the impact of results. The **PEDR will be updated during the project in the following months: M16, M36 and M48.**

This document will be structured in two sections:

- **PART 1: Communication and Dissemination Strategy**

Communication and dissemination activities play an important role to increase the impact of an H2020 project. **Communication** aims to create awareness of the EU initiatives, promote the project and its results to a very differentiated target of audience ranging from stakeholders and investors to the media and great public. **Dissemination** is more focused on fostering the transfer of knowledge created within the project to make the results available for others to use. The target audience for a dissemination action is represented by the scientific community, the industrial partners, and the policymakers.

COMMUNICATION

The main objective of communication is to reach out the society, beyond the project own community, and promote the impact and benefits of the EU funded projects in a strategic and effective manner. The research activities carried out must be outlined with a language that can be understood by multiple audiences, included non-specialists. Communication is relevant from the start of the project and the aim is to inform the audience on the goals and benefits of the project.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

COMUNICATION STRATEGY

According to the Article 29 of the Grant Agreement "Unless it goes against their legitimate interests, each beneficiary must — as soon as possible — 'disseminate' its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium). This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

The Grant Agreement shows the obligation to communicate and promote project action and to do that without breaching obligations of Article 29 on the dissemination of the results, reiterating the importance to take an integrated approach to carry out the communication together with dissemination activities to maximize the impact of the project.

FERTIMANURE workplan is fully committed to communicate projects results and their benefits to the stakeholders and their benefits for the stakeholders to the widest possible audience.

- **PART 2: Exploitation**

This part provides a summary the potential routes for their exploitation that project partners have envisioned at the beginning of the project, and which are being redefined as the project technically has progressed. The different sections include the proposed measures for exploitation and dissemination of results, including management of intellectual property.

This section begins with a discussion of the impact potential of the project, both in terms of key outputs (technologies, fertilisers, and business models), but also in terms of impacts on society, the environment, and the related economic sectors.

In the following sections, what is discussed is the FERTIMANURE impacts on the market, in terms of the exploitation and commercialization strategy, business models, and a CANVAS analysis of the two main business cases considered, the business model for farmers, and the business model for fertiliser companies.

Next, the different technological components of the project are evaluated and described in terms of their technology readiness level (TRL).

Later is discussed the different measures which will be taken by the project to expand the dissemination of results, in terms of synergies with other projects, platforms, clusters, and the inclusion of important industry and government actors within the project consortium, which helps orient the project towards successfully replicable results.

Finally, intellectual property concerns are addressed, though many of these aspects are not to be published in this document due to the public nature of this deliverable, whereas consortium IPR documents are a confidential source.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Content

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

List of Tables

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

List of Figures

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

List of Abbreviations

TRL Technology readiness level

PEDR Plan for Exploitation and Dissemination of Results

IPR Intellectual property rights

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

1. Introduction

1.1. The FERTIMANURE project

The use of manufactured fertilisers as a regular farming practice began in most EU countries in the mid to late nineteenth century but the greatest increase in consumption was after the World War II. During 2015, the total amount of nitrogen and phosphorus mineral fertiliser used in EU-28 agriculture was 11.4 million tonnes (64 kg/ha) and 1.1 million tonnes (6.3 kg/ha) respectively. In the past, the production of mineral fertilisers from rock deposits (P) and based on fossil energy (N) have enabled food security and access to sufficient food for the World's growing global population. Nonetheless, the EIP-Agri emphasises that current dependency of EU agriculture on fossil-based mineral fertilisers must be regarded as a very serious threat to future food security.

FERTIMANURE opportunities are those that can offer real benefits and solutions to those facing current challenges related to inefficient use and management of animal manure. This project seeks to provide an innovative circular economy model to favour rural development in agricultural sector by creating real synergies and links within farmers and other industrial activities.

Benefits and **targeted solutions** in which **FERTIMANURE's** circular economy approach is based are:

- ✓ **Livestock sector**: Diversify the revenue sources. New farm activities bringing new business opportunities in the current fertilizers market.
- ✓ **Agricultural sector**: Well-defined and standardised fertilizers that will overcome the inherent variability residing in animal manure as feedstock, while achieving the same consistency in performance than conventional mineral fertilisers.
- ✓ **Chemical Industry**: Diversify nutrient sources to produce fertilizing products. On-farm and centralised Tailor-Made Fertilizers production.
- ✓ **Technology providers:** new market opportunities for technological companies providing efficient & effective technologies for nutrient recovery.
- ✓ **Society**: Alternative internal secondary nutrient sources that will, in the long-term, ensure food security and sustainable agriculture.

1.2. Scope and objectives of this deliverable

This deliverable is the first of four deliverables regarding the PEDR of FERTIMANURE project. The three subsequent reports shall be further elaborated, updated and published at midterm (M16 and M32) and at the end of the FERTIMANURE project (M48).

This first release (M6) includes formulation of FERTIMANURE project Dissemination and Exploitation strategy and an action plan for activities concentrated on the first and second year (January 2020 –February 2022) of FERTIMANURE project.

The second and third release (M16, M32), published in the beginning of the second year FERTIMANURE project, will include a detailed PEDR report of the Dissemination and Exploitation activities performed in the first two year of the project and an updated Dissemination and Exploitation plan for rest of the project.

The fourth deliverable (M48) is planned to include the PEDR report for the entire project duration.

The Dissemination Plan in FERTIMANURE project represents the strategic vision of the Consortium in terms of communication of the FERTIMANURE project itself, and of its achievements and outputs as well. The Dissemination Manager, Mr. Rodrigo Arandi (GWIN), will lead the communication and dissemination activities whereas partners such as Fertilizers Europe (industries), European Landowners Association and or French

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Chambers of Agriculture (Farmers and Policy makers) will also have a key role to maximize FERTIMANURE impact.

The **Exploitation Plan** is designed in order to multiply the impact of the proposed solutions and prepare the transition towards industrial and commercial uptake in order to fully achieve the expected impact. IPS, as the main expert in this regard in the consortium and leader of WP6 “Market potential, business plan, and exploitation, will serve as the main contact and manager for this aspect of the project. Other FERTIMANURE partners with a key role in exploitation are the industrial partners (or representatives thereof) Fertilisers Europe, FERTINAGRO, and AlgaEnergy. Of course, other partners will also have a role in the development of exploitation activities and plans, including the collection of data from farmers and provision of data for the development of business plans and life cycle analyses, etc. During the project, several activities will be carried out to prepare the future industrial exploitation of the end-products obtained in FERTIMANURE. Two different actors of the value chain, farmers and fertiliser companies, are envisaged as the main actors to exploit the FERTIMANURE end-products; as both actors have clearly different value propositions, two initial path-compatible business models have already been drafted following a CANVAS approach. In addition to a common exploitation plan developed within the project, partners will also exploit individually their results during and after the end of the project.

2. Methodologies and Organisation

The methodology employed is mainly based on desk research techniques via literature review, partners years of experience and targeted discussion with experts.

FERTIMANURE partners are involved in broad and relevant networks that will be used as lever to map and ensure successful outreach to relevant stakeholders. GreenWin, as an industrial cluster active in green chemistry and industrial biotechnologies, as well as the Biorefine Cluster Europe, initiated and coordinated by UGENT, have excellent connections with national and international clusters in their fields (sustainable chemistry, agro-industry and bio-based resource recovery respectively). GreenWin is also a member of EU networks and association, such as the BIC consortium and the Vanguard initiative Bioeconomy pilot. In addition, FERTINAGRO is a member of BIC consortium. RITTMO is involved in “4 per 1000” initiative and will make link with BBF developed and possibilities to store MO from BBF in soils. Several partners are involved in related EU projects and initiatives and will thus, build bridges between them and FERTIMANURE and hence foster synergies between their respective communities.
Through their involvement in various open innovation projects, the partners have access to important initiatives which increase project visibility.
The Biorefine cluster Europe (UGENT), a platform interconnecting projects resource recovery related is already coordinating the communication and dissemination activities of its member projects to boost cooperation and outcomes dissemination and can look at potential synergies of those projects with FERTIMANURE.
The cluster furthermore manages the Nutrient Recycling Group of the European Commission Common Dissemination Booster.
The learnings from this initiative will be very useful to apply CDB services to the promotion of FERTIMANURE.
All partners will be involved in DC activities to ensure the successful completion of our outreach objectives.
The following general subjects of dissemination have been identified: (I) FERTIMANURE project itself (general scope, coverage, goals and milestones and plans to reach them); (II) interim results (reached objectives and achievements); (iii) techniques and methodologies (in respect of IPR issues); (iv) technologies (in respect of industrial IPR issues); (v) sustainability assessment results; (vi) innovation aspects (in an “open innovation” perspective) and (vii) end – products (in respect of IPR issues).

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

3. Dissemination and Communication Plan

The main objective of the planned dissemination activities is to raise awareness and efficiently transfer knowledge of FERTIMANURE achievements to end users, industries and SMEs, academic community and policy makers, to ensure replicability across Europe and CELAC countries. FERTIMANURE project aims to provide innovative solutions for manure management that are ready to be applied and exploited to cover real needs. Even though the project will be mainly focused and designed to improve manure management and nutrient recycling in Europe, at the end it is expected to obtain global solutions that could have a real impact worldwide. In that sense, special attention will be put in how the project results can be exploited and replicated in CELAC region. To enhance the acceptance and to facilitate the decision-making process to farmers, a Decision Support System will be developed integrating all generated knowledge taking into account environmental, technical, economic and policy aspects. This DSS will provide information on: (i) WHICH end-products to produce, (ii) HOW to produce them (BBF vs TMF, on-farm vs centralized) and (iii) WHEN and WHERE to use them (better fertilization strategies).

Specifically, FERTIMANURE project will:

- Broadcast FERTIMANURE scientific and technical results.
- Push exchange between the project and a wide range of stakeholders across the whole value chain.
- Foster exchange and knowledge transfer among the bio-economy stakeholders (academy and industry; farmers and rural community and industry; farmers and rural community and academy) and liaise with relevant initiatives to stimulate FERTIMANURE replication potential.
- Interact with end-users and outreach locations and attract investors (public & private) to enhance commercial development of the project results.
- Interact with standardization bodies in charge of producing standards for bio-based fertilizers. At EU level: CEN TC 260/WG8, CEN 223, CEN TC 455 and at National Level: BN Ferti for France.

The Consortium attaches great importance to dissemination. All partners will contribute to that effort and will strive to maximize use of all existing dissemination channels through website, social media, leaflets and large audience publication (general press, industrial and agricultural magazines). The project and its results will also be presented at various conferences and fairs. All general communication material will be, when possible, translated in all consortium languages to ensure a large broadcast and will bring clear and accessible messages for all, avoiding technical jargon. Efficient outreach activities will be based on an evolving dissemination strategy ensuring that the right messages are conveyed to the right stakeholders. As part of these activities, we will draw strong links with similar projects and initiatives in EU through the already existing Biorefine cluster to build a strong network of relevant stakeholders. This network will be kept alive and informed not only through regular communication channel (website, social media, publications), but mostly through active participation in workshops, events and webinars.

3.1. Dissemination Strategy

The objective of the dissemination strategy is to identify and organise the activities to be performed in order to maximise the influence of the project and to promote commercial and other exploitation of the project results.

In more detail, the objectives of the dissemination are:

i. To raise public awareness about the project, its expected results and progress within defined target groups using effective communication means and tools;
ii. To exchange experience with projects and groups working in the field in order to join efforts, minimize duplication and maximize potential;

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

iii. To disseminate the fundamental knowledge, the methodologies and technologies developed during the project;
iv. To pave the way for a successful commercial and non-commercial exploitation of the project outcomes.

The dissemination strategy and activities will follow principles and best practices successfully tested by the partners in other projects and in line with the EC Guidelines for successful dissemination:

- All research results/reports will be duly reviewed and a copy will be sent to relevant partners involved in the project before these are published or disseminated. When appropriate, the reports will refer to other research projects and build on the existing results and literature.
- Research will be conducted following sound analysis and scientific practice principles, taking into account as much as possible policy requirements and needs.
- All partners who will contribute to the project activities will be duly informed about the final outcomes and the implications stemming from project results.
- All public results will be accessible from the project website and usable from all parties who may benefit from them.

A well-planned strategy for dissemination, exploitation and protection of results has been developed by highly considering FERTIMANURE project objectives, outputs and work plan. It is important to mention that all partners of the project have been actively involved in developing the PEDR, as it is a crucial document to assure the good project development. In case that FERTIMANURE project is funded, the PEDR presented in the following points (2.2.1 – 2.2.3), will be annexed in the Grant Agreement and will be a living document all along the project.

D7.1. Dissemination and Communication plan (DCP) (GWIN) – Related to the PEDR but specifically addressed to communication activities and released in M6. The aim of this document is to set up the objectives and the strategies that will be considered as to manage the communication and dissemination activities during the lifetime of the project. During the project's lifetime there can be some changes regarding the interest of the potential stakeholders, which will bring as a result a close review and a regular update of this Plan. The procedures and objectives will be continuously evaluated to achieve the maximum impact, so this initial Plan may undergo some changes during the project.

3.1.1. Subject of dissemination

The following general subjects of dissemination have been identified:

- **FERTIMANURE** project itself (general scope, coverage, goals and milestones and plans to reach them)
- Interim results (reached objectives and achievements)
- Techniques and methodologies (in respect of IPR issues)
- Technologies (in respect of industrial IPR issues)
- Sustainability assessment results
- Innovation aspects (in an "open innovation" perspective)
- End – products (in respect of IPR issues)

3.1.2. Target Audience

The overall aim is to maximize the utilization of the dissemination potential of FERTIMANURE consortium. Dissemination activities then must be tailored in such a way to reach the audiences most efficiently through appropriately selected dissemination channels and dissemination tools.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

In order to convey the right message to the right stakeholder, the most appropriate channels have to be used. The **FERTIMANURE audience is manifold:**

- **Key agriculture and industry players**: Livestock farmers, fertilizers (manufacturers & sellers) and chemical industry will be updated on the applications that can be made of manure as well as the exploitation and replication possibilities of the project results. Arable farmers, crop-growers and producers will be sensitive to the use of alternative to conventional fertilizers.
- **Research and education community**: Research institution, relevant EU projects and networks, in particular the Nutrient recovery community, will receive update about the technical and scientific project progress.
- **Policy makers and authorities:** Public procurers, local council and regional government of the region involved in the partnerships and National and European-level policy makers will be awaken to their driver role in the market uptake of bio-based products
- **Investors in bioeconomy:** Public and private investors will be informed about the exploitation opportunities and possible commercial development of FERTIMANURE
- **Industry of equipment supply:** Contact with this industry that is interested in proposing new mature technologies to answer challenges of Circular economy will allow future development of FERTIMANURE technologies in real economy.
- **Rural communities and society:** Engaging with the general public and rural communities will allow to promote the environmental and health benefits of biofertilizers. We want as well to raise public awareness to the necessity of a transition towards a greener economy as well as the advocacy role the public can play in boosting EU bioeconomy.

A detailed Stakeholder analysis (WP6) will be carried out to comprehensively understand and segment our audience. This stakeholder analysis will be the basis to design an evolving Dissemination and communication plan (WP7) to determine the best possible channels to deliver target-specific key messages and eventually set the base for the targeted value chain involvement and business case development.

Table 1 KPIs to efficiently measure the impact of FERTIMANURE Dissemination activities

KPI	Value	Description	KPI goals
Presentations of results in conferences and fairs	Up to 20	Presentation of project results in key sectorial fairs and conferences	
Scientific or technical publications	Up to 10	Scientific/technical publications regarding FERTIMANURE's new processes, technologies and obtained BBF.	The number of scientific publications will depend mainly on the information that will be made available considering that there would be information that will be protected, thus not published in the scientific journals. GreenWin will be asking the partners in a monthly basis if they have available information that is ready to be published.
Large scale events	4	4 events will be organised at The Netherlands, Poland, Argentina (CELAC region) and Spain (Final conference). Targeting more than 100 attendees, aiming to engage stakeholders and share knowledge and best practices.	It is expected that at least 100 relevant stakeholders will attend these events
Local stakeholder engagement	In the range of 4 per country	Number of entities actively participating in DC activities organised in FERTIMANURE.	4 per country

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Policy makers outreach	In the range of 2 per country	Number of authorities directly involved and engaged in the FERTIMANURE pilots	2 per country
Advisory Board Meetings	4	Number of meetings with the Advisory Board Members (1 per year).	1 per year (total 4)
Workshops/seminars (including webinars)	6	Workshops targeting farmers, scientific community and policy makers will be organized for closer interaction with stakeholders.	6 workshops/seminars

3.1.3. Communication activities

The overall objective of the communication activities is to ensure the successful outreach of the FERTIMANURE project vision to the public and society. Through communication activities, we will raise general awareness about the project, its impacts, and benefits to all stakeholders. We also want to publicize the benefits for the EU circular bioeconomy, as well as the sustainable development of rural activities in Europe.

3.1.4. Dissemination management

3.1.4.1. Distribution of responsibilities

According to the Article 29.1 of the Grant Agreement, unless it goes against their legitimate interests, each beneficiary must — as soon as possible — 'disseminate' its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium).

All partners of the consortium must contribute to the dissemination according to their foreseen role and effort and using all available tools, thus for instance by participating and giving presentations at conferences, publishing papers, holding press conferences, networking and similar activities and will strive to maximize the existing dissemination channels for the purpose of project result adoption and successful future commercialization of FERTIMANURE outputs.

GreenWin is the responsible partner for external communication.

3.1.4.2. Dissemination policy and rules

On one hand, the **FERTIMANURE Data Management Plan (D8.2)** describes the obligations for dissemination, including requirements such as the showcasing of the European Union Banner and Funding phrase. Partners should also use FERTIMANURE templates for presentations, rollups, etc. In general, main communication materials are created or supervised by the Communication leader (GWIN) with revision by the Project Coordinator and WP leaders as necessary.

Regarding the issue of intellectual property (IP), if the rules of protection of data in D8.2 are respected, there should be no issues or impact from the dissemination or results on rights protection.

The basic regulation of the dissemination activities in the CA states that:

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Results are owned by the Party that generates them. Ownership of the Results shall be governed by the provisions of Section 26.1 and 26.2 of the Grant Agreement. Where Results are generated from work carried out jointly by two or more Parties and it is not possible to separate such joint invention, design or work for the purpose of applying for, obtaining and/or maintaining the relevant patent protection or any other intellectual property right, the Parties shall have joint ownership of this work. As such, dissemination of results should also reflect the ownership of those results, i.e., dissemination activities should adequately reflect the participation of any parties having participated in the generation of those results. During the Project and for a period of 1 year after the end of the Project, the dissemination of own Results by one or several Parties including but not restricted to publications and presentations, shall be governed by the procedure of Article 29.1 of the Grant Agreement. Prior notice of any planned publication shall be given to the other Parties at least 45 calendar days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Coordinator and to the Party or Parties proposing the dissemination within 30 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted.

3.1.4.3. Dissemination monitoring and reporting

All consortium partners are encouraged by the partner responsible for dissemination **to report the results of each dissemination activity immediately after they are presented**. The reports shall include feedback gathered by the respective partner from the target audience (if applicable), eventually gained contacts to be listed in the contact repository used for further dissemination purposes

For monitoring purposes, the dissemination activities will be reassessed regularly and conveyed to the Project Technical Committee by GreenWin during the project progress meetings that take place every month.

The Final Report to be delivered to the EC at the end of the project will include the final PEDR compiled by GWIN and with the contributions of UVIC and IPS on the basis of the contributions of all partners.

Finally, the Deliverable D7.5. Dissemination Reports will include a summary of all the dissemination and communication activities performed in FERTIMANURE. The final version of this report will be submitted in Month 48.

3.1.4.4. Evaluation

For the purposes of evaluation of FERTIMANURE dissemination activities, quantitative indicators and associated metrics were set up where applicable. – The following is a summary of communication key performance indicators (refer to D7.1, Communication and Dissemination Plan):

Communication tool	Key performance indicator
Website	8,000 visits by project end
Twitter, Facebook and LinkedIn	400 followers
Leaflet	1,000 leaflets distributed
Poster	Displayed > 30 times
Roll-up	Displayed > 30 times
Video	1,000 views by end of project
Newsletter	400 readers reached by the end of the project

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

3.1.5. Dissemination Plan

Table 2 FERTIMANURE Dissemination plan

Target audience	Dissemination objectives	Dissemination activities	Expected impacts
Farmers – Livestock & Arable	Alternative manure management. Use of BBFs and TMFs produced as an alternative to mineral fertilisers.	• Specific articles in dedicated industrial or agricultural journals (4) • Organisation of workshops targeting farmers both in EU and in CELAC countries. • Participation at the Libramont Agriculture, forestry and agribusiness Fair (largest in EU) • Organisation of large-scale event (100 attendees)	Broadcast FERTIMANURE results, outcomes and their benefits to the farming sector.
Fertilisers producers & chemical industry	Uptake of FERTIMANURE results to develop innovative BBFs and TMFs	• Scientific papers published in high-impact peer reviewed international journals (10) • Participation in international conferences/workshops (8) • Specific articles in dedicated industrial or agricultural journals (4) • Webinars on specific scientific project-related issues • Organisation of large-scale event (100 attendees)	Broadcast FERTIMANURE latest scientific and technological results to show the potential for BBF commercialization
Academic & research	Uptake of FERTIMANURE results to continue research on new generation BBFs and TMFs	• Scientific papers published in high-impact peer reviewed international journals (10) • Active participation in international conferences/workshops (8) • Technical webinars on specific scientific project- related issues • Organisation of large-scale event (100 attendees) with matchmaking session	Broadcast FERTIMANURE scientific and technological outcomes for further development. Training around circular biobased economy & biotechnological valorization of agricultural wastes.
Policy makers & authorities	Improve policy to move towards larger use of BBFs and TMFs produced	• Participation in international conferences/workshops (8) • Organisation of specific webinars (2) targeting policy makers both in Europe and South America • Organisation of large-scale event (100 attendees) • Participation to CEN TC 223, 260 and 455 meetings	Broadcast FERTIMANURE to show the agricultural, economic and environmental potential of BBFs and TMFs and raise awareness of the role policy-maker can play to favor their market uptake.
Public & private investors	Uptake FERTIMANURE results to invest in the scale-up and production of novel BBFs and TMFs	• Specific articles in dedicated industrial or agricultural journals (4) • Active participation in international conferences/workshops (8) • Organisation of large-scale event (100 attendees) with matchmaking session	Advertise exploitation potential of results and their further commercial development. Share knowledge and best practices between the project and Stakeholder. Foster exchange among Stakeholders.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

3.2. Communication Plan

Table 3 FERTIMANURE Communication plan

Communication Measures	Scope	Target Audience
Visual identity	Build a strong identity for FERTIMANURE through branding	All stakeholders
Project website (www.fertimanure.eu)	Share general project information, main public deliverables and also promote events, workshops and all other organized activities.	All stakeholders
Social Media	Create Twitter and LinkedIn accounts to share posts and relevant information of FERTIMANURE progress	All stakeholders
Leaflets and posters	Give visibility of FERTIMANURE to internal and external events, conferences and other activities	Academic & research; fertilizers & chemical industry; farmers; public authorities & policy makers
Biannual newsletter	Share main project information/results and update about project progress	Academic & research; fertilizers & chemical industry; farmers; public authorities & policy makers
Press releases		Society
large-audience vulgarizer video	Raise awareness	Society

3.2.1. Publications

The Industrial and academic partners will individually and in collaboration publish and present scientific advances in technical papers as well as in journals (peer reviewed or not) and magazines. Scientific publications are an effective way to disseminate high level project information and to attract the interest of representatives of the various target groups. Publications in specialised magazines, papers sent to related events will attract the attention of technicians and researchers as well as to give the opportunity to collaborate within the purposes of FERTIMANURE. In order to support this activity, whenever possible, project publications will be archived or linked on the FERTIMANURE website.

In Annex I, the FERTIMANURE consortium has prepared a list of planned articles for scientific Journals, and in Annex II, a list of planned articles for magazines, sectorial publications, etc.

3.2.2. Target Conferences and Events

FERTIMANURE promotes project presentation at scientific conferences targeting relevant domains for the project. The impact of presentations at this kind of events is very high because of the attendance of scientists and industrial experts. National and international conferences are an excellent opportunity to share the results with experts in the field and, therefore, to achieve an effective dissemination of the project. Workshops, meetings and other large events (exhibitions, trade fairs, showcases) represent relevant opportunities for dissemination. The goal of these events will be to disseminate both the techniques developed during the project and the preliminary results of the project to the targeted beneficiaries of the FERTIMANURE project. In Annex III, the FERTIMANURE consortium has prepared a list of planned presentations in conferences in events.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

4. Impact and Exploitation Plan

4.1. Innovation Potential of FERTIMANURE

It is estimated that total farm livestock population in Europe excrete around 1400 million tonnes (Mte) of manure annually, representing the largest waste stream with valorisation potential for production of fertilisers from organic origin. From this, just a relatively small proportion is currently being valorised (energy, fertilizers). FERTIMANURE will provide innovative nutrient management solutions to finally reach a circular economy model to favour rural development in the agricultural sector. Two business models will be developed, one targeting the farming sector and another focused-on fertilisers companies, to take advantage of the opportunities identified by several EU initiatives (EU Circular Economy Action Plan, Common Agricultural Policy, New EU Fertilizers Regulation (which will replace current EC No. 2003/2003), etc.).

What are the specific types of innovative impacts of FERTIMANURE?

- FERTIMANURE is distinguished by its use of **innovative technologies** for the treatment of manure and recovery of useful matter and nutrients. On one hand, the project incorporates individual technologies which have not been widely accepted on the market, have been recently patented, or are still under development. Furthermore, the five pilot plants are notable for the combination of different innovative technologies along the processing chain in order to achieve high efficiencies in nutrient separation and recovery. More specifically:

    - In the Spanish pilot, the main innovations are the implementation of membrane contactors for N recovery (gas and liquid), freeze concentration, the production of biostimulants from microalgae and the valorisation of the solid fraction and P-recovery by means of biodrying coupled to thermal treatments.
    - In the Dutch, pilot, the main innovations are the inclusion of a combined biological acidification plus phosphorus recovery system and the nitrogen recovery from the acidified liquid fraction.
    - In the German pilot, the main innovations for the pilot are the ammonium binding to minimise the nitrogen “leak” into the gas phase and acid scrubber; the catalytic reforming of the manure with zeolite; the selective ammonium recovery directly from the TCR-gas stream; the phosphoric acid leaching of the TCR-biochar and the exchange reaction to produce solid ammonium phosphate ready for application in a decentralised unit.
    - In the Belgian pilot, the main innovations are the market uptake of secondary ammonium sources obtained from on-farm decentralised stripping/scrubbing technologies. Mainly (i) the use of ammonium sources from farms in centralised chemical processing facilities, (ii) the use of alternative counter-acids in acid scrubbing operations, (iii) product delivery, dried granulates vs liquid and (iv) logistics & economics of centralised upcycling scrubber waters.
    - In the French Pilot, the main innovations are (1) to propose these technologies (pyrolysis, and striping - after methanisation or not) in a mobile unit in order to test them on farm on variety of manures and slurries existing in real farms environment (2) to estimate both agronomic values of fertilizers and soil improvers produced and indication on reduction of non-desired compounds (with specific focus on pathogens reductions from poultry manure by pyrolysis) (3) to measure interest of farmers for these new technologies on one hand and, on the other hand, for a mobile service proposing these technologies so that interested farmers could use them even if their manures and slurries production are not sufficient to justify investing money and time in such equipment.

- FERTIMANURE will create a suite of highly **innovative fertilising products**, the so-called tailor-made fertilisers (TMFs), whose objective and innovative nature is that they are designed and produced for specific crops to satisfy individual crop needs. This is in line with a more efficient and adequate

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

fertilisation demanded by society, accompanied by integral fertilisation programs which will promote a more sustainable agricultural model and the rural circular economy. The FERTIMANURE project alone plans to formulate 20 stable and homogenous TMFs that can have a real market value. These TMFs are designed for application to the 10 focus crops of the project.

- With the above technological innovations, FERTIMANURE paves the way for propagation of sustainable manure management and fertilisation with the development of **innovative business models**. On one hand, a business model for farmers are developed, based on the production of of high-quality fertilising products which can either be used directly on farm, or sold to fertiliser companies to produce TMFs. On the other hand, two value propositions are defined for fertiliser companies. On one hand, fertiliser companies are in need to diversify their source of nutrients to produce their TMF, therefore they will produce biobased TMF from secondary renewal resources. On the other side, in mixed farming systems a new model is proposed in which TMF are directly produced on-farm and the fertiliser companies sell to farmers the supplements/additives to produce these TMF. Depending on the value proposition, farmers act as suppliers or customers of the fertiliser companies.

End-user accurate knowledge of eco-friendly and economic viability of end-products produced, encouraging acceptance, is the linchpin to the market uptake of bio-based fertilizers. FERTIMANURE will be developed considering the end-user acceptance and requirements as a key challenge to be addressed since the early beginning. To enhance the acceptance and to facilitate the decision-making process to farmers, a Decision Support System will be developed integrating all generated knowledge taking into account environmental, technical, economic and policy aspects. This DSS will provide information on: (i) WHICH end-products to produce, (ii) HOW to produce them (BBF vs TMF, on-farm vs centralized) and (iii) WHEN and WHERE to use them (better fertilization strategies).

4.2. Socio-economic impacts of FERTIMANURE

In 2017/18, global fertilizer consumption grew moderately (+0.9%) to reach an estimated 187 Mt of nutrients and it is expected that global fertilizer demand will be slightly below 200 Mt in 2022/236. Of this total market, the EU inorganic fertiliser market volume (80%) can be estimated at about 16 million tons of nutrients per year (around 9% of the world consumption, according to IFA). Fertilisers Europe estimates the market size of the European inorganic fertiliser as follows: (i) 10.368 Mt N/year, (ii) 2.408 Mt P2O5/year and (iii) 2.704 Mt K2O /year. Global demand is forecast to grow faster for K (1.8% p.a.) than for P (1.4% p.a.) and N (1.0% p.a.) as a result of steady improvements in N management practices and more balanced fertilization in some regions. Inorganic fertilisers manufacturing plants are distributed throughout Europe, with France, the Netherlands, Germany, Poland and Spain being major producers. The world inorganic nitrogen fertiliser production is currently concentrated in Russia (20%), the United States (19%) and Canada (6%). Morocco, China and the US hold two-thirds of the world phosphate rocks reserves. World fertilizer market conditions in 2017 were relative weak, generating poor margins for the fertilizer industry. Demand was not high, while supply was plentiful. According to Eurostat, the EU total fertilising product market is an economic sector that has between 20 and 25 billion € in annual turnover. Around 95,000 to 100,000 jobs are involved: i.e., approximately 1% of EU Gross Value Added for the whole manufacturing sector and 0.2-0.3% of the workforce in manufacturing.

The three FERTIMANURE business plans for the end-products produced (mineral, organic amendments and biostimulants) will be developed to assure their short-term exploitation and market uptake. In that sense, it is important to mention that the main fertilisers companies in FERTIMANURE consortium are expecting a total turnover increase in the short term of more than 10 million € thanks to the FERTIMANURE project outputs.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

4.3. Environmental impacts

The Farm to Fork Strategy is a big part of the European Green Deal which aims to improve the well-being and health of the current citizens and future generations by transforming the EU into a modern, resource-efficient and economy. The Farm to Fork Strategy aims to accelerate out transition to a sustainable food system and to make food systems fair, healthy and environmentally friendly. The Farm to Fork Strategy is aiming to make sure Europeans get healthy, affordable, and sustainable food, tackle climate change, protect the environment and preserve biodiversity and increase organic farming.

FERTIMANURE aims to recover mineral nutrients, biostimulants and organic matter from animal manure and obtain BBFs and TMFs. The developed end-product will be evaluated under the organic farming regulatory framework and undergo an assessment of their sustainability and acceptability on organic farming. It will benefit farmers facing challenges related to inefficient use and management of animal manure and target solutions to contribute to the long-term sustainability of production agricultural which is in line with the goals of the Farm to Fork Strategy.

Furthermore, FERTIMANURE is in line with the Green Deal strategy that should lead to the use of sustainable practices, such as precision agriculture, organic farming, agro-ecology, agro-forestry, and stricter animal welfare standards. Measures such as eco-schemes should reward farmers for improved environmental and climate performance, including managing and storing carbon in the soil and improved nutrient management to improve water quality and reduce emissions. Green Deal will also need to reflect an increased level of ambition to significantly reduce the use and risk of chemical pesticides, as well as the use of fertilisers and antibiotics. The area under organic farming will also need to increase in Europe. The EU needs to consider the potential role of new innovative techniques to improve the sustainability of the food system, while ensuring that they are safe.

Most of the nutrients in manure are being returned to agricultural land with little or no processing favouring, in that way, N leakage. The main pathways for nitrogen leakage from agriculture are nitrate leaching to ground and surface waters (43%), denitrification (conversion to N_2 gas) (30%) and ammonia emissions (23%). Manure handling and application results in large amounts of nutrient losses (calculated to exceed 6 Mt N per annum) through gas emissions, leaching and runoff. Essentially, these values show that a significant proportion of nitrogen escapes as gases to the atmosphere, and most of the rest is leached into groundwater, waterways, and ultimately to seas and oceans. In soils, excess P build-up can lead to increased phosphorus losses through runoff and soil erosion. P and N in waters contribute to eutrophication, reducing water quality, aquatic biodiversity and increasing greenhouse gas emissions. In the atmosphere, nitrogen oxides and ammonia reduce air quality, contribute to atmospheric deposition and have a strong impact on human health.

FERTIMANURE can contribute significantly towards a situation where optimal application of manure with minimal loss of nutrients can be achieved in all regions. For example, the use of biostimulants can increase fertiliser efficiency by 5-25%. A 5% improvement across the EU would mean 550,000 fewer tonnes of N lost to the environment per year. That would mean a cost savings to EU farmers of €165M annually (assuming an average price of €300/t N) improving farm profitability and competitiveness. The following table shows the current environmental impacts generated due to the loss of 6 Mt of N and the expected decrease in these impacts at mid- and long-term after the implementation of FERTIMAMURE Nutrient Management strategies. These calculations do not include the avoided environmental impacts of mineral fertiliser substitution, therefore even better results can be expected. Environmental impacts have been calculated by using the EMEP/EEA models to determine the fate of N in the different environmental compartments (e.g., NH_3 to air and NO_3^- to water bodies) and taking into account emission factors provided by the European Platform on LCA. Ammonia emissions contributes to the formation of particulate aerosols in the atmosphere. The reduction in NH_3 emissions due to a better use of nutrients in manure will help to address air quality issues, as exposure to particles has negative effects on human health. Health effects may include cardiovascular effects such as cardiac arrhythmias and heart attacks, and respiratory effects such as asthma attacks and bronchitis. The production of mineral fertilisers requires the use of non-renewable resources –mineral deposits and/or (fossil)

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

energy. Nitrogen (N) production requires large amounts of natural gas to transform nitrogen from air into forms that can be used by plants. The EU N fertiliser industry is an energy intensive industry and contributes directly and indirectly to GHGs emissions. FERTIMANURE sustainable production of N-fertilisers from animal manure will contribute to the challenging EU 2030 framework for climate and energy policies. The following table shows the global warming potential related to the production of the main N and P conventional mineral fertilizers currently used and the expected avoided impacts at mid- and long-term after the FERTIMANURE implementation. Better use of nutrients contained in manure will imply a reduced need in the production of conventional fertilizers.

4.4. Exploitation of FERTIMANURE results

The exploitation plan is designed in order to multiply the impact of the proposed solutions and prepare the transition towards industrial and commercial uptake in order to fully achieve the expected impact. The EP will describe the activities to be undertaken (how and by whom) in order to ensure the exploitation beyond the project itself.

The exploitation strategy will reflect and will be built-up as a result of sound analysis of the market trends (WP6), potential users, and financial sustainability.

All partners of FERTIMANURE are interested in the results exploitation in different manners. Research partners are more oriented to transfer knowledge and technology to interested stakeholders while the industries are strongly focused on industrialization and future commercialization of the research products.

During the project, several activities will be carried out to prepare the future industrial exploitation of the end-products obtained in FERTIMANURE. Two different actors of the value chain, farmers and fertiliser companies, are envisaged as the main actors to exploit the FERTIMANURE end-products; as both actors have clearly different value propositions, two initial path-compatible business models have already been drafted following a CANVAS approach.

4.5. Market analysis

One technical task carried out in FERTIMANURE (M10-24) is a a comprehensive market analysis of supply and demand for BBF in the 7 EU countries. The analysis will be based both on data gathered in WP1 and data collected via specially designed questionnaire (streams availability, target market and competition, technology applicability, pricing and forecast, previous research). Within each country, the lead partners will carry out a rigorous questionnaire procedure to gather information from the detected stakeholder groups. Here, the emphasis will be on discovering crucial socio-economic elements and detecting technical and legal guidelines to close the nutrient loops within the local market (sustainability of agronomic production by tapping existing agro side streams). Furthermore, investigation of possibilities to valorise manure streams between different regions will be performed (suitable action radius, financial and environmental aspects).

4.6. Commercialization strategy

The new Fertilisers Regulation revision (2016/0084 [COD]) will support future market growth and the transition towards a more competitive, resilient & sustainable EU fertiliser industry. FERTINAGRO is the first supplier of NPK (+20% market share), organ minerals, microgranular and ecologic fertilizers in Spain. In addition, FERTINAGRO provides farmers with sustainable and efficient nutrition solutions working together with its final customers: proximity to farmers is the key. So that, FERTINAGRO develop Integral Fertilization Programs (IFP) for different crops into different zones preparing nutritional programs based on soil and crop characteristics to design the best nutrition plan for each specific case. The business plan of FERTINAGRO in this Project consists in the development of IFPs for each targeted crop in the selected locations using the

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

products obtained in each pilot and completing the TMF formulation with the products that FERTINAGRO has in its portfolio. FERTINAGRO will provide to the farmers with technical advice and all the fertilizers/biostimulants included in the IFP that are not directly produced in that study case to generate a balanced IFP to the target crop. In this way FERTINAGRO obtains an economic benefit by marketing the complementary fertilizers needed for the target crops. This business model avoids the extra cost of the purchase and resale of basic raw materials for fertilizers. FERTINAGRO has enough capacity of production and commercialization to launch the new biofertilizers developed in the project. This commercialization strategy can latter on be replicated by other companies in different markets and countries which will boost the final impact of the project.

A key element to reach the market with the BBF/TMFs produced is its price competitiveness compared to conventional fertilizers, therefore, a key aspect will be to optimize the technological innovations to recover nutrients at comparable costs. It is important to consider that current costs for farmers to treat slurries and manures ranges from 6 to 18€/m3. Therefore, treatment cost reduction coupled to revenues obtained from selling the BBF can help to increase the overall economic sustainability of farming systems. Moreover, environmental externalities (e.g., expenditures to remediate contaminated water bodies) should be considered when evaluating the price of these recovered nutrients which will make the economics of the system even better.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

4.6.1. Preliminary business model for farmers

The commercialization strategy will be developed fully in the FERTIMANURE Business Plans and Models, D6.3 and D6.4, however their preliminary descriptions are given below.

Farmers dealing with manure management currently face the problem to implement cost-effective technologies for manure management. By implementing one of the valorisation approaches proposed in FERTIMNAURE, the farmer will include a new business line on its farm by producing high-quality fertilisers products that can be use used directly on-farm (mixed systems) of sold at fertiliser companies to produce TMF. The following figure shows the initial CANVAS model proposed for farmers to exploit the results derived from FERTIMANURE. The canvas will be further upgraded during the project life-time and according to research findings and stakeholder notions.

Figure 1 CANVAS business model for farmers

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

4.6.2. Preliminary business model for fertilizer companies

Two value propositions are defined for fertiliser companies. On one side, fertiliser companies are in need to diversify their source of nutrients to produce their TMF, therefore they will produce biobased TMF from secondary renewal resources. On the other side, in mixed farming systems a new model is proposed in which TMF are directly produced on-farm and the fertiliser companies sell to farmers the supplements/additives to produce these TMF (FERTINAGRO patented process). Depending on the value proposition, farmers act as suppliers or customers of the fertiliser companies. The following figure shows the initial CANVAS model proposed for fertiliser companies to exploit the results derived from FERTIMANURE. The canvas will be further upgraded during the project lifetime and according to research findings and stakeholder.

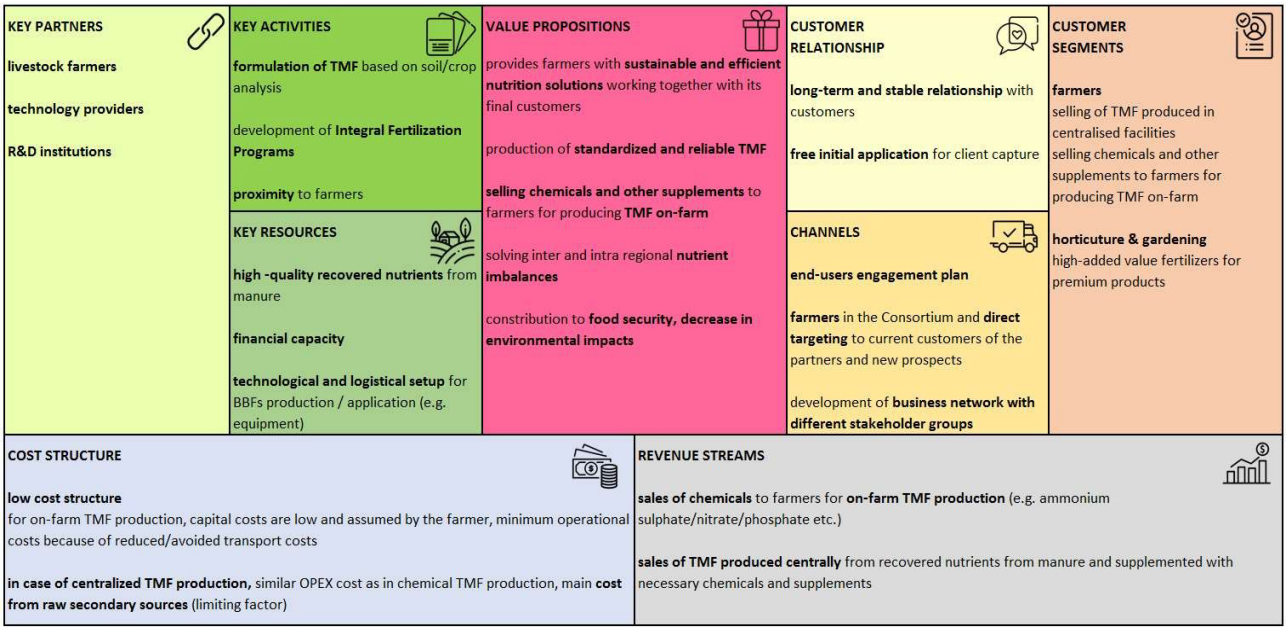

Figure 2 CANVAS business model for Fertilizer companies

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

4.7. Exploitation strategy per partner

In addition to a common exploitation plan developed within the project, partners will also exploit individually their results during and after the end of the project as presented in the following table:

Table 4 Exploitable results of FERTIMANURE

Partner	Exploitable Result	Routes to exploitation	Potential end-users and sectors	Time frame
UVIC	Freeze Concentration Technology	Upscaling to TRL 7-8	Livestock producers, waste management companies	2 years post project
UVIC	Biodrying + Thermal Treatment	Upscaling to TRL 7-8	Livestock producers, waste management companies	1 year post project
UVIC	ILCD Datasets	Implementation in LCA databases	LCA software developers	End of the project
UVIC	Decision Support System for farmer advice	DSS available on-line. Consultancy service	Livestock producers, farmers, fertilizer companies	End of the project
FHR	TCR process with zeolite	Upscaling to TRL 7-8 and further testing for homologation & commercialization	Livestock producers, waste management companies, biofuel companies	2 years post project
FHR	Selective NH_3 removal from syngas	Upscaling to TRL 7-8 and further testing for homologation & commercialization	Livestock producers, waste treatment sector, coke and steel sector	2 years post project
FHR	Phosphorus recovery from biochar and ammonium phosphate production	Upscaling to TRL 7-8	Livestock producers, wastewater companies, fertilizer companies	2 years a post project
LEITAT	Membrane contactors	Upscaling to TRL 7-8	Livestock producers, agro-industrial companies, waste and wastewater utilities.	2 years post project
LEITAT	Micro-algae reactor	Upscaling to TRL 7-8	Fertilizer companies	2 years post project
ALGE	Scenedesmus based biostimulant	Broadening existing microalgae based biostimulant portfolio.	Fertilizer companies, Agroindustry	1 year post project
UGENT	Nitrogen recovery (stripping) process	Upscaling to TRL 7-8	Livestock producers, waste management companies	2 years post project
FERT	On-farm TMF production through the patent WO2017ES070793	Upscaling to TRL 7-8 and further testing for homologation & commercialization	Livestock producers	1 year post project
FERT	New Integral Fertilization Programs	Further testing for commercialization	Farmers, Agroindustry	1 year post project
AGRI	Microbial activated organic amendments	Further testing for commercialization	Farmers, Agroindustry	2 years post project
RITTMO	Pyrolysis mobile treatment plant	Further testing for commercialization	Livestock producers	1 year post project

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

RITTMO	Stripping mobile treatment plant	Further testing for commercialization	Firms proposing services to farms	3 years post project
RITTMO	Relevant information for BBF/TMF standardisation	Submitting project results to relevant standardisation committees	Policy makers	1 year post project
APF	Operational management experience with Nutrient Recovery System	Upscaling to TRL 7-8	Livestock producers, biofuel companies, waste management companies	2 years post project
APF	Practical information of the product quality and value and recovered products for the market	Further development of the NRR system into practice to TRL 7-8	Livestock producers, biofuel companies, waste management companies	2 years post project
DORSET	Nitrogen recovery (stripping) process	Further testing for licensing and commercialization	Livestock producers waste management companies	2 years post project
WENR	Phosphorus recovery (stripping) process	Upscaling to TRL 7-8	Livestock producers, waste management companies	2 years post project
APCA, DARP	Integral Fertilization Programs (PFIs) for each target crop	Further testing for commercialization	Farmers, Agroindustry	2 years post project
APCA, DARP	Integral Fertilization Programs (PFIs) for each target crop	Training sessions	Farmers and advisors	1 year post project
IPS	Development on the market analysis of supply and demand of BBF	Further analysis and market research, broadening database	Livestock producers, farmers, waste treatment sector	1 year post project
GWIN, ELO	Practice Abstracts	Presenting FERTIMANURE in an understandable way	Livestock producers, farmers, policy makers	End of project
INTA, LEITAT	FERTIMANURE replication potential in CELAC	Consultancy services to farmers in Argentina, Chile and others	Livestock producers, farmers, policy makers	End of project

Research Centres and Universities will be benefited from FERTIMANURE results mainly:

- Advancement of knowledge on the technological aspects linked to the FERTIMANURE technological innovations;
- Technology transfer of novel solutions for nutrient recovery, from lab-based prototypes and tests to pilot plants tested at real environment (TRL 6-7);
- Direct contact and exposure to relevant industrial partners;
- Increasing scientific productivity in terms of world ranking and relevant publications;

4.8. Methods for assuring impact and exploitation

FERTIMANURE partners are involved in broad and relevant networks that will be used as lever to map and ensure successful outreach to relevant stakeholders. GreenWin, as an industrial cluster active in green chemistry and industrial biotechnologies, as well as the Biorefine Cluster Europe, initiated and coordinated by UGENT, have excellent connections with national and international clusters in their fields (sustainable

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

chemistry, agro-industry and bio-based resource recovery respectively). GreenWin is also a member of EU networks and association, such as the BIC consortium and the Vanguard initiative Bioeconomy pilot. In addition, FERTINAGRO is a member of BIC consortium. RITTMO is involved in “4 per 1000” initiative and will make link with BBF developed and possibilities to store MO from BBF in soils. Several partners are involved in related EU projects and initiatives and will thus, build bridges between them and FERTIMANURE and hence foster synergies between their respective communities.
Through their involvement in various open innovation projects, the partners have access to important initiatives which increase project visibility. The Biorefine cluster Europe (UGENT), a platform interconnecting projects resource recovery related is already coordinating the communication and dissemination activities of its member projects to boost cooperation and outcomes dissemination and can look at potential synergies of those projects with FERTIMANURE. The cluster furthermore manages the Nutrient Recycling Group of the European Commission Common Dissemination Booster. The learnings from this initiative will be very useful to apply CDB services to the promotion of FERTIMANURE. All partners will be involved in DC activities to ensure the successful completion of our outreach objectives.

4.9. IPR Management

Intellectual property (IP) generated within the project will be protected by patents, if appropriate, and its management will be regulated in compliance with the consortium agreement and the IP agreement among the partners. The consortium has identified three levels of IP, which will be created during the project: i) **Individual and joint IP**, which belongs to individual partners or is jointly owned by partners working in a particular task and is restricted to those partners and likely to be covered by patents/licensing. ii) **Generic IP**, which can be used by all partners of the consortium. Some of generic IP will be made more widely available to European academics, SME’s and other industrial organizations. iii) **Publicly available IP**, which will be published at conferences, on the public web site and made available with no restrictions. The general principles for Intellectual Property Aspects set out by the EC for Horizon2020 projects will apply in FERTIMANURE. **Existing know how (background or pre-existing intellectual property)** of a specific partner shall be made available within the consortium, but strictly limited for use to the achievement of the project goals and for the duration of the project. Each partner owns the foreground he/she develops and is responsible for securing IP of the knowledge or results created during the project. **Results:** owned by one or more of the partners shall be licensed to other partners of the consortium on favorable conditions to the extent necessary to enable these partners to exploit their own results. **Publication of results:** While project results should be published in the usual scientific form, all concept publications must be submitted to all partners together with a request for permission to publish.

4.9.1. IPR Background (CONFIDENTIAL)

.

4.9.2. Exploitable results (CONFIDENTIAL)

4.9.3. Characterisation of potentially exploitable results from FERTIMANURE project (CONFIDENTIAL)

4.9.4. Market analyses (CONFIDENTIAL)

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

5. Discussion

All partners of the consortium must contribute to the dissemination according to their foreseen role and effort and using all available tools, thus for instance by participating and giving presentations at conferences, publishing papers, holding press conferences, networking and similar activities and will strive to maximize the existing dissemination channels for the purpose of project result adoption and successful future commercialization of FERTIMANURE outputs.

The FERTIMANURE audience is manifold: (i) key agriculture and industry players, (ii) research and education community, (iii) policy makers and authorities, (iv) investors in bioeconomy, (v) industry of equipment supply, and (vi) rural communities and society. Furthermore, FERTIMANURE promotes project presentation at scientific conferences targeting relevant domains for the project. The impact of presentations at this kind of events is very high because of the attendance of scientists and industrial experts. Next to this, Industrial and academic partners will individually and in collaboration publish and present scientific advances in technical papers as well as in journals (peer reviewed or not) and magazines.

All consortium partners are encouraged by the partner responsible for dissemination to report the results of each dissemination activity immediately after they are presented. The reports shall include feedback gathered by the respective partner from the target audience (if applicable), eventually gained contacts to be listed in the contact repository used for further dissemination purposes. For monitoring purposes, the dissemination activities will be reassessed regularly and conveyed to the Project Technical Committee by GreenWin during the project progress meetings that take place every month.

For the purposes of evaluation of FERTIMANURE dissemination activities, quantitative indicators and associated metrics were set up where applicable – including KPIs for website, social media, printed materials, videos and newsletters.

6. Conclusions

The outputs of the FERTIMANURE project will have a direct impact on the EU Circular Economy Strategy, which aims to boost the emergence and commercialisation of these new fertilisers. FERTIMANURE will provide clear evidence-based information regarding the quality and performance of the different end-products obtained to assure their market uptake.
In Annex I, the FERTIMANURE consortium has prepared a list of planned articles for scientific Journals, and in Annex II, a list of planned articles for magazines, sectorial publications, etc.

One technical task carried out in FERTIMANURE (M10-24) is a a comprehensive market analysis of supply and demand for BBF in the 7 EU countries.

In addition to a common exploitation plan developed within the project, partners will also exploit individually their results during and after the end of the project. The exploitation strategy will reflect and will be built-up as a result of sound analysis of the market trends (WP6), potential users, and financial sustainability.

Two value propositions are defined for fertiliser companies. On one side, fertiliser companies are in need to diversify their source of nutrients to produce their TMF, therefore they will produce biobased TMF from secondary renewal resources. On the other side, in mixed farming systems a new model is proposed in which TMF are directly produced on-farm and the fertiliser companies sell to farmers the supplements/additives to produce these TMF (FERTINAGRO patented process).

Intellectual Property Rights (IPR) are a valuable strategic and financial asset for every project meaning it should be carefully managed. The IPR Management focuses on the careful handling of IPR issues in the FERTIMANURE project, that are of strategic importance to facilitate the (commercial) exploitation of its end-

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

products and innovative technologies. It aims to create a favourable environment for respecting intellectual property rights (IPR) and ensuring a uniform approach by the FERTIMANURE participants, in conjunction with a permanent IP monitoring during the project.

FERTIMANURE puts lots of efforts through different WPs (WP1 – T1.2, WP4, WP6, WP7) to ensure continuous involvement of different stakeholder groups, aiming to actively involve farmers, fertilisers industry, technology providers, policy makers, citizens and other relevant stakeholders covering the whole value chain. The goal is to properly focus on all the activities and guarantee a positive impact of all results. Different communication channels and activities will be used for the dissemination of project results in a user-friendly manner.
Better insight will be provided through webinars, advertising through the media, social sites. Exploitation of foregrounds will be happening during and after FERTIMANURE execution in order to convey the right message to the right stakeholder. Each type of stakeholders is expected to engage variously with the project and to provide different feedbacks. GreenWin is the responsible partner for external communication.

7. Recommendations

Communication and dissemination activities play an important role to increase the impact of an H2020 project. Communication aims to create awareness of the EU initiatives, promote the project and its results to a very differentiated target of audience ranging from stakeholders and investors to the media and great public. Dissemination is more focused on fostering the transfer of knowledge created within the project to make the results available for others to use.

The FERTIMANURE audience is manifold: (i) key agriculture and industry players, (ii) research and education community, (iii) policy makers and authorities, (iv) investors in bioeconomy, (v) industry of equipment supply, and (vi) rural communities and society.

The Dissemination Plan in FERTIMANURE project represents the strategic vision of the Consortium in terms of communication of the FERTIMANURE project itself, and of its achievements and outputs as well. The Dissemination Manager, Mr. Rodrigo Arandi (GWIN), will lead the communication and dissemination activities whereas partners such as Fertilizers Europe (industries), European Landowners Association and or French Chambers of Agriculture (Farmers and Policy makers) will also have a key role to maximize FERTIMANURE impact.

The Exploitation Plan is designed in order to multiply the impact of the proposed solutions and prepare the transition towards industrial and commercial uptake in order to fully achieve the expected impact. IPS, as the main expert in this regard in the consortium and leader of WP6 “Market potential, business plan, and exploitation, will serve as the main contact and manager for this aspect of the project.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Annexes

ANNEX I - Proposed scientific articles

Proposed by	Scientific journal name	Tentative article title / general description of topic	Tentative submiss-ion year
UVIC	Journal of Cleaner Production	LCA of tailor-made fertilisers from manure	2023
UVIC	Journal of Environmental Management	Development of a DSS for fertilizer production and use	2023
UVIC	Agriculture, ecosystems, and environment	Agro-ecological characterization of novel tailor-made fertilizers: a Mediterranean field study	2023
UVIC	Plant and soil	Nutrient release profiles of novel tailor-made fertilisers: a pot study	2023
UVIC	Frontiers in plant science	Algal biostimulants for stress protection in ryegrass and tomato	2023
LEITAT	Science of the Total Environment	Monitoring of antibiotic resistance genes along the value chain of bio-based fertilizers	2023
LEITAT	Journal of Applied phycology	Microalgae hydrolysates as new biostimulants	2023
FHR	Bioresource technology	Construction and operation of pipe reactor and granulator for monoammonium phosphate (MAP) production	2022
FHR	Journal of environmental chemical engineering	Construction and operation of biochar leaching reactor for phosphorous recovery	2022
FHR	Journal of Environmental Management	Quality and properties of MAP from TCR-Gas	2023
FHR	Journal of environmental chemical engineering	Ammonium binding performance of zeolites and acids on cattle manure treatment	2021
FHR	Agriculture, ecosystems, and environment	Fertilizing performance of recovered fertilizers and biochar from cattle manure in controlled conditions	2023 - 2024
FHR	Agronomy	Analysis of uptake of phosphorous recovered from cattle manure based on pot trials	2024
UVIC	Science of the Total Environment	New insights on livestock manure valorization for energy and phosphorous recovery	2024
UVIC	Chemosphere	Freeze concentration livestock manure brines for tailor-made fertilizers production	2024
UVIC	Water research	Biostimulants production from algal-based systems treating RO permeate	2023
UVIC	Bioresource technology	Biorefineries for livestock manure valorization: from pig slurry to value-added agricultural products generation	2023
RITTMO	Agronomy	biochar from poultry manure - characterization and effects on plant growth	2022
RITTMO	Plant and soil	agronomic impact of biochar from poultry manure - field results	2023
RITTMO	Plant and soil	Nutrient's dynamics of ammonium salt recovery from manures on ryegrass growth - greenhouse test	2022

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

RITTMO	Science of the Total Environment	Poultry Biochar: carbon sequestration and impacts on soil activities	2023
RITTMO	Environmental Technology & Innovation	Impact of temperature production on poultry biochar properties	2022

ANNEX II - Proposed magazine and sectorial articles

Proposed by	Magazine/sectorial/non-technical publication name	Tentative title/topic	Tentative month/year
UVIC	EIP-Agri	TMFs developed in the context of FERTIMANURE	2022
UVIC	Extensius.cat	New sustainable fertilisers tested in Catalonia	2022
UVIC	Vida Rural	Testing new, sustainable fertilisers from renewable sources	2022
UVIC	Tierras	Testing new, sustainable fertilisers from renewable sources	2022
LEITAT	Algae industrial magazine	Microalgae hydrolysates as new biostimulants	2023
APCA	Le France Agricole ; Campagne et Environnement; Terre Net; Plein Champs; Groupe Réussir	The French Chambers of Agriculture, partner of the European project FERTIMANURE on the production of bio-based fertilisers from manure	Jun-20
APCA	Réussir Terra	FERTIMANURE, a project to optimize manure management	Jun-20
APCA	Paysan Lorrain	Insert in a soil-life article "Biochar, an interesting new amendment?"	Aug-20
APCA	Filières Avicoles	On-farm biochar production	2021
APCA	Action Agricole Picarde	Field trials of new bio-based fertilizers on potatoes: 1st results)	2021/2022
APCA	Réussir Terra	New fertilizers produced at the farm level: 1st results of field trials	2022
APCA	Paysan breton	Three Strategies for Zero Waste Effluent Management	2022
APCA	Potato Planet / La Pomme de terre Française	Results and outlook for potato biofertilizers	2022/2023
FHR	Topagrar	Cattle manure - a resource for fertilizer production	2021
FHR	agrar heute	Fertilizer production from cattle manure - a demand oriented approach for nutrient supply	2022
FHR	Food & Farm	Improvement of plant growth by application of high plant available phosphorous fertilizer	2024
RITTMO	Web-agri	Manures valorization into high value fertilizer	2022
RITTMO	TBD	How to transform your manure into high value fertilizer - FERTIMANURE project	2021
RITTMO	TRAVAUX ET INNOVATIONS	FERTIMANURE project (various themes and results)	2021-22-23
RITTMO	INTERNATIONAL BIOCHAR NEWS / IBI	Biochar from manures: characterization and agronomic properties	2023
RITTMO	ESPP newsletter	Phosphorus bioavailability from manures biochars	2022
UGENT	EIP-Agri	BBFs developed in the context of FERTIMANURE	2022

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

ANNEX III - Planned presentations in conferences and fairs

Proposed by	Conference or fair name	Tentative presentation title/topic	Month/year of planned conference
UVIC	MANURESOURCE conference	(various)	2021
UVIC	World biostimulants congress	Algal biostimulants for stress protection in ryegrass and tomato developed in FERTIMANURE	Nov-23
UVIC	European geosciences union	Agro-ecological characterization of novel tailor-made fertilizers in the FERTIMANURE project	2023
UVIC	Eurosoil	Soil properties as affected by TMFs developed in the FERTIMANURE project	2023
UVIC	European scociety for Agronomy	The development of TMFs in the FERTIMANURE project	Sep-22
UVIC	8th International Conference on Sustainable Solid Waste Management	Integrated valorization of pig slurry for value-added products manufacturing.	Jun-21
LEIT AT	Eurosoil	Antibiotic resistance genes in bio-based and tailor-made fertilizers	2023
LEIT AT	AlgaEurope conference.	Microalgae hydrolysates as new biostimulants	2023
LEIT AT	EABA conferences (it's not detailed the name yet)	Microalgae hydrolysates as new biostimulants	2023
APCA	International exhibition for animal production (SPACE, in Britttany)	Reconnecting nutrient flows between crop and livestock production in a circular economy strategy - FERTIMANURE project	Sep 2021/2022/2023
APCA	Brittany Poultry Day	Depends on results	Dec-21
APCA	Agrimax, Terres Innovation and/or PARTAGE project events Events in Grand Est about fertilization or soil carbon)	Depends on results	2021/2022/2023
APCA	Comité Nord, Potato Europe and/or Quali'Pom (Events in Hauts de France about potatoes)	Depends on results	2021/2022/2023
APCA	Rendez-vous Tech and Bio (in France)	Depends on chosen themes by organizers	2022
APCA	Sommet de l'Elevage (in Clermont-Ferrand, France)	Depends on chosen themes by organizers	Oct 2022/2023
APCA	Paris International Exhibition of technologies and solutions for efficient and sustainable agriculture (SIMA)	Depends on chosen themes by organizers	Nov 2022/2023

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

APCA	Paris International Agricultural Fair Show (Salon International de l'Agriculture de Paris)	Depends on chosen themes by organizers	Feb-23
APCA	Salon TECH & BIO (in Valence, France)	Depends on chosen themes by organizers	Sep-23
FHR	»BIO-raffiniert XI« »Bioökonomie: Baustein der zirkulären Wirtschaft – Chancen für Produkte und Prozesse	Nutrient recovery system from cattle manure at pilot scale	Feb-21
FHR	IFAT	Taylored made fertilizer production from cattle manure	Jun-22
FHR	Symposium Fachverband Pflanzenkohle e.V.	Biochar from cattle manure production and application	2022 and/or 2023
FHR	European Sustainable Phosphorous Conference	Phosphorous recovery and fertilizer production from cattle manure	May-21
FHR	KTBL progress on manure treatment	Nutrient recovery system from cattle manure at pilot scale	2022
FHR	European Biomass Conference and Exhibition EUBCE	Comprehensive valorisation of cattle manure: biofuels and nutrient recovery	2021 and/or 2022
FHR	DPP-FORUM 2023	On-farm production of phosphorus fertilizer by treatment of cattle manure	2023
RITTMO	Paris International Agricultural Show	Tailor made fertilizer produced from manures	2023
RITTMO	Journée Recherche & Industrie Biogaz Méthanisation (French only) Biogas Methanization Research & Industry Days	Ammonium salts obtained from liquid digestate - quality and efficiency	2022
RITTMO	European Nitrogen Workshop	Nitrogen recovery from manure-quality and efficiency	
UGENT	European Sustainable Nutrient Initiative ESNI 2020	Oral or poster presentation about the project	Oct-20
UGENT	European Sustainable Nutrient Initiative ESNI 2021	Oral or poster presentation about the project	Oct-21
UGENT	European Sustainable Nutrient Initiative ESNI 2022	Oral or poster presentation about the project	Oct-22
UGENT	European Sustainable Nutrient Initiative ESNI 2023	Oral or poster presentation entitled: N & P dynamics of manure derived BBF v/s mineral fertilizers in controlled experimental conditions. Case of Flanders	Oct-23
UGENT	MANURESOURCE conference	Oral or poster presentation about the project	2021

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

References

1. EU FUNDING PROGRAMME. *Lessons learnt from the Covenant of Mayors Community. (https://www.iprhelpdesk.eu/sites/default/files/EU-IPR-Brochure-Boosting-Impact-C-D-E.pdf)*
2. EU Project Websites. (2010) *Best Practice Guideline (http://www.eurosfaire.prd.fr/7pc/documents/1271333123_project_website_guidelines_en.pdf)*
3. Grant Agreement Fertimanure NUMBER 862849. EUROPEAN COMMISSION Research Executive Agency
4. Scherer, J. (2017). *Adresssing Impact and Exploitation in Horizon 2020 proposals European IPR*

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

FERTIMANURE

FERTIMANURE

INNOVATIVE NUTRIENT RECOVERY FROM SECONDARY SOURCES-PRODUCTION OF HIGH-ADDED VALUE FERTILISERS FROM ANIMAL MANURE

PROJECT COORDINATOR

Fundació Universitària Balmes (Spain)

CONSORTIUM

Ghent University (Belgium)
Wageningen Environmental Research (The Netherlands)
University of Milan (Italy)
Leitat (Spain)
GreenWin (Belgium)
European Landowners Organisation (Belgium)
IPS Konzalting (Croatia)
Fraunhofer (Germany)
Dorset Green Machines (The Netherlands)
Prinsen Dairy Company (The Netherlands)
French Chamber of Agriculture (France)
Cooperativa Plana de Vic (Spain)
AlgaEnergy S.A. (Spain)
Fertinagro Biotech (Spain)
RITTMO Agroenvironnement (France)
Agrifutur (Italy)
Departament d'Agricultura, Ramaderia, Pesca I Alimentació (Spain)
Fertilizers Europe (Belgium)
Instituto Nacional de Tecnología Agropecuaria (Argentina)

PROJECT WEBSITE:

https://www.fertimanure.eu

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Brief project summary

The mission of the FERTIMANURE project is to provide innovative solutions (technology, end-products, and business models) that solve real issues, ie the manure challenge, and help farmers with the challenges that they are currently facing. FERTIMANURE will develop, integrate, test and validate innovative nutrient management strategies so as to efficiently recover and reuse nutrients and other products with agronomic value from manure, to ultimately obtain reliable and safe fertilisers that can compete in the EU fertiliser market.

The FERTIMANURE project will cover both technological and nutrient management approaches. The technological side will be addressed with the implementation of 5 innovative & integrated on-farm experimental pilots for nutrient recovery in the most relevant European countries in terms of livestock production (Spain, France, Germany, Belgium, The Netherlands), whereas nutrient management will be addressed through 3 different strategies adapted to mixed and specialised farming systems:

Strategy #1 with on-farm production and use of bio-based fertilisers (BBF)(1) , **Strategy #2** with on-farm BBF production and centralised tailor-made fertilisers (TMF)(2) production, and **Strategy #3** with on-farm TMF production and use.

Definition of Bio-based fertilisers (BBFs): *Bio-based fertilisers (BBFs) are fertilising products or a component to be used in the production of (Tailor-Made) Fertilisers that are derived* ***from biomass-related resources.***

The BBFs of FERTIMANURE are "obtained through a ***physical, thermal/thermo-chemical, chemical, and/or biological processes for the treatment*** *of manure or digestate that result into a change in composition due to a change in concentration of nutrients and their ratios compared to the input material(s) in order to get better marketable products providing farmers with nutrients of sufficient quality".*

However, just separation of manure in a solid and liquid fraction (as first processing step) is excluded. These products are not conceived as a BBF, although they are valuable sources to supply nutrients on agricultural land.

LIST OF BBFs Produced in FERTIMANURE

Number	BBF-code	BBF product description
1	NL-AS	Ammonium sulphate solution
2	NL-LK	Liquid K-fertiliser
3	NL-SC	Soil conditioner
4	NL-WP	Wet organic P-rich fertiliser
5	NL-DP	*90% dried organic P rich fertiliser (calc)*
6	ES-NC	Nutrient-rich concentrate
7	ES-DSC	Bio-dried solid fraction
8	ES-PA	Phosphorous (ashes)
9	ES-AM	Ammonium salts
10	ES-AA	AA-based biostimulants
11	DE-AS	Ammonium sulphate solution (liquid)
12	DE-BC	Biochar (solid)
13	DE-AP	Ammonium phosphate on perlite (solid)
14	BE-AN	Ammonium nitrate
15	BE-AS	Ammonium sulphate
16	BE-AW	Ammonium water
17	FR-BC	Biochar
18	FR-AS	Ammonium sulphate
19	FR-LK	Liquid K-fertiliser

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849

Definition of Tailor-Made Fertilisers (TMFs): *A tailor-made fertiliser (TMF) is a customized fertiliser that meets with the nutrient requirements of a specific crop by taking into account the soil type, soil fertility status, and growing conditions and fertilisation practises.*

The TMFs obtained in FERTIMANURE are produced from BBFs (produced from manure or digestate and/or other recovered fertilising products that are available) and/or mineral fertilisers (MF) (and/or biostimulants).

Fully crop specific TMFs can be defined and centrally produced assuming e.g. a sufficient nutrient status of a soil type and no additional fertilisation practice.

However, on farm level the soil-crop requirements will be different due to another nutrient status of the soil and the fact that often manure/digestate will be applied on the fields which has to be taken into account as nutrient supplier. Consequently, the composition of the TMF (combination of BBF and MF) that will be used by the farmer can differ from the one produced in a centralised way.

This project has received funding from
the EU Horizon 2020 Research and Innovation Programme
under grant agreement No. 862849