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Tecnologia Ambiental i Alimentària



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Main elements of Research and Innovation Projects on manure management – **FERTIMANURE project**

Laia Llenas Argelaguet

EUROPEAN PIGMEAT REFLECTION GROUP

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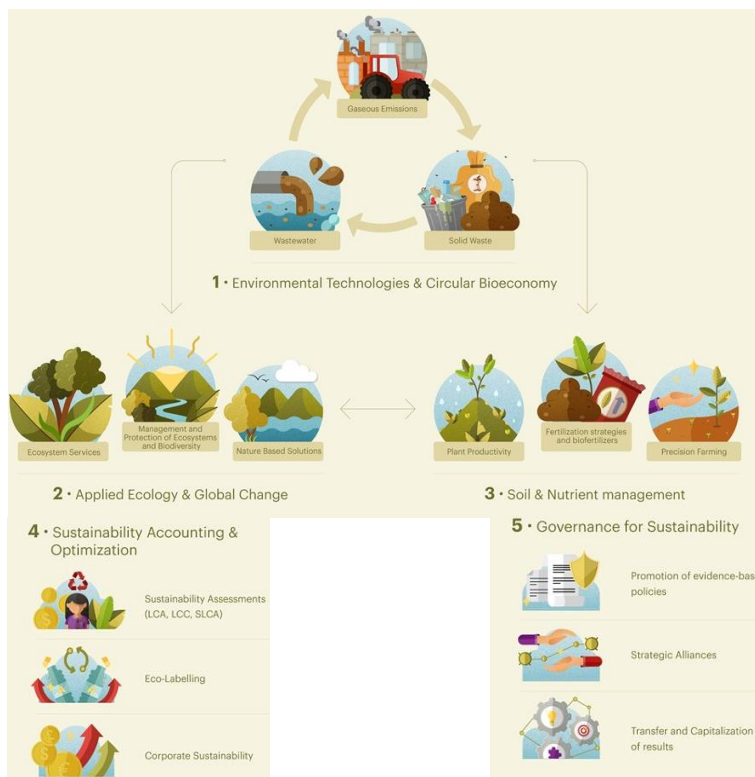
FERTIMANURE



The project has received funding from the European Union's Horizon2020 research & innovation programme under grant agreement No 862849.

The technological centre in Biodiversity, Ecology and Environmental and Food Technology, is willing to contribute to **sustainable rural development** and transition to a circular bioeconomy.

The main mission of the centre is to be a **relevant actor for the technological development, the improvement of the competitiveness and the quality of life of rural societies.**



Nutrient sustainability as a key element in the contribution to rural development and circular bioeconomy



❖ European Projects



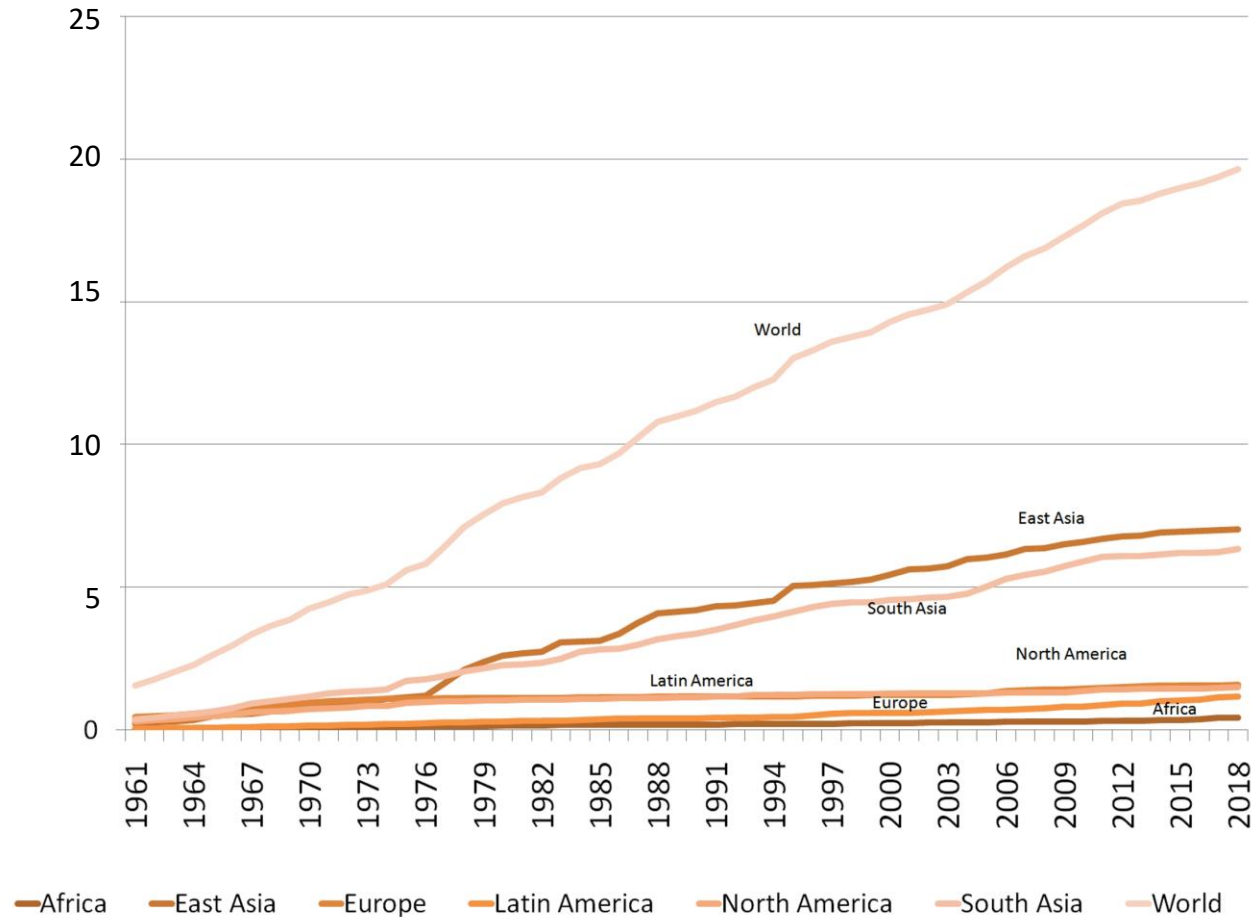
and more...

❖ Operational Groups (EIP-AGRI)

❖ New capitalisation project starting soon...

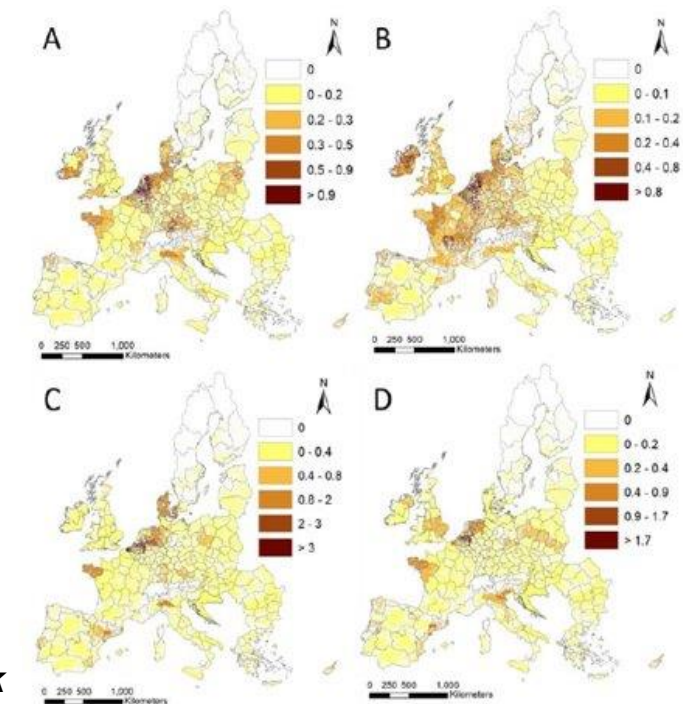


Consumption of synthetic N fertilizers from 1961-2018 (in millions of tons of nitrogen)



- According to the IPCC, the use of synthetic nitrogen fertilizers has increased by 800% since 1960.
- The supply chain of synthetic nitrogen fertilizers was responsible for 21.5% (in 2018) of annual CO₂ emissions from agriculture.
- Synthetic nitrogen fertilizers are responsible for 1 in 40 tons of GHGs currently released into the atmosphere.
- Mineral phosphorous is considered as a critical raw material.
- The current energetic crisis is alarmingly increasing the prices of mineral fertilizers.

- The **EU livestock sector** is the largest in the world.
- Meat, milk and eggs make up 40% of the EU's agricultural value and it accounts for 48% of total EU agricultural activity, with an **estimated €130bn output value annually**.
- Total farm livestock population in Europe excrete around **1400 Mt of manure annually**, which contains **7-9 Mt N/year** and **1.8 Mt P/year**.
- More than 90% of manure produced is currently returned to agricultural fields



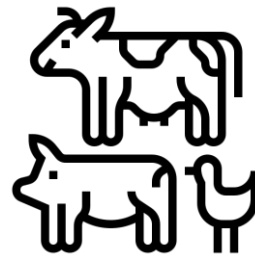
Animal densities by livestock

As a summary...



- Increasing global demand for mineral fertilisers
- Resource Depletion
- Regional Nutrient Imbalances

- In Europe, 1400 Mt/year of manure
- 7-9 Mt N/year + 1.8 Mt P/year
- More than 90% of manure is currently returned to agricultural fields



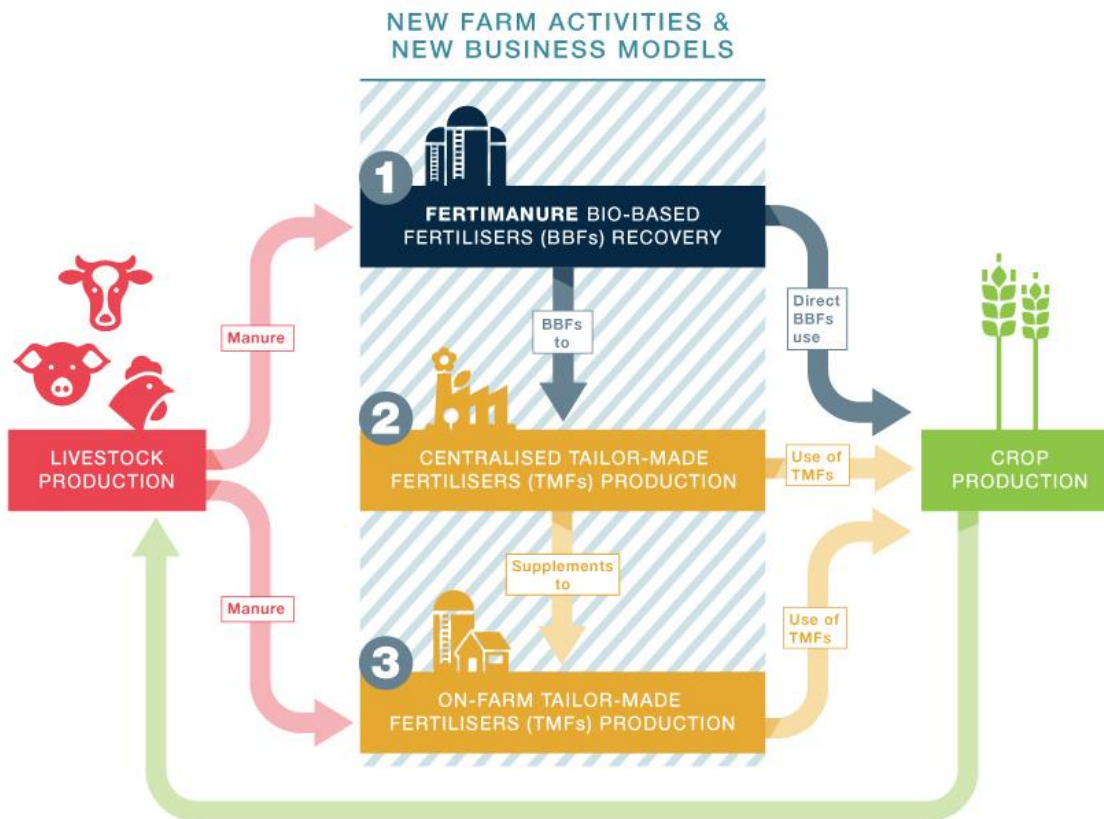
Let's consider the wastes rich in nutrients as an opportunity!



A good Nutrient Management should provide real benefits and solutions / **opportunities** to all those facing challenges related to their inefficient use.

- **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** 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.
- **Policy makers**: Providing **policy relevant information** to support new policies and legislations that enhance circular bioeconomy.
- **Society**: Alternative internal secondary nutrient sources that will, in the long-term, ensure **food security and sustainable agriculture**.

FERTIMANURE CIRCULAR ECONOMY STRATEGY



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”.

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).

FERTIMANURE – From Farm to Market: Upcycling Manure to improved fertilising products



- Is not only about innovative technologies.
- Needs to solve regional and inter-regional nutrient imbalances (export nutrients in a high-added value form).
- Will obtain high-quality, safe and marketable fertilising products from animal manure. The fertilising products include: mineral, organic and biostimulants.
- Will develop specific and complementary business models and exploitation strategies, covering all actors of the value chain.
- Needs to be in line and have an impact to all those EU initiatives linked to nutrient management and fertilising products use (including policies and legislation).

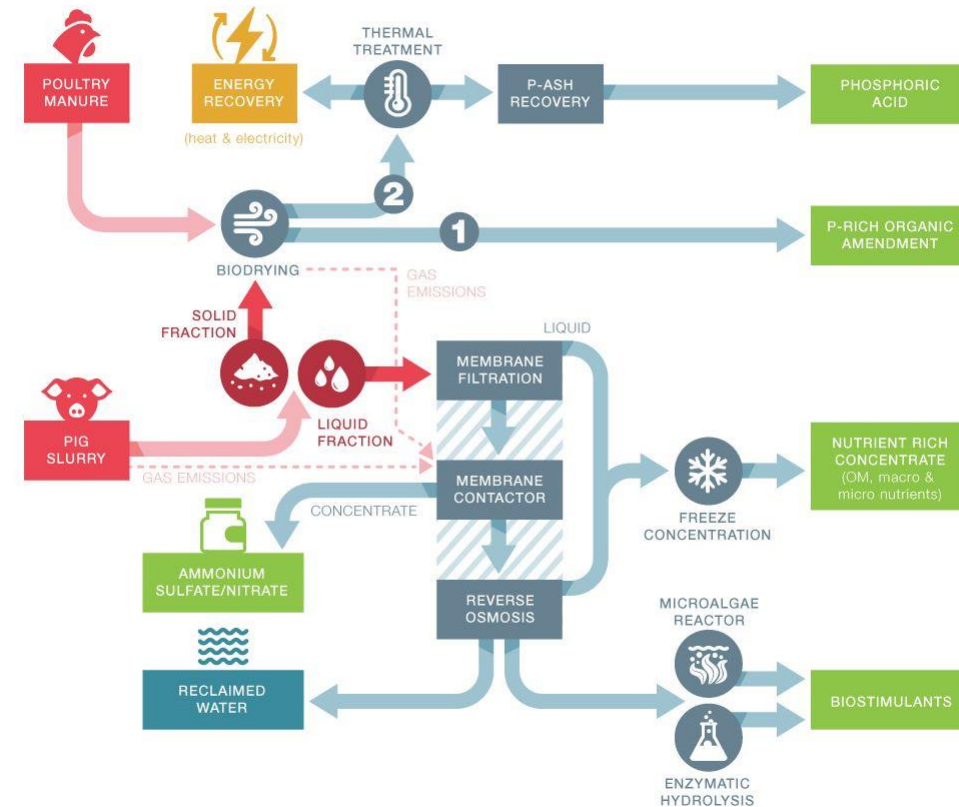


TECHNOLOGY + NUTRIENT MANAGEMENT + QUALITY/SAFETY + BUSINESS + ACCEPTANCE

ON-FARM PILOTS



ON-FARM EXPERIMENTAL PILOT IN SPAIN



The infographics for the other on-farm pilots can be found in our website
(www.fertimanure.eu)

ON-FARM PILOTS



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







Complete **product characterisation**
(Regulation 2019/1009)

Agronomic assessment
(incubations, pot tests, field trials)

Sustainability assessment
(LCA, LCC, sLCA)







Formulation of TMF

The project outputs should target the relevant stakeholders

	STAKEHOLDER GROUP 1 (SG1)	agricultural producers	<ol style="list-style-type: none"> 1) livestock farmers 2) arable farmers, crop growers 3) agro SME's 4) agro associations 5) sustainable agriculture associations
	STAKEHOLDER GROUP 2 (SG2)	fertilisers processing industry	<ol style="list-style-type: none"> 1) Fertiliser companies (manufacturers and sellers, both mineral and organic) 2) chemical industry 3) manure processors 4) public investors in bioeconomy 5) private investors in bioeconomy 6) technology providers 7) fertiliser association
	STAKEHOLDER GROUP 3 (SG3)	academia and research	<ol style="list-style-type: none"> 1) research institutions 2) EU subject related networks and clusters (agro - industry, sustainable chemistry) 3) EU R&D neighbouring projects and consortiums 4) nutrient recycling research community
	STAKEHOLDER GROUP 4 (SG4)	business and financial advisors	<ol style="list-style-type: none"> 1) business consultants 2) financial institutions 3) agricultural banks 4) funding agencies
	STAKEHOLDER GROUP 5 (SG5)	policy makers & authorities	<ol style="list-style-type: none"> 1) ministries of agriculture 2) paying agencies for agriculture 3) agro-connected intermediaries established by government (extension service, LAGs) 4) local council 5) regional government 6) Waterboards 7) standardization body
	STAKEHOLDER GROUP 6 (SG6)	public entities & general public	<ol style="list-style-type: none"> 1) non- governmental organisations 2) media 3) general public – rural communities

- 6 stakeholder groups identified
- We want to understand end-users needs and hear their voice in order to create business plans/models that suit the real case scenarios
- The project outputs should be tailored for the relevant target groups

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FERTIMANURE catalogue of BBFs

- Targeted stakeholder: fertilisers industry
- Aims to present in an easy and understandable way all the relevant information about FERTIMANURE BBFs
- Alignment of the BBFs with the EU Fertilising products regulation



**Support Tool for
Fertilisers industry to
have new source of
nutrients**

FERTI – Manure Management Package

- Targeted stakeholder: farmers
- Aims to help farmers on a better management of manure, considering direct manure use, nutrient recovery, as well as environmental, legal and economic aspects.



**LOGISTICS
TOOL**

**DECISION
SUPPORT
SYSTEM**

**TMF Nutrition
Tool**



**Tailored business
models for farmers**

Acceptance of FERTIMANURE BBFs – Market Landscape Analysis

Share of farmers willing
to accept BBFs from the
following sources (%)

					
	Croatia	Argentina	Italy	Spain	France
manure	70,00	56,92	62,00	47,00	61,11
sewage sludge	7,00	16,15	4,00	6,00	1,85
ash from sewage sludge	5,00	16,92	2,00	6,00	-
household waste	19,00	25,38	18,00	8,00	1,85
food industry waste	10,00	33,85	23,00	12,00	7,41
green waste	-	-	18,00	16,00	5,56
ash	-	-	2,00	10,00	3,70



612 responses were collected

Obstacles for BBFs acceptance



Financial/economic effects

Croatia		50,58 %
France		35,71 %
Argentina		37,70 %
Spain		29,63 %
Italy		49,48 %






Legislative framework

Italy		20,83 %
France		22,62 %
Spain		29,63 %

Technical equipment for application of bio-based fertilisers

Croatia		27,24 %
Italy		21,35 %
Argentina		30,05 %

What farmers wants to see
in BBFs?

					
	Croatia	Argentina	Italy	France	Spain
The nutrient ratio that fits with crop nutrient demand	x	x	x		x
High organic matter content	x		x		x
Basic pH – lime value					
Easy application	x				x
Price per unit of N or other nutrients		x	x	x	x
Ability to use the same machinery	x	x	x	x	
Availability to buy at fertiliser supplier/trader		x			
Certification				x	
Storage (packaging size etc.)					

FERTIMANURE Impact at Policy/Regulation Level

❖ European Fertilising Products Regulation (EU Reg 2019/1009)

The main aim is to evaluate which of the FERTIMANURE products could potentially be **CE marked products**.

Component Material Categories: CMCs

BBF



Product Function Categories : PFCs

BBF

TMF

Final products that can be traded in European market as CE-fertilising products in framework of regulation 2019/1009

- They can contain only authorized raw materials (CMCs)
- They should respect specifications on both efficiency and innocuousness parameters

❖ FERTIMANURE products in Organic Farming framework

The reality of the EU Livestock sector

- Global meat consumption is estimated to increase by an average of 1% per year between 2017 and 2030¹
- Very large farms now account for 72.2% of all the animals being reared in the EU. In the Benelux countries and Denmark, more than 90% of animals are reared on very large farms¹
- Animal manure is the main secondary source of nutrients.

Organic farming targets and limitations

- The area under organic farming has increased by almost 66% in the last 10 years. It currently accounts for 8.5% of the EU's total 'utilised agricultural area'.
- By 2030, at least 25% of the EU's agricultural land under organic farming.
- Nutrients coming from factory farming manure are forbidden.

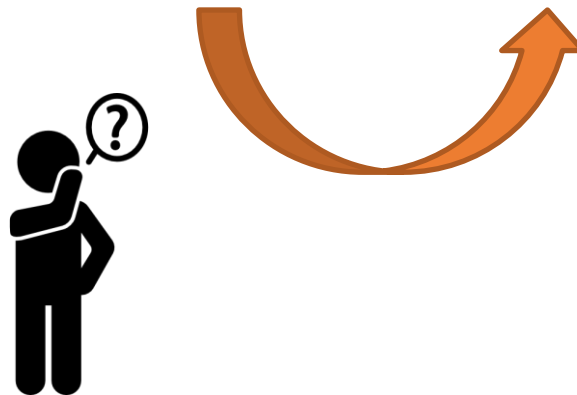
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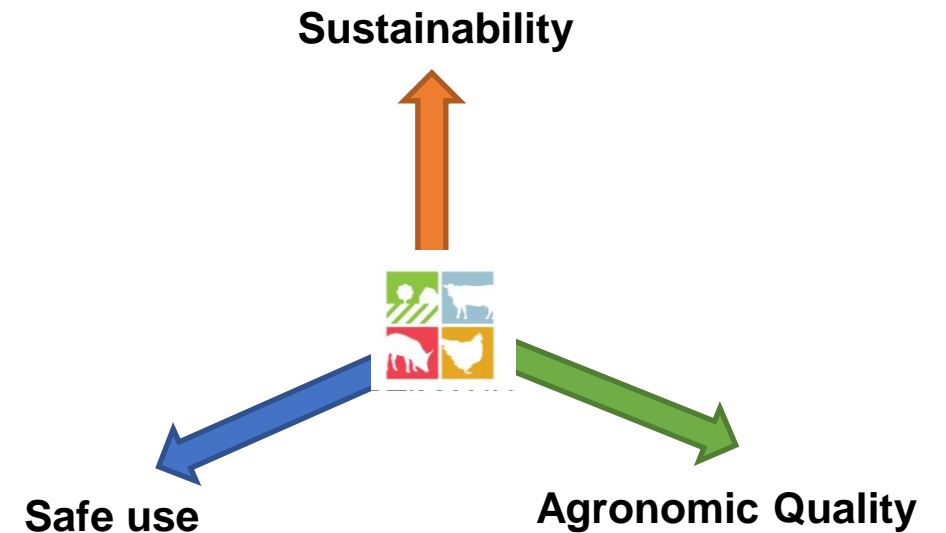
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Which relevant data will FERTIMANURE provide?

- Complete **sustainability** assessment (processes & products)
- **Quality and safety** check of the 18 BBFs with Regulation 2019/1009 and beyond (member state level).
- Thorough evaluation of ARGs and their dynamics when the BBFs are applied in crops
- Comparison of FERTIMANURE BBFs with raw manure and with commercial fertilising products





01/01/2020
31/12/2023

The FERTIMANURE project will be ending at December 2023



www.fertimanure.eu

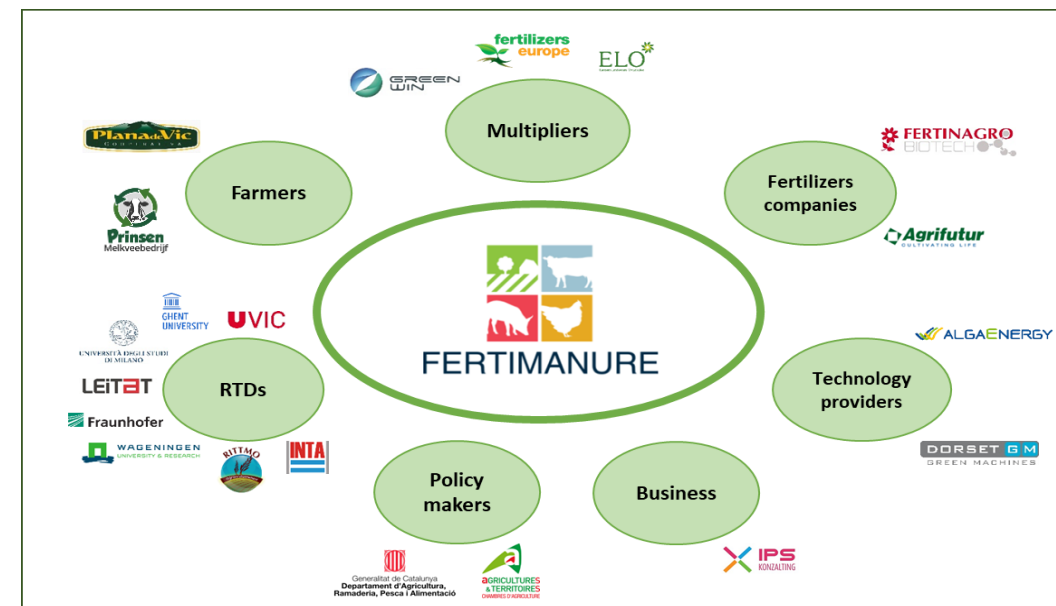
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Thank you for your attention

laia.llenas@uvic.cat
www.fertimanure.eu
www.betatechcenter.com

