Driving circular fertilisers adoption in Europe: FER-PLAY policy insights

ESNI Conference
19th September 2024, 14:55 to 15:55 CET
Ateliers des Tanneurs, rue des Tanneurs 58-62, 1000 Brussels (Belgium)

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

FER-PLAY

Circular fertilisers for healthy soils

Introduction by Inès Verleden, Researcher Energy and Circular Economy at INAGRO

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

What is FER-PLAY?

FER-PLAY is working to

- protect ecosystems,
- decrease EU dependence on fertiliser imports, and
- improve **resource efficiency** through the promotion of **circular fertilisers**.

The project is

- mapping and assessing circular fertilisers made from **secondary raw materials** and
- highlighting their multiple benefits to foster their wide-scale production and application.

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

The challenge

Conventional fertilisers

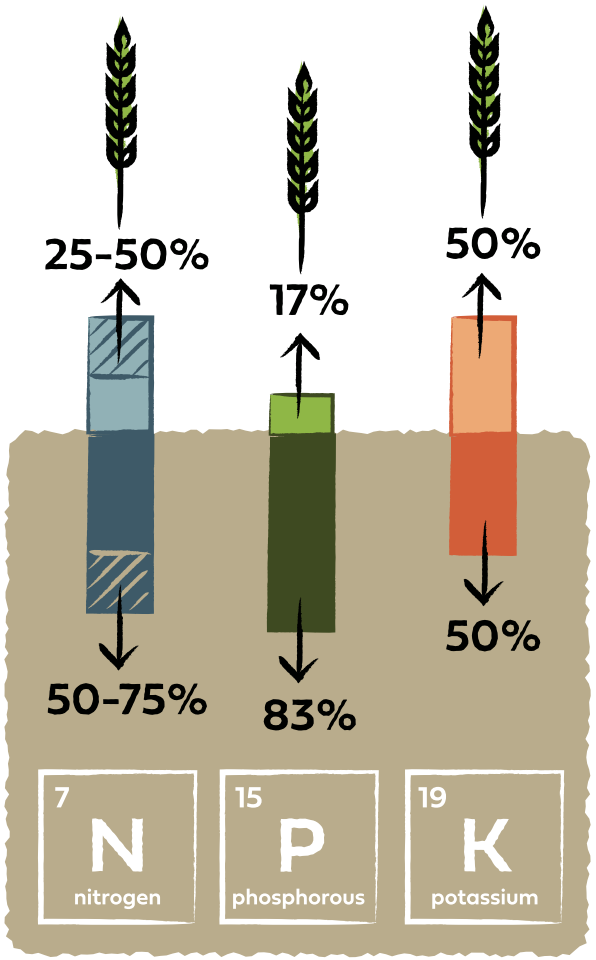
- **Finite**, often **imported**, resources + energy-intensive
- Fast release of nutrients

Crop nutrient uptake

- 25-50% of the available Nitrogen(N),
- 17% of phosphorous (P), and
- 50% of potassium (K)

Excess nutrients

- Soil leaching
- **Degradation of ecosystems and water and soil quality**
- **Reduction of the soil's capacity to sequester CO_2**

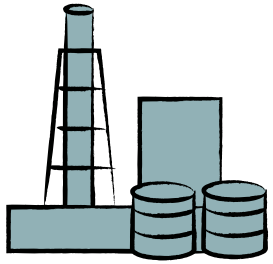


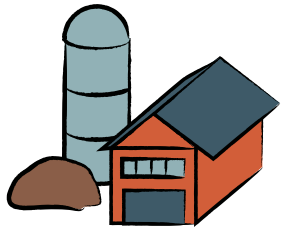
The opportunity

Circular fertilisers as a promising solution to this environmental challenge

Opportunity to **reduce the environmental impact** of fertilisers

Close the loop between domestically available resources and required nutrients to be used in fertilising products

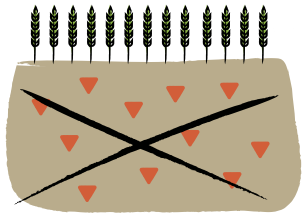




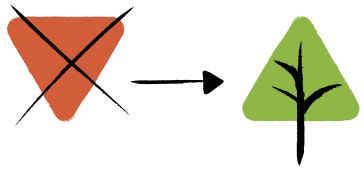
Nutrients recovered from locally sourced secondary raw materials

Yield benefits, **minimising the risks** associated with mineral fertilisers, **protecting the soil and water** from nutrient enrichment

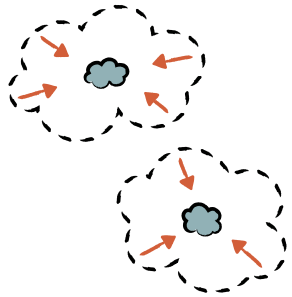
Contributing to EU objectives



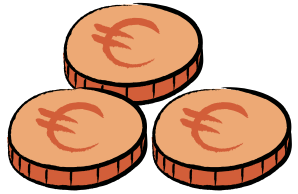
Preventing water and soil contamination



Replacing conventional fertilisers with circular ones



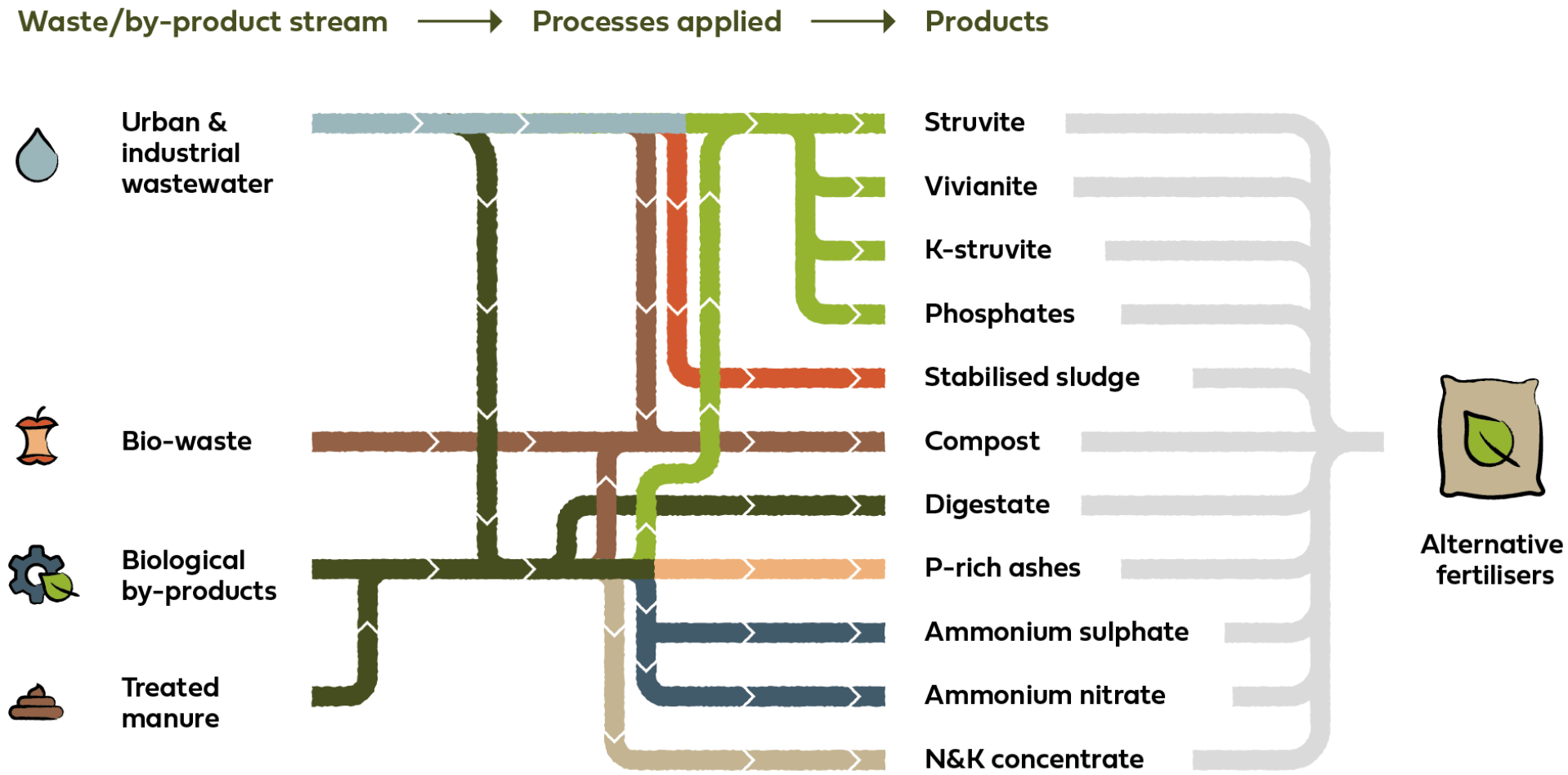
Mitigating GHG emissions from the agricultural sector



Improving resource independence

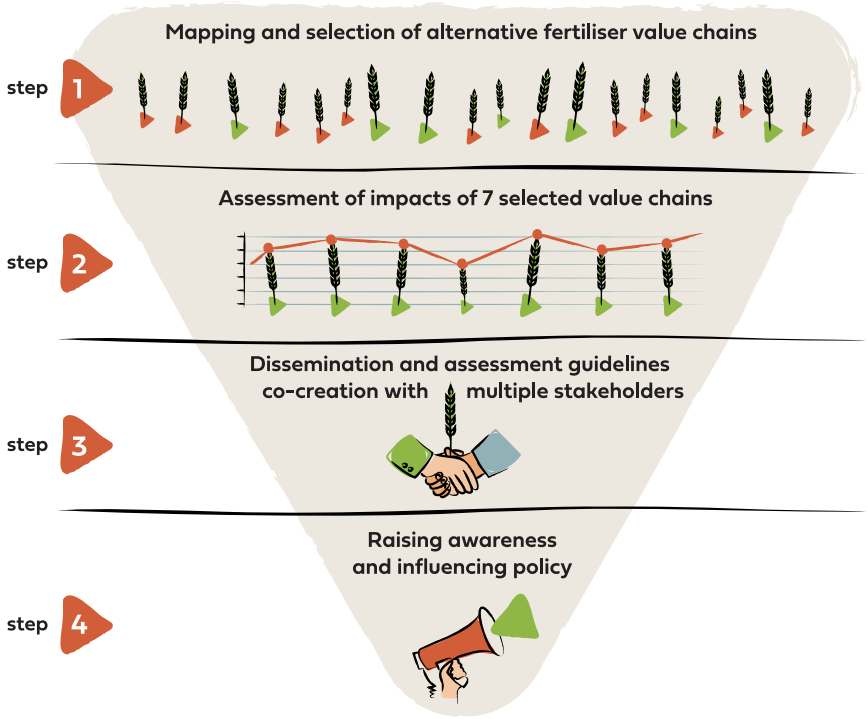
Promoting the circular bioeconomy at local and regional levels

Nutrient recovery



fer play

FER-PLAY's step by step process



Stakeholders targeted

Fertiliser producers

Farmers and farmers associations

Public administrations

Waste valorisation & agricultural researchers

The consortium

Thank you for your attention

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Stay up-to-date with FER-PLAY

Join us on **social media** and head over to our **website** to subscribe for our project **newsletter**, The Alternative, to learn the latest about the project, upcoming activities, networking opportunities, project outputs, and how to be part of the research!

@FER_PLAY_eu

FER-PLAY EU

www.fer-play.eu

Get in touch

Martín Soriano

Project Coordinator | CETENMA

martin.soriano@cetenma.es

Angela Sainz

Communication Lead | European Biogas Association

sainz@europeanbiogas.eu

Inès Verleden

Researcher | Inagro vzw

ines.verleden@inagro.be

fer play

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Life Cycle Analysis results

Dr Christina Papadaskalopoulou

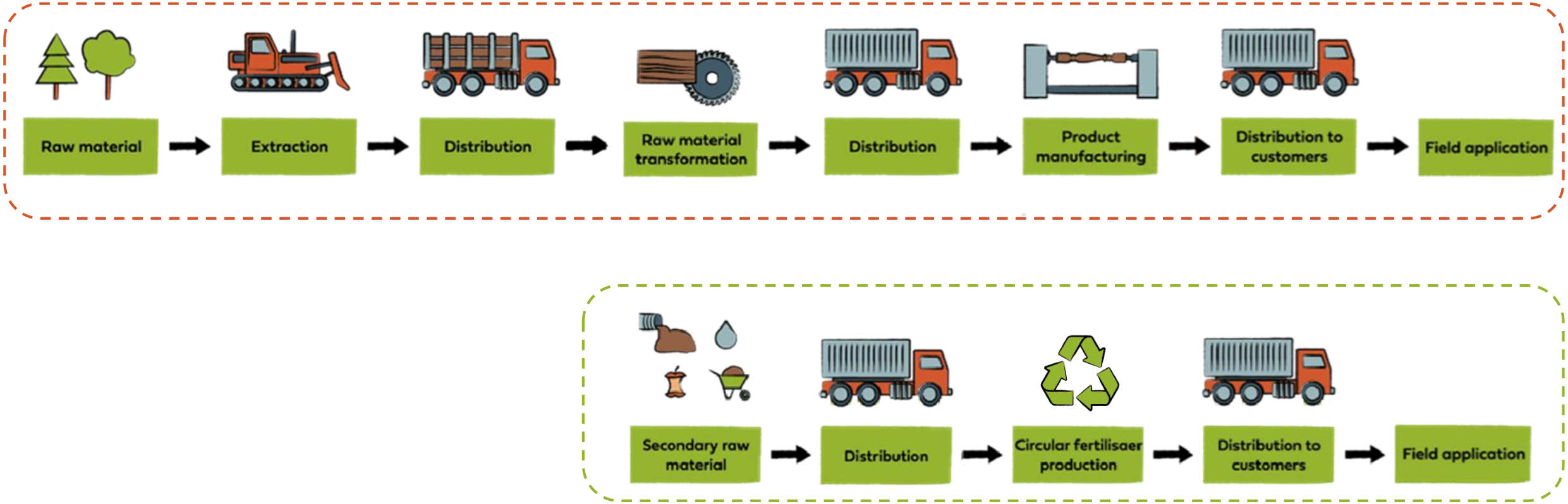
Head of Circular Economy and Climate Resilience,
DRAXIS Research VENtures, DREVEN

ESNI Conference, *19th September 2024*

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Linear VS circular fertilizers

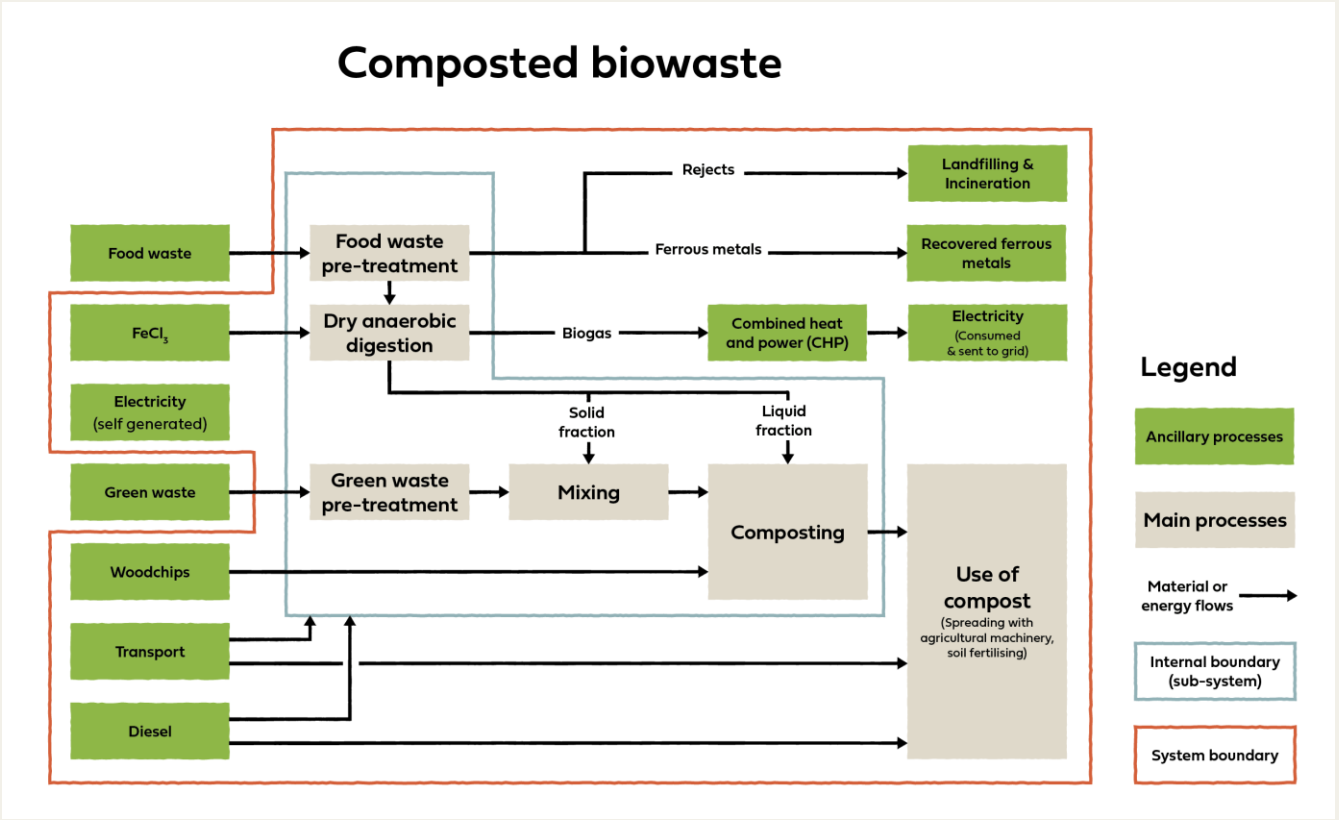


Life Cycle Sustainability Assessment results

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Composted biowaste



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Biowaste

Composted biowaste

Social Dimension
1. Rate of non-fatal accidents at workplace
2. Public sector corruption
3. International migrant stock
4. Frequency of forced labour
5. Living wage per month
6. Trade Union density

> +100%	+ 70-100%	+40-70%	+ 10-40%
Neutral			
-10-40%	- 40-70%	-70-100%	< -100%

Variation percentage of the circular fertiliser vs. its non-renewable counterpart. Greener values mean better prospects for circular fertilisers.

Environmental Dimension
1. Climate change
2. Eutrophication, freshwater
3. Resource use, minerals and metals
4. Land use
5. Ecotoxicity, freshwater

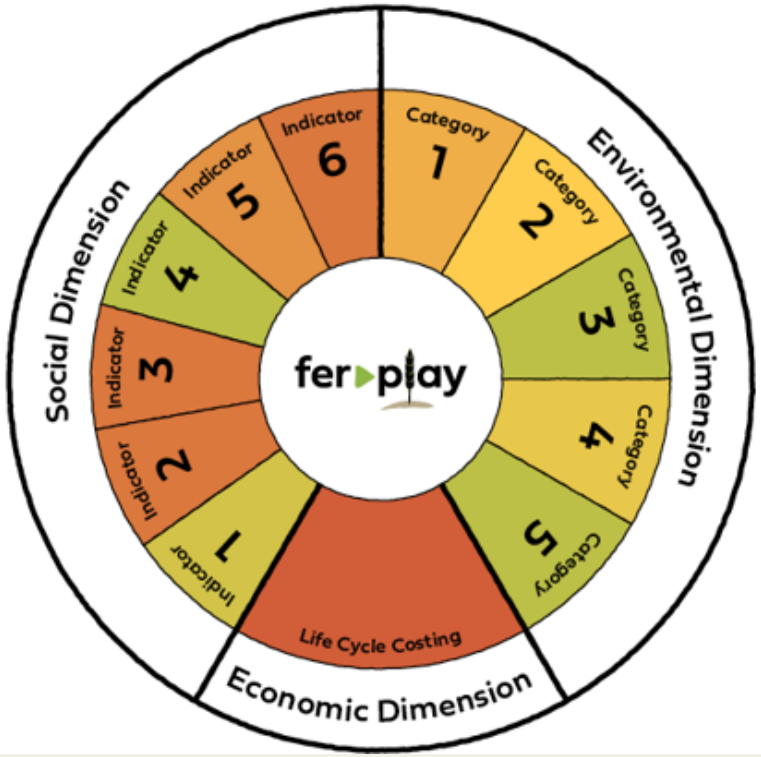
Social impacts

Higher impacts are mostly related to the Sewage and refuse disposal sector.

Economic impacts

Higher impacts for composted biowaste

However: The nature of the business makes it **attractive for public-private partnerships** and public tenders, as food waste treatment is a 'public good' which is hard to be supplied profitably only by the engagement of the private sector.



Northern EU region

Environmental impacts

Lower or similar impacts for composted biowaste

How: This is mainly attributed to the production and use of **renewable energy** from anaerobic digestion.

What: **land use** is the main impact from compost while **resource depletion** is the main impact from the non-renewable fertilizer.

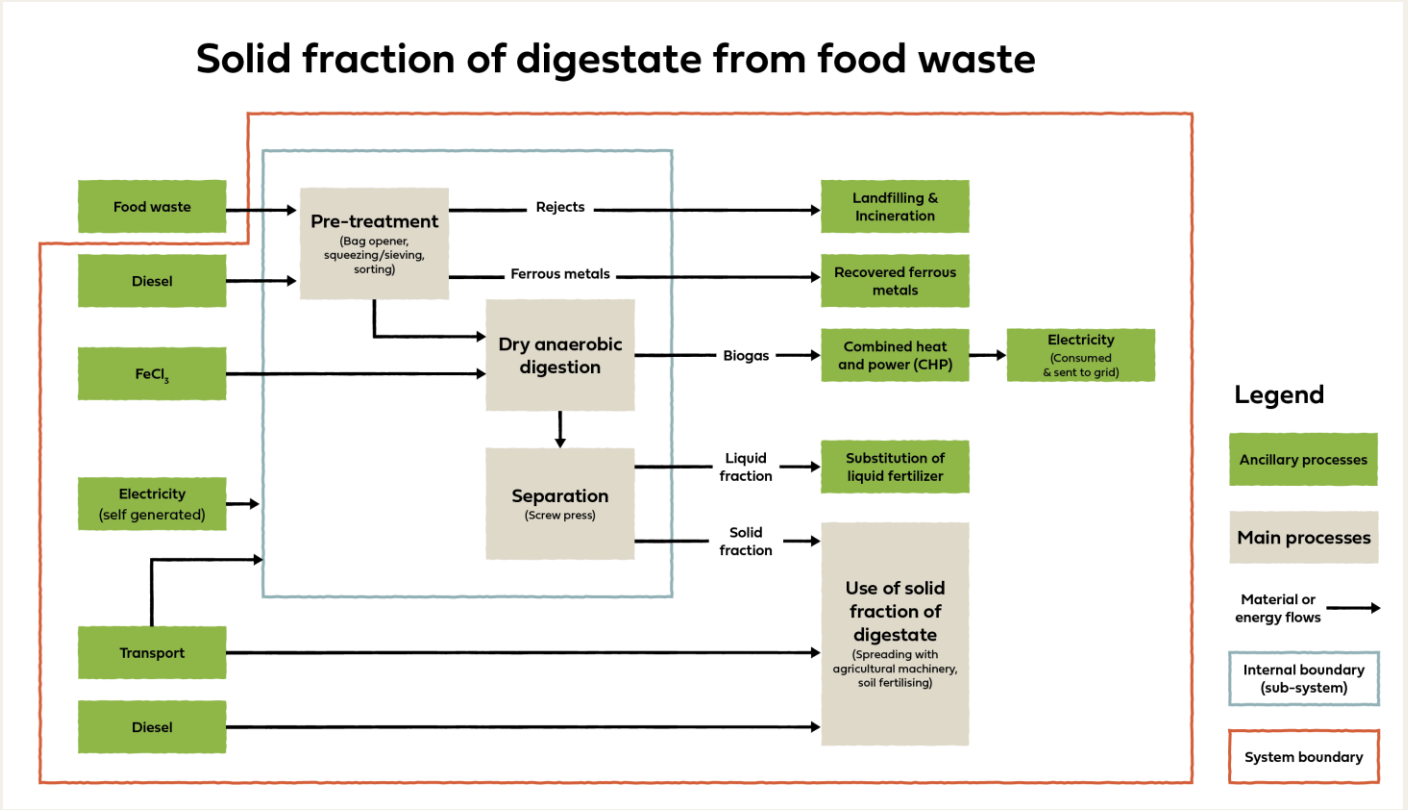
** the avoided emissions resulting from reducing the amount of waste sent to landfilling could also be considered*

fer play

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Solid fraction of digestate from food waste, manure & sewage sludge



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Digestate

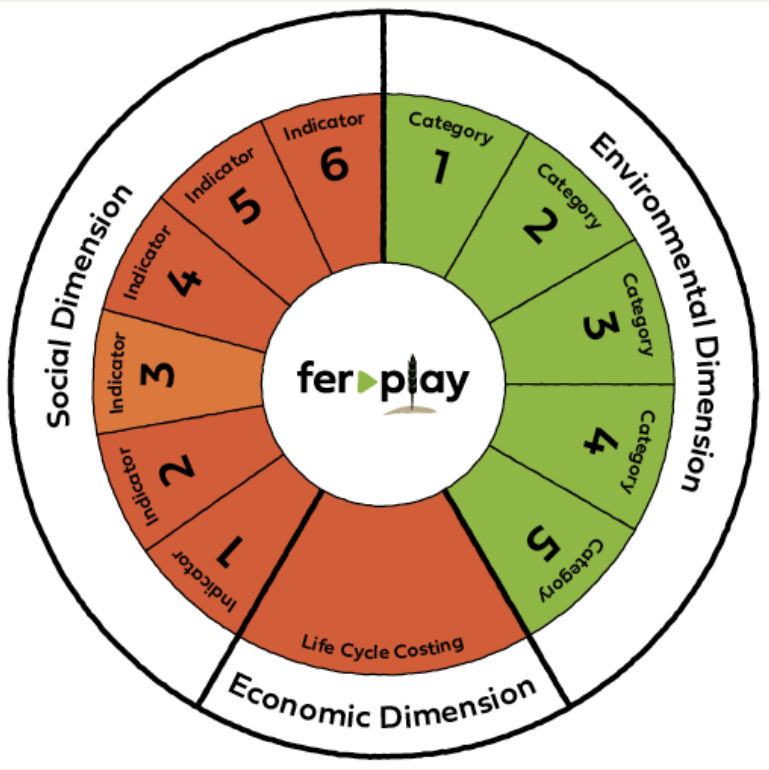
Solid fraction of digestate

> +100%	+ 70-100%	+40-70%	+ 10-40%
Neutral			
-10-40%	- 40-70%	-70-100%	< -100%

Variation percentage of the circular fertiliser vs. its non-renewable counterpart. Greener values mean better prospects for circular fertilisers.

Social Dimension
1. Rate of non-fatal accidents at workplace
2. Public sector corruption
3. International migrant stock
4. Frequency of forced labour
5. Living wage per month
6. Trade Union density

Environmental Dimension
1. Climate change
2. Eutrophication, freshwater
3. Resource use, minerals and metals
4. Land use
5. Resource use, fossils



Social impacts

Higher impacts for digestate

Social risks are mostly associated to the handling of manure

Economic impacts

Higher impacts for digestate

However: **SFD from sewage sludge has positive results**, due to economies of scale and the efficiencies achieved by operating coupled to WWTP.

Environmental impacts

Avoided net impacts for digestate

How: Substitution of conventional electricity production, while assuming that the liquid fraction is also valorised as a fertiliser

The net result of producing and using SFD as a fertiliser **reduces the burden overall**.

Central EU region

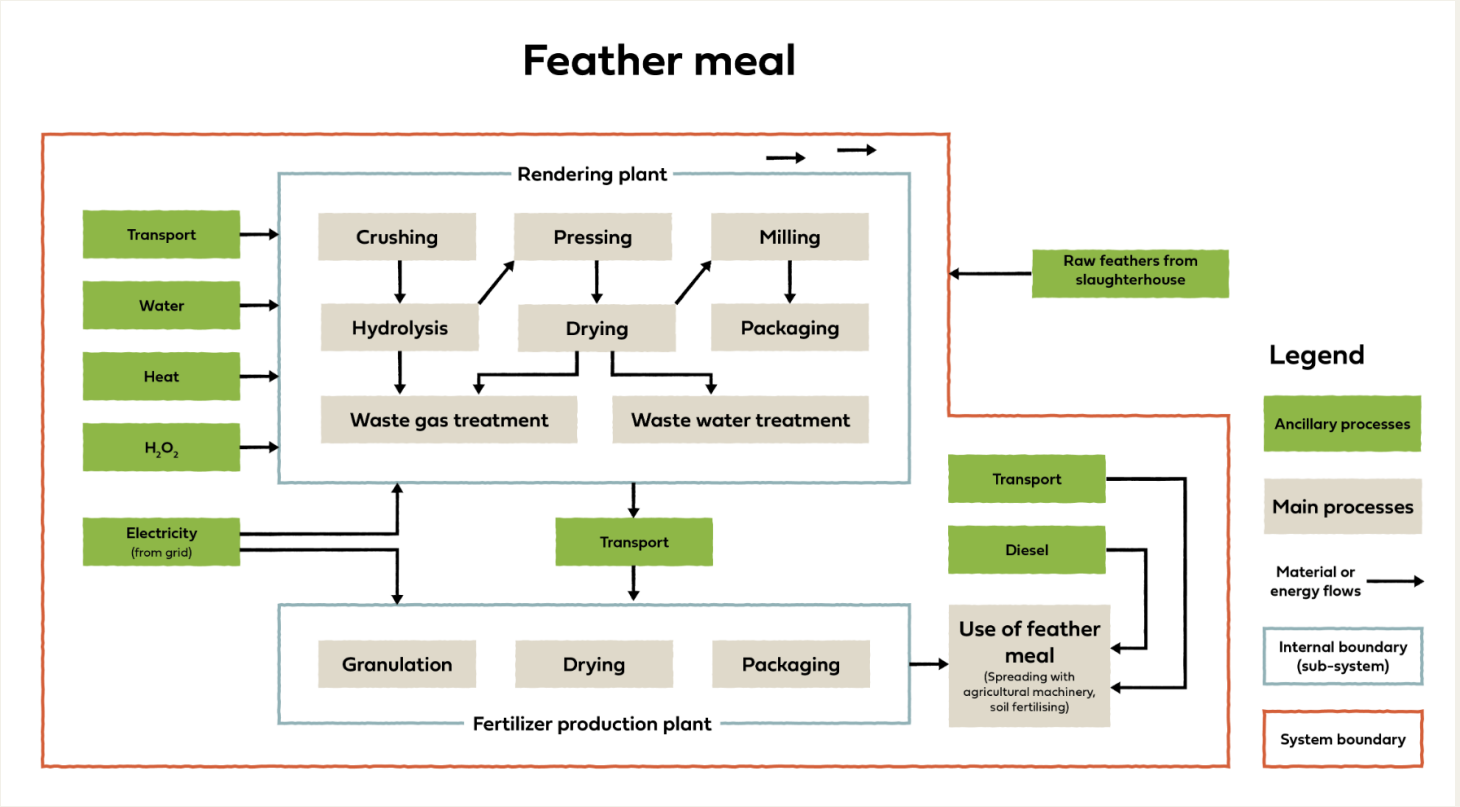
ferplay

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Feather meal

Biological by-products → Feather meal



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Biological by-products | Feather meal

Social Dimension
1. Rate of non-fatal accidents at workplace
2. Public sector corruption
3. International migrant stock
4. Frequency of forced labour
5. Living wage per month
6. Trade Union density

> +100%	+ 70-100%	+40-70%	+ 10-40%
Neutral			
-10-40%	- 40-70%	-70-100%	< -100%

Variation percentage of the circular fertiliser vs. its non-renewable counterpart. Greener values mean better prospects for circular fertilisers.

Environmental Dimension
1. Climate change
2. Acidification
3. Resource use, minerals and metals
4. Eutrophication, terrestrial
5. Eutrophication, marine

Social impacts

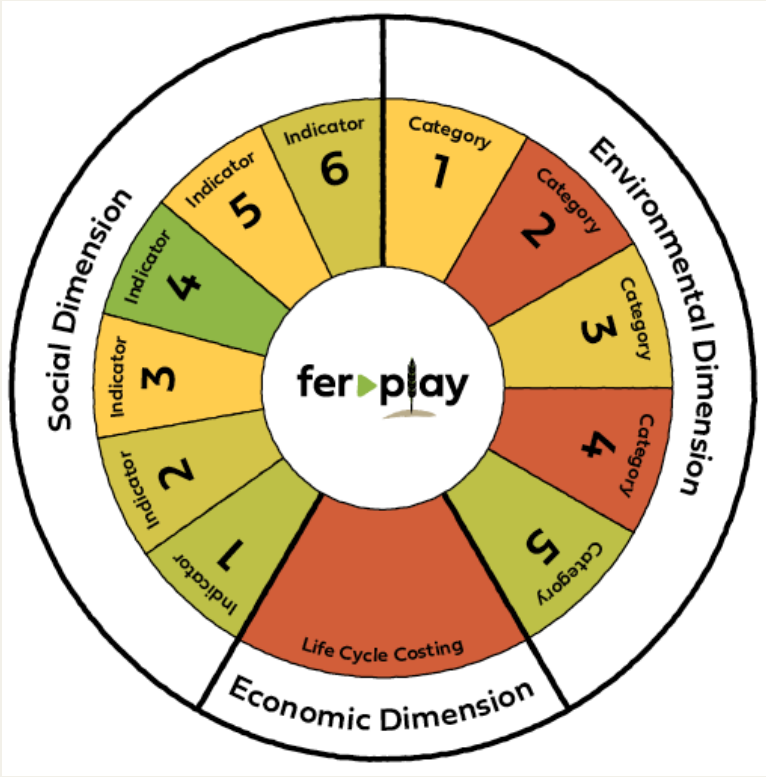
Lower impacts for feather meal

The main contributors are those related to energy provision e.g. electricity, gas, steam and hot water.

Economic impacts

Higher impacts for feather meal

Why? Feather meal as fertiliser has a rather unconsolidated and fragmented market, with limited presence of suppliers across a restricted number of countries that results in an imbalance between supply and demand dynamics.



Northern EU region

Environmental impacts

Use phase: This is the main source of most impacts (except climate change) for both fertilisers, mainly due to **ammonia emissions** from the application of fertilisers on land.

Why? Higher emission factor for FMF than for NRF; Almost **double nitrogen content** applied to land for FMF than for NRF

Production phase: Climate change is the main impact, followed by freshwater eutrophication and resource use.

Why? Energy consumption in the rendering process, as well as the transportation required along the supply chain.

ferplay

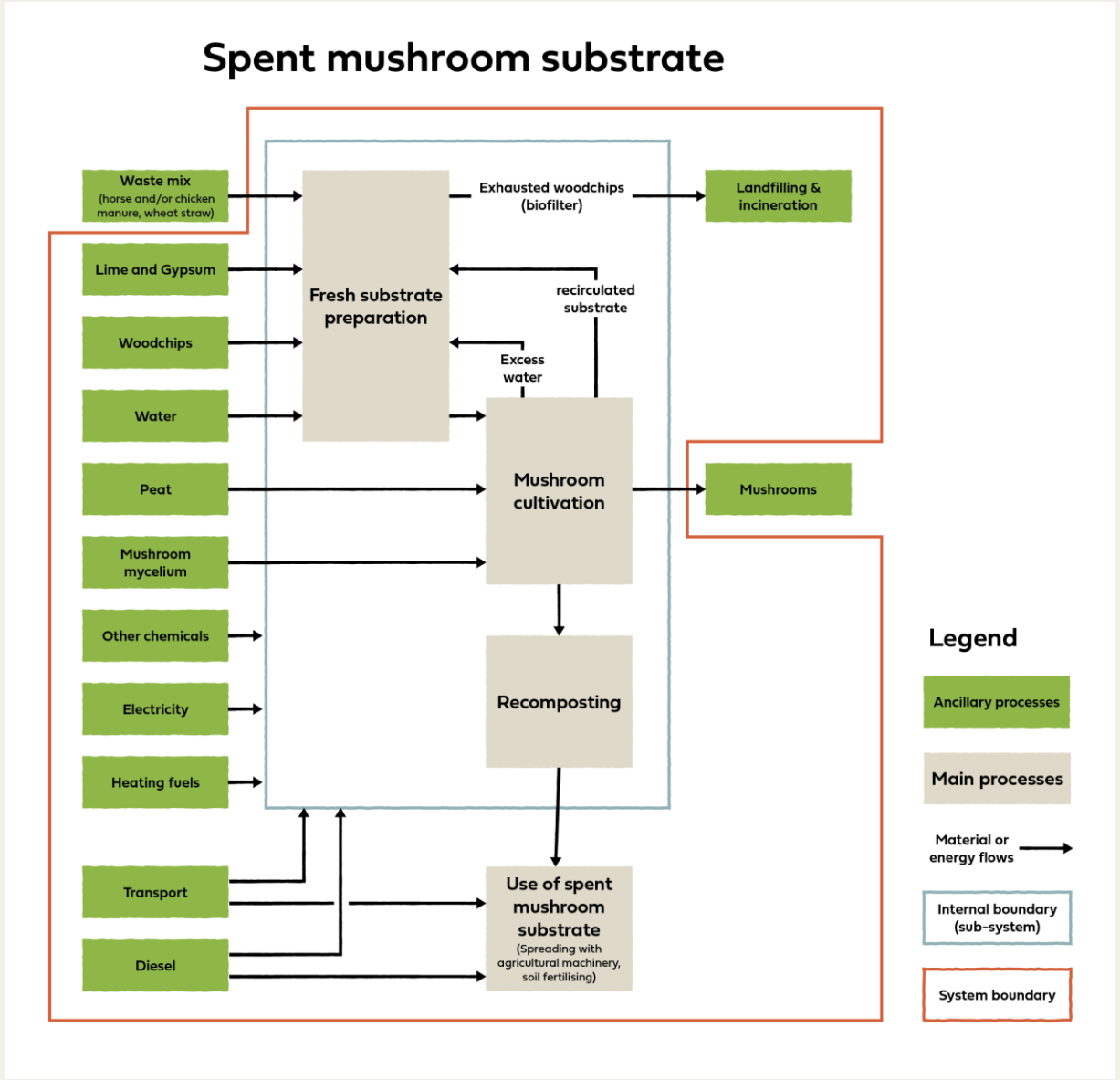
Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Spent mushroom substrate

Treated manure

Spent Mushroom Substrate



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Treated manure

Spent Mushroom Substrate

> +100%	+ 70-100%	+40-70%	+ 10-40%
Neutral			
-10-40%	- 40-70%	-70-100%	< -100%

Variation percentage of the circular fertiliser vs. its non-renewable counterpart. Greener values mean better prospects for circular fertilisers.

Social Dimension
1. Rate of non-fatal accidents at workplace
2. Public sector corruption
3. International migrant stock
4. Frequency of forced labour
5. Living wage per month
6. Trade Union density

Environmental Dimension
1. Climate change
2. Eutrophication, freshwater
3. Resource use, minerals and metals
4. Land use
5. Resource use, fossils

Social impacts

Higher impacts for SMS

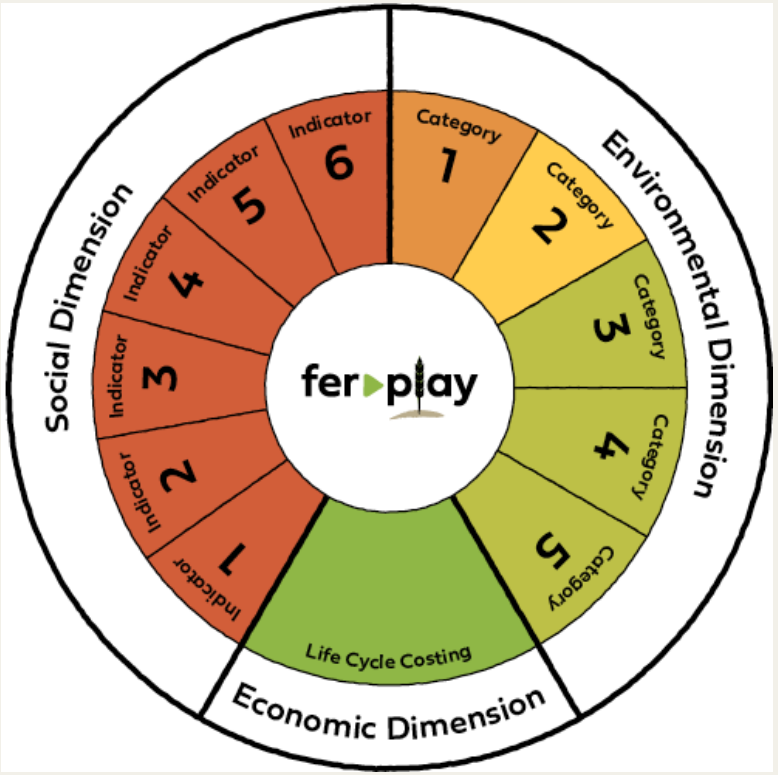
The impacts are mostly associated to the food sector

Economic impacts

Lower impacts for SMS

How? The biggest advantage is mushroom sales revenue. The 'recipe' of the substrate is also relevant, because the more wheat straw used, the higher the yield, and the lower the costs per unit.

However: the high number of actors involved, and the capital-intensive activity of mushroom growing is responsible for high overall costs.



Mediterranean EU region

Environmental impacts

Lower impacts for most categories

Higher extraction of minerals for the production of non-renewable fertilisers

Exception: Lower climate change impacts for the non-renewable fertilisers, due to high efficiency of industrialized processes of fertiliser production (lower consumption of raw materials)

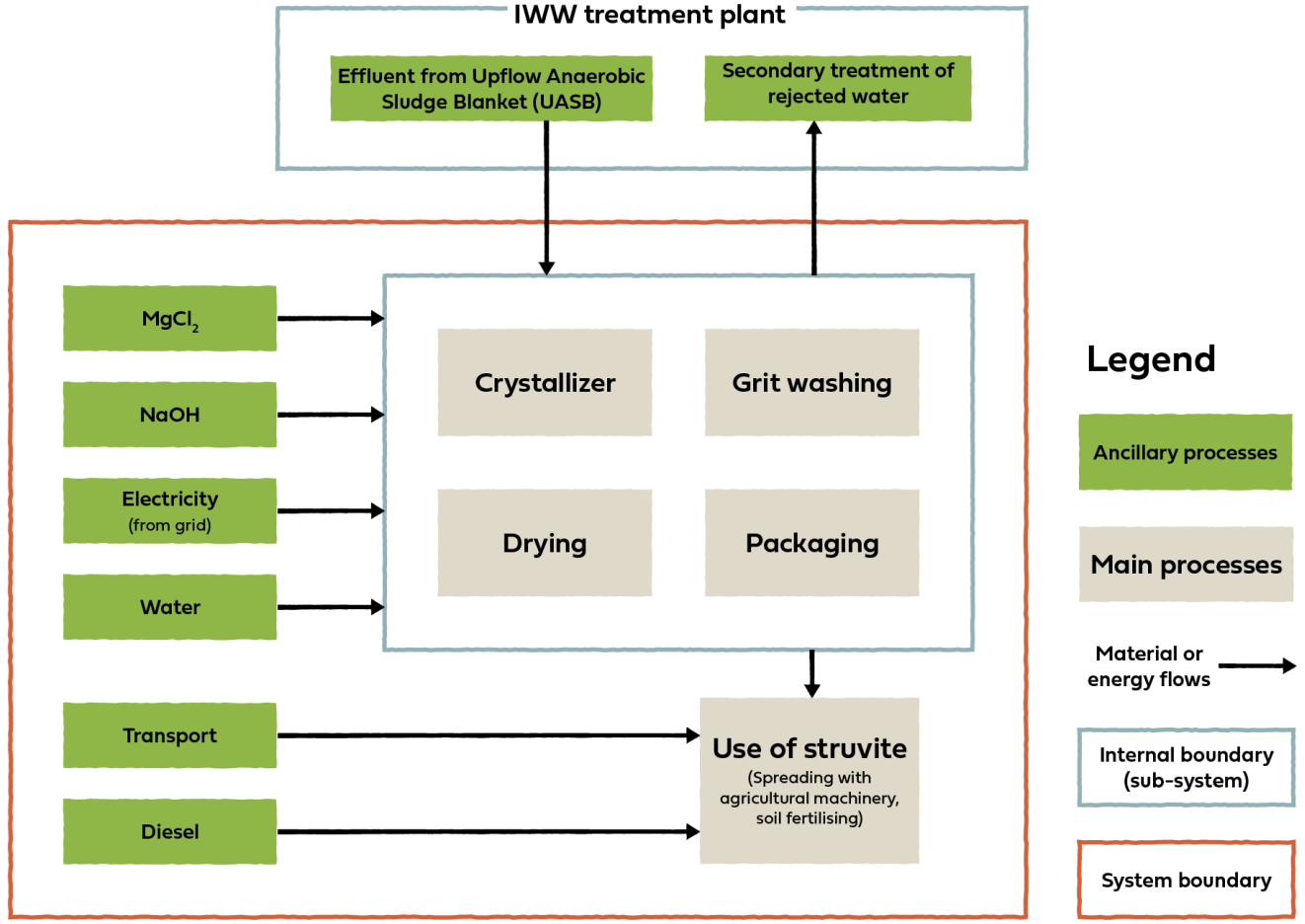
fer play

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Struvite from wastewater

Struvite from IWW



fer play

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

waste water → Struvite

Social Dimension
1. Rate of non-fatal accidents at workplace
2. Public sector corruption
3. International migrant stock
4. Frequency of forced labour
5. Living wage per month
6. Trade Union density

> +100%	+ 70-100%	+40-70%	+ 10-40%
Neutral			
-10-40%	- 40-70%	-70-100%	< -100%

Variation percentage of the circular fertiliser vs. its non-renewable counterpart. Greener values mean better prospects for circular fertilisers.

Environmental Dimension
1. Climate change
2. Eutrophication, freshwater
3. Resource use, minerals and metals
4. Acidification
5. Eutrophication, terrestrial

Social impacts

Lower impacts for struvite

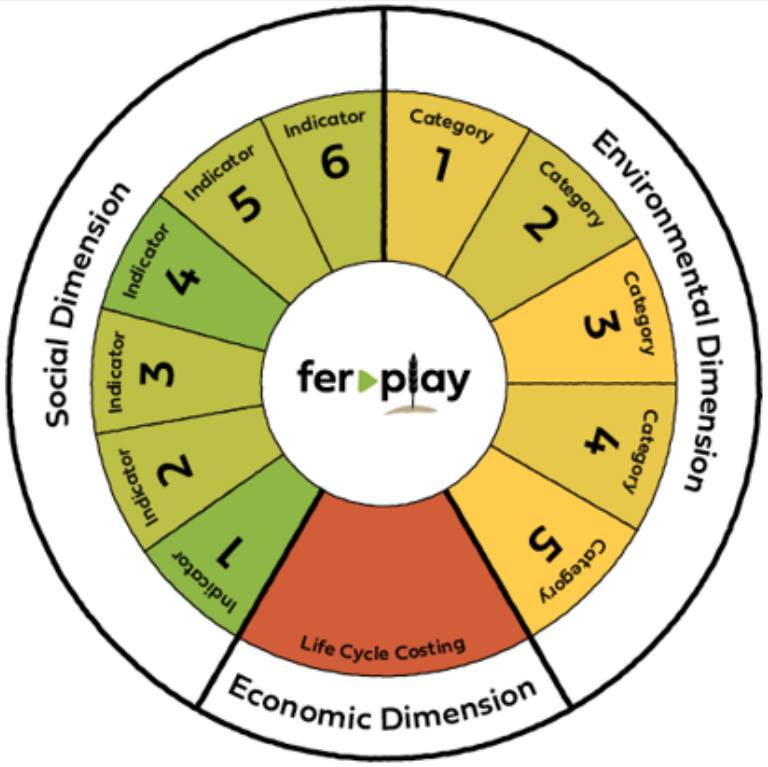
The chemical manufacturing sector is the main responsible for the social impacts

Economic impacts

Higher impacts for struvite

However: If struvite removal for improving operational efficiency was considered instead of struvite recovery for reuse, the costs would be lower.

! Matter of **burden allocation for multifunctional systems**



Northern EU region

Environmental impacts

Production phase: Lower impacts in the production phase due to lower amounts of energy and/or chemicals consumed for struvite production.

What: Main impacts are associated to the use of magnesium chloride for struvite recovery

However: recovered magnesium chloride is also used in some cases, which could further decrease the impacts of the production phase

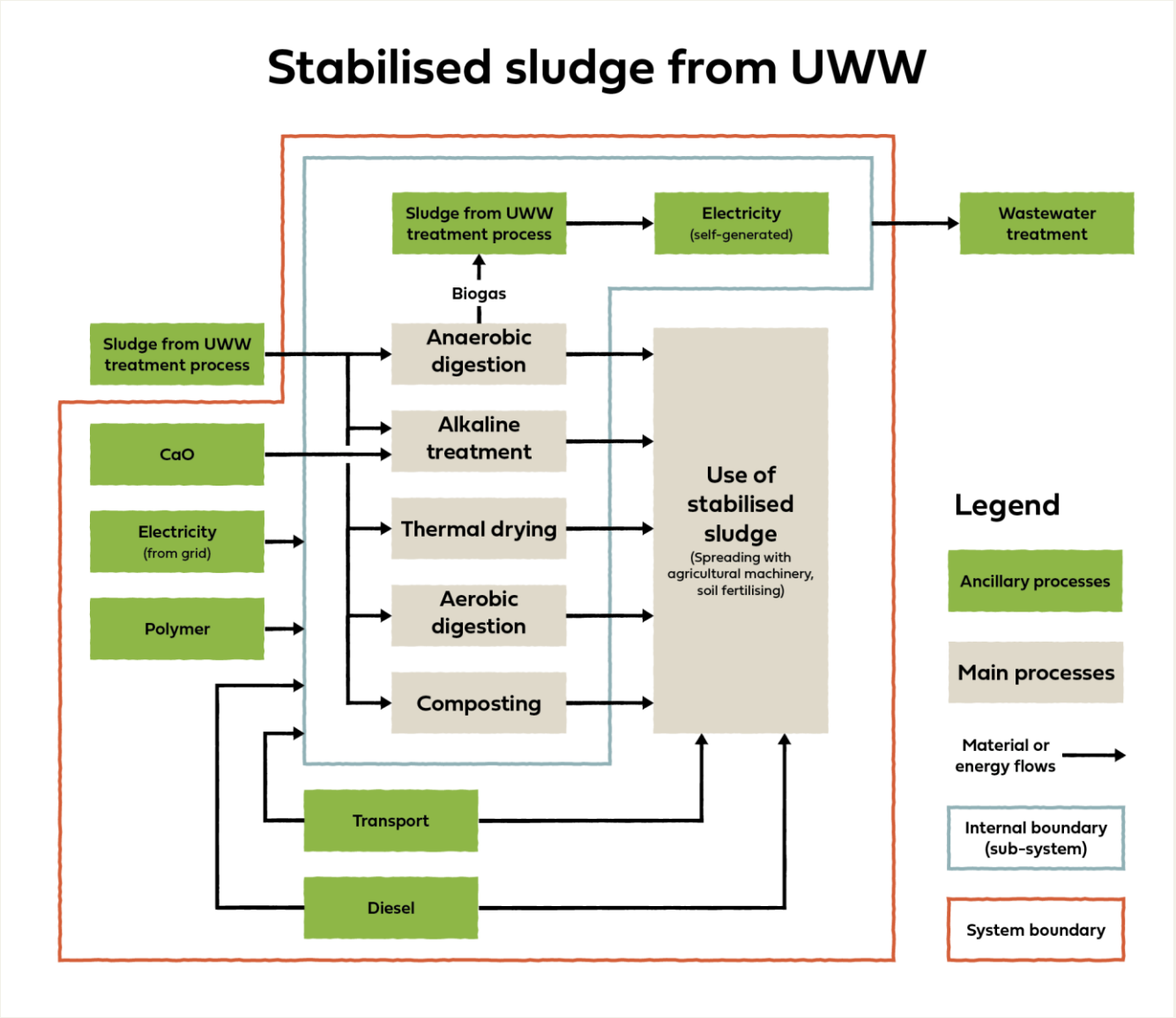
Use phase: Lower impacts during the application of struvite mainly due to its slow-release properties

fer play

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Stabilised sludge from urban wastewater



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Sewage sludge → Stabilised sludge

Social Dimension
1. Rate of non-fatal accidents at workplace
2. Public sector corruption
3. International migrant stock
4. Frequency of forced labour
5. Living wage per month
6. Trade Union density

> +100%	+ 70-100%	+40-70%	+ 10-40%
Neutral			
-10-40%	- 40-70%	-70-100%	< -100%

Variation percentage of the circular fertiliser vs. its non-renewable counterpart. Greener values mean better prospects for circular fertilisers.

Environmental Dimension
1. Climate change
2. Eutrophication, freshwater
3. Resource use, minerals and metals
4. Acidification
5. Eutrophication, terrestrial

Social impacts

The main impacts are associated to the electrical energy, gas, steam and hot water supply sector

Economic impacts

Lower impacts for stabilised sludge

Sludge treatment and reuse is increasingly being incorporated in UWWTP making the treatment of both water and sludge more economically viable.

* As SS is still seen more as a waste, its selling prise is low, but has potential to increase.

Northern EU region

Environmental impacts

Lower or similar impacts for stabilised sludge

How: Its production leads to less environmental burdens and depletion of resources.

What: The use of renewable energy generated by the Anaerobic digestion is an added value that renders the process self-sufficient.

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Thank you for your attention

Christina Papadaskalopoulou chpapadaskalopoulou@draxis.gr

The FER-PLAY LCA team

fer play

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Regulatory framework for struvite utilisation

ESNI Conference, 19th September 2024

Wim Moerman, Dr. Ir. Process Engineer at NURESYS

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.


Regulatory Framework for Struvite Utilisation
Wim Moerman & Aiman Anwar NuReSys Contact: aa@nuresys.com
This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.
moerman
moerman
Aiman Anwar

Regulatory framework analysis: key results for 7 circular fertilisers value chains

ESNI Conference, 19th September 2024

Lucile Sever, EBA Policy Officer for circular economy

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

Objective

Assessing policies and legislations impacting on the **production**, **application**, **marketing** or **promotion/financing** of circular fertilisers.

1. Identify current **regulatory obstacles** hindering the adoption of circular fertilisers by end-users as well as **regulatory drivers** promoting their use.
2. Proposing **policy recommendations** to overcome those regulatory obstacles.
3. Proposing **new regulatory drivers** that can further stimulate the market of circular fertilisers.

Scope

7 circular fertilisers value chains

3 levels of governance

International level

European level

National level (AT, BE, DK, FR, DE, GR, IT, NL, ES, SE)

Adopted legislation and legislation currently in the process of being adopted

Methodology

Identification of policy experts ➔ 46 policy experts

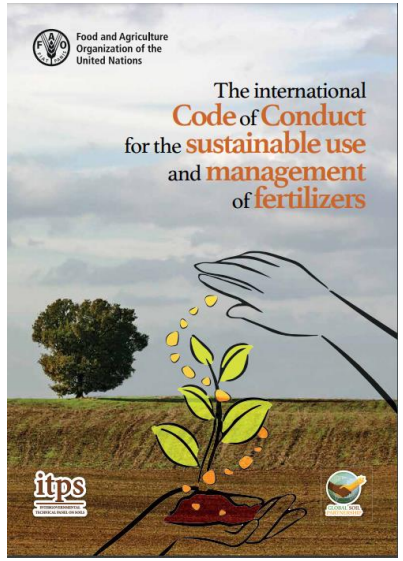
Interview process + online survey ➔ 24 interviews + 20 answers to the survey

Analysis of interviews and survey responses, supplemented by co-creation tasks and literature review

International level

UN's

FAO's



G7's GAFS

Global Alliance for Food Security

US-led Global Fertilizer Challenge

European level

Circular Economy and Zero Pollution Action Plans

Supporting waste prevention, circularity and nutrient recycling

Farm-to-Fork, EU Biodiversity and EU Soil Strategies

Tackling nutrient losses and promoting the use of circular fertilisers

Production	Application	Marketing	Promotion / financing
Waste Framework Directive	Nitrates Directive	Fertilising Products Regulation	Common Agricultural Policy
Animal By-Products Regulation	Sewage Sludge Directive	Organic Farming Regulation	Carbon Removal and Carbon Farming Certification Framework
			Soil Monitoring Law
			Urban Wastewater Treatment Directive
			Taxonomy Regulation

- Certain legislative provisions are significantly hindering the adoption of most FER-PLAY circular fertilisers.
- Certain legislative provisions could be refined to better encourage the adoption of most FER-PLAY circular fertilisers.
- The current legislation is either not obstructing or is actually encouraging the adoption of most FER-PLAY circular fertilisers.

The Sewage Sludge Directive

Which FER-PLAY circular fertilisers are governed by the Sewage Sludge Directive?						
UWW	IWW	SS	BW	FM	DIG	SMS
✓	✓	✓			✓	

Lack of regulation of problematic contaminants or low standard for sewage sludge.

Excessive strictness at national level, inconsistencies between national laws. General distrust of farmers in ***struvite***, ***stabilised sludge*** *and* ***digestate from sewage sludge****.*

The Sewage Sludge Directive must be updated to potentially include stricter concentration limits for heavy metals and set limits for additional pollutants. This revision would increase farmers' trust in circular fertilisers, thereby promoting their use in agriculture.

Lack of political will for a revision

The Fertilising Products Regulation

Which FER-PLAY circular fertilisers are included in the FPR?

UWW	IWW	SS	BW	FM	DIG	SMS
✓	✓		✓		✓	

Certain circular fertilisers not yet included in the FPR (e.g. **feather meal, spent mushroom substrate**). Overly stringent requirements for certain PFCs (e.g. **digestate)** and exclusion of input materials from certain CMCs (e.g. **stabilised sludge**).

Major discrepancy between the ABPR and the FPR limiting the processing of **compost** and **digestate** into EU fertilising products to only the standard transformation parameter.

Incomplete implementation of the FPR (e.g. lack of published EU-harmonised standards for testing methods by CEN, absence of notified bodies in some countries).

Overly complex legislation and difficult to operationalise.

Unnecessary alignment of the national legislation with the EU Fertilising Products Regulation.

The FPR's requirements must be reviewed to establish achievable standards for producers and to include new materials like sewage sludge and industrial sludge.

The inclusion of **feather meal** and **Spent Mushroom Substrate** in CMC 10 must be sped up.

Alternative transformation parameters authorised by national competent authorities under the ABPR must be permitted to treat animal by-products that will be used as input materials for **compost** and **digestate**.

The operationalisation of the FPR must be completed by establishing new notified bodies and publishing EU-harmonized standards for testing methods through CEN. In the longer term, simplifying procedures and making certification more accessible for smaller companies is desirable.

Member States must maintain a separate national legislative framework, setting their own requirements for marketing products as soil improvers or fertilisers.

Continually updated

The Organic Farming Regulation

Which FER-PLAY circular fertilisers are included in the OFR?						
UWW	IWW	SS	BW	FM	DIG	SMS
✓	✓		✓	✓	✓	✓

Overly strict requirement for **struvite** to meet FPR standards for use in organic farming, especially for small producers.

Lack of definition of the concept of "factory farming" at EU level.
➔ *Results in varying interpretations among Member States and a lack of harmonisation.*

The Regulation must be updated to allow the use of struvite certified under national legislation in organic farming.

The concept of "factory farming" needs to be clearly defined at the EU level, or further guidance should be provided for Member States to establish their own definition.

Uncertainty regarding a potential revision

The Common Agricultural Policy

Which FER-PLAY circular fertilisers are included in the CAP?						
UWW	IWW	SS	BW	FM	DIG	SMS
✓	✓	✓	✓	✓	✓	✓

Absence of mandatory measures, under SMRs or GAECs, requiring farmers to produce or use circular fertilisers in the CAP 2023-2027.

Lack of ambition from Member States to introduce additional voluntary measures under eco-schemes and rural development programs to further support the uptake of circular fertilisers.

The CAP must include mandatory measures, under SMRs or GAECs, requiring farmers to produce or use circular fertilisers.

In their CAP Strategic Plans, Member States must introduce additional voluntary measures under eco-schemes and rural development programs to further support the uptake of circular fertilisers.

Interim evaluation scheduled for 2026

New regulatory drivers at European level

1. Revitalising the Integrated Nutrient Management Action Plan
2. Establishing a European Nutrients Recycling Target

3. Implementing fiscal tools for sustainable nutrient management
4. Considering the integration of agriculture into the Emissions Trading System
5. Enhancing Research and Innovation in sustainable nutrient management

Thank you for your attention

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.

About FER-PLAY

FER-PLAY is working to protect ecosystems, decrease EU dependence on fertiliser imports, and improve resource efficiency through the promotion of circular fertilisers. The project will map and assess circular fertilisers made from secondary raw materials and highlight their multiple benefits to foster their wide-scale production and application.

Get in touch

Martín Soriano
Project Coordinator | CETENMA
martin.soriano@cetenma.es

Angela Sainz
Communication Lead | European Biogas Association
sainz@europeanbiogas.eu

Lucile Sever
Policy Lead | European Biogas Association
sever@europeanbiogas.eu

Social Medias


@FER_PLAY_eu


FER-PLAY EU

fer play


Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N° 101060426.