



### GOEfluentes - Livestock effluents

#### COUNTRY

Portugal

#### PROJECT PROMOTER

INIAV - Estação Zootécnica Nacional

#### FUNDING

2014-2020 RDP funds, EUR 260 499  
National funds, EUR 35 522

#### RDP MEASURES

M16 – Cooperation (EIP-AGRI)

#### DURATION

2018 – 2019

#### CONTRIBUTION TO

- generating environmental benefits
- mitigating climate change
- increasing efficiency of biomass resource use
- creating value through increased cooperation among value chain actors
- scaling up a pilot project to commercial scale

#### KEYWORDS

Added value, agriculture, bio-based waste, nutrients, residues, innovation

#### CONTACT

[olga.moreira@iniav.pt](mailto:olga.moreira@iniav.pt)

#### WEBSITE

<https://ec.europa.eu/eip/agriculture/en/find-connect/projects/goefuentes-effluentes-de-pecu%C3%A1ria-abordagem>

## The initiative

This EIP-AGRI project promotes an integrated approach to reducing and valorising the nutrient flows generated within intensive animal production systems.

Considering the economic and environmental importance of the agricultural sector, and the challenges it faces, this project will create concrete solutions that increase the efficiency of water and nutrient utilization, reduce the environmental impact of farming and add value to that which was, until recently, considered as waste.

## RESULTS

- ✓ The BATAFARM software ([www.batfarm.eu](http://www.batfarm.eu)) was developed based on a comparison of the characteristics of different farms from across different European regions. By adapting its applicability to the regional specificities of the livestock sector in Portugal, the results obtained will contribute to the robustness of overall emissions estimates.
- ✓ Develop an inventory of solutions concerning the management of livestock effluents from intensive farms of cattle, pigs and poultry. Define their applicability according to the characteristics of farms and other regional constraints.
- ✓ Determine the potential of using BSF larvae in the biodegradation of effluents in the Portuguese context. The success of this task could lead to the emergence of an innovative service for the valorisation of effluents and for generating fertilizers / correctives for differentiated soils, which have competitive characteristics.
- ✓ Simplify the procedures associated with the agricultural valorisation of livestock effluents and thus facilitate compliance with applicable legal requirements.
- ✓ 27 individuals directly employed in/by the initiative.



## Context

Animal production is crucial for the sustainability of traditional agricultural systems. This is primarily due to the fact that they provide soil improvers (manure) which still hold around 70% of the food's original nutrients and which would otherwise be lost. However, the intensification of these systems results in a global loss of nutrients at various levels. Nutrients related issues include competition for the use of cereals that would otherwise be intended for human consumption; low animal digestive efficiency; excess excreta and negative environmental impacts when manure handling is inadequate (such as improper or accidental effluent discharges). Another problem relates to the high concentrations of holdings in certain regions, which limits their capacity to handle the waste they produce.

The concepts of "circular economy" and "zero residues" are becoming part of the broader policy agenda and are of greater importance in Mediterranean countries due to their climatic and geographical characteristics: high temperatures during the summer, with an average increase per decade of 0.5°C; a decrease of about 80% in precipitation and an increase in the frequency and intensity of droughts; erosion and leaching of soil nutrients. Soils in southern Europe have low organic matter and poor soil quality. In order to address these issues, the EU has introduced the current extensive legislation including the Nitrates Directive, Water, Ceiling of Emissions, etc.

## Objectives

Considering the economic and environmental importance of the agricultural sector, and the challenges it faces, this project will create concrete solutions that increase the efficiency of water and nutrient utilization, reduce the environmental impact of farming and add value to what was, until recently, considered as waste.

## Activities

The initiative promotes resource valorisation that takes into account the different interests that converge in the production and integrated management of nutrient flows in the farming system, thus ensuring sustainable development at regional/national level. In all steps related to the management of these flows (production, collection, storage, recovery and re-use under local conditions), the aim of the recovery will not only be to eliminate nutrient losses, but also to reduce the exploitation of natural resources through recycling.

The identification and classification of nutrient flows will be fundamental to achieving nutrient balance at farm level and, consequently, sustainable management. Specific objectives include:

1. Development of a methodology for mapping the management of nutrient flows in farming systems, based on the relationships between production systems and effluent management, as well as any legislation and constraints on its application.
2. Development of a systematic overview of the management of flows in farming systems, aiming at establishing a pattern of forecasting production scenarios and characterising, in the long term, ecosystems and livestock activities, in specific regions.
3. Installation of experimentation / demonstration units that answer to specific effluent management / valorisation issues and help different actors to comply with the legal / regulatory requirements.
4. Contribution to the Portuguese Emissions Inventory with specific national data through monitoring, reporting and verification of emissions (CH<sub>4</sub>, NH<sub>3</sub>, N<sub>2</sub>O).
5. Collection of spatial information on effluent management systems (storage, treatment, application). Sensitize different actors by providing accurate estimation of emissions; benchmarking; identification of specific mitigation options in each region; studies of different scenarios.

The project will experimentally evaluate the impact of emerging solutions in the treatment of effluents, e.g. the separation of solids by acidification of liquid fractions, or by adding biochar, and solid fraction composting. It will also examine the reduction of pollutants emissions (ammonia and greenhouse gases) and its effects on the management of the effluents, the economic feasibility of applying these technologies to farms and the valorisation of organic fertilizers obtained in other agricultural activities.

The work to be carried out with the technology of anaerobic digestion will make it possible to determine the quality of the substrates / slurries that ought to be considered in order to achieve adequate and viable processes for the three livestock sectors. In addition, biogas production models will be developed to benefit from the potential of local resources. The knowledge generated from the valorisation of the digested co-product in these processes will help to better inform livestock producers and farmers.

## Environmental sustainability

Environmentally sustainable growth, the intensification of agriculture and the adaptation and mitigation of climate change are key points of the European FACCE-JPI initiative strategic agenda.

In parallel, in Portugal, adaptation policies promote the increased resilience of the territory and the economy to climate change. These include the [Green Growth Commitment](#); the Strategic Framework for Climate Policy (QEPiC) (RCM 56/2015) adopted by Portugal that includes the National Programme for Climate Change 2020/2030 (PNAAC) and the second phase of ENAAC 2020; as well as, the SNIERPA (the Portuguese National System for the Estimation of Emissions by Sources and Removals by Sinks of Air Pollutants, RCM 20/2015) for monitoring and reporting on GHG emissions.

SNIERPA proposes that the agricultural sector reduce emissions through the structural adjustment of farms and their improved resource and energy efficiency. As objectives for manure management, SNIERPA encourages the reduction of carbon intensity through manure treatment: i) through more efficient effluent treatment systems (anaerobic digestion with biogas energy recovery, combined with complementary treatment systems e.g. composting; application of the Code of Good Agricultural Practices, etc.); ii) by reinforcing the implementation of the REAP approach, which gives priority to the agricultural valorisation of livestock residues, incorporating organic matter in the soil; iii) GHG monitoring in order to improve the environmental performance of the livestock sector, using methods that are compatible with the Portuguese emissions inventory and the REAP approach.

The GoEfluentes project acts across the entire production system. It addresses the different specificities, trying to typify the main variables of the flows generated in these farming systems. Considering the main impacts, it intends to point out and test operational strategies for the respective sustainable valorisation / management of effluents.

In addition, the contribution to the development of new organic fertilizers and the identification of other agricultural production sectors that can use them, such as fruit and vegetables, will directly benefit these sectors and indirectly the environment and the national economy, by reducing the use of other types of inputs.

## Lesson learnt

Regarding the project's digital platform, one of its strengths is that it simplifies the procedures associated with the agricultural valorisation of livestock effluents and, in this way, facilitates compliance with the applicable legal requirements. Other strengths of this initiative will include the systematisation of information and the construction of geo-referenced databases that will support it.

Likewise, it is expected that a project of this kind will allow further joint action between the project partners relating to the agricultural valorisation of effluents, which until now has seemed unlikely. This will have obvious benefits for all parties.