Project description

Background

Intensive livestock farming has greatly affected the use of manure to replenish the soil, leading to the accumulation of macro-nutrients, such as nitrogen, phosphorus and potassium, and heavy metals (in particular, copper and zinc), and consequently to the increased risk of water and atmospheric pollution. Animal farming is responsible for odorous substances (ammonia) and emissions of greenhouse gases (GHGs) such as methane (CH4) and nitrous oxide (NO2).

The anaerobic decomposition of organic material in livestock manure releases methane. This occurs mostly when manure is managed in liquid form, such as in lagoons or holding tanks. Methane emissions could be reduced by adopting more effective manure management practices or biogas collection. Biogas production from anaerobic digestion of animal manure and slurries is an effective way of reducing GHG emissions.

Livestock waste management in Cyprus is particularly important since several piggeries, poultry and other livestock farms are in operation. However, management practices are inadequate and uncontrolled waste disposal is common. The size of the island and the location of populated areas have meant that such practices have affected the supply of water for irrigation and residential use.

In some countries, some manure is separated and the solid fraction dried and exported. The liquid fraction may be treated and discharged and/or applied to
crop land. The challenge for Cyprus is to link manure management, and especially its treatment, to overall farm management. Manure management and treatment must be compatible with livestock and crop production plans, rather than being separate considerations, so that the benefits of manure management and treatment offset the economic costs to the farmer. At present, standardisation in the design of facilities that treat anaerobic supernatant produced from the treatment of the Organic Fraction Municipal Solid Waste (OFMSW) is under development. To aid this development, it is initially necessary to assess the performance of alternative treatment options.

Objectives

The LIVE-WASTE project aims to:

- Develop, demonstrate and evaluate an integrated system for the treatment of livestock waste. The developed prototype system will be installed at a premises where livestock waste is readily available to be used as raw material in the anaerobic digestion unit. The system involves several advanced, integrated processes for the sustainable treatment of livestock waste. These processes consist of anaerobic digestion (AD) for the treatment of livestock waste for biogas production; a sequencing batch reactor (SBR) for the treatment of the liquid stream produced from the AD, resulting in high quality effluent that can be reused for several purposes; composting for the treatment of the solid stream, and an odour-abatement system for the elimination of volatile organic compounds (VOCs) and odours from the process;
- Introduce and implement innovative solutions for livestock waste management with a low carbon footprint;
- Recover materials and energy from livestock waste to produce reusable effluent;
- Develop and disseminate a strategic plan on sustainable decentralised livestock waste management in line with EU and national legislation;
- Develop and identify concrete market opportunities for the end products; and
- Develop and demonstrate an innovative assessment tool integrating the principles of LCA, cost-benefit analysis and the current legislative framework for the evaluation of system performance and end-product quality.

Expected results: The project expects to achieve the following results:

- Identification of livestock waste production sources;
- An integrated methodology for effective livestock waste management;
- High-quality compost and treatment of effluent phosphorus;
- Minimisation of the environmental disturbance resulting from the production, treatment and disposal of livestock waste;
- Reduction of greenhouse gas emissions;
- An assessment tool for the environmental and socio-economic evaluation of the livestock waste management;
- A strategic plan for the integrated management of livestock waste in EU countries; and
- Assessment of the environmental impact and the burden on climate change from
current livestock waste management practices.

Results

Environmental issues addressed:

Themes

Waste - Agricultural waste
Industry-Production - Agriculture - Forestry

Keywords

manure, odour nuisance, life-cycle management, agricultural waste, animal husbandry

Natura 2000 sites

Not applicable

Beneficiaries:

Coordinator
Cyprus University of Technology

Type of organisation
University

Description
The Cyprus University of Technology (CUT) is focusing its research activities on energy and the environment, by developing synergies and cooperation with universities and research organisations in Cyprus and farther afield. The project will be led by the university’s Department of Environmental Science and Technology.

Partners
Animalia Genetics Ltd, Cyprus Environment Department-Ministry of Agriculture, Natural Resources & Environment, Cyprus National Technical University of Athens, Greece Universitat de Studi di Verona, Italy Universidade de Santiago de Compostela, Spain
Administrative data:

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Read more:

- Project web site: [Project's website](#)
- Project web site - 2: [Project's Twitter page](#)
- Project web site - 2: [Project's Facebook page](#)