

RE-LIVE WASTE- Improving innovation capacities of private and public actors for sustainable and profitable REcycling of LIVEstock WASTE

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TABLE OF CONTENTS

1	INTRODUCTION - THE PROBLEM.....	3
2	EUROPEAN LEGAL FRAMEWORK.....	3
3	PURPOSE - OBJECT OF THE ROAD MAP.....	5
4	THE ROAD MAP	5

1 Introduction - The problem

The development of intensive livestock farming throughout the European Union leads to environmental problems, such as soil, water and air pollution and contributes to climate change.

The concentration of a large number of animals indoors or in confined spaces, where animals are fed mainly on commercial feed, leads to waste and animal byproducts generation, both liquid and solid. Much of the quantity generated is disposed on the ground and around the farms. Despite legal restrictions and obligations, insufficient waste storage capacity often results in uncontrolled disposal. This often leads to higher pollutants concentration in sensitive environmental receptors than permitted.

The composition of livestock waste varies depending on the animal rear but, in general, it is characterized by high organic load, high humidity (above 80%), high concentration of nutrients (nitrogen, phosphorus, potassium), high electrical conductivity and increased boron concentration.

It is considered that agricultural activities, including livestock farming, are responsible for 50% of total nitrogen discharges into surface water. The impact affects both the areas around the farms and far away from them, making it a global problem.

Livestock and agricultural activities cause, among other things, emissions of ammonia (NH_4^+), which contribute to the soil acidification process, the eutrophication of water bodies and the pollution of the lower atmosphere with ozone together with other pollutants (sulfur dioxide, nitrogen oxides, volatile organic compounds).

Furthermore, all activities related to farming and the use of fertilizers cause the release of nitrous oxide (N_2O) and methane (CH_4), as well as greenhouse gases with global warming capacity 21 times higher than carbon dioxide (CO_2).

2 European legal framework

Directive 2018/851/EC which is amending Directive 2008/98/EC on wastes, is increasing the targets for preparing for re-use and recycling of waste, to make them better reflect the Union's ambition to move to a circular economy. According to 2018/251/EC, in order to provide operators in markets for secondary raw materials with more certainty as to the waste or non-waste status of substances or objects and to promote a leveled playing field, it is important that Member States take appropriate measures to ensure that waste which has undergone recovery operations is considered to have ceased to be waste if it complies with all the conditions laid down in Article 6(1) of Directive 2008/98/EC as amended by this Directive. Such measures may include the adoption of legislation transposing those conditions supported by procedures for their implementation, such as the establishment of material and application-specific end-of-waste criteria, guidance documents, case-by-case decisions and other procedures for the ad hoc application of the harmonized conditions established at Union level. Such measures should include enforcement provisions to verify that declassified waste following a recovery process complies with Union law on waste, chemicals and mixtures, in particular prioritizing waste streams that pose a higher risk to human health and the environment due to the nature and volume of such waste streams waste subject to innovative recovery procedures or waste recovered for subsequent re-use in other Member States.

Measures may also include the setting of a requirement on the operators recovering waste or holders of recovered waste materials to demonstrate compliance with the conditions laid down in Article 6(1) of Directive 2008/98/EC as amended by this Directive. In order to prevent illegal shipments of waste and to raise awareness among Member States and economic operators, there should be greater transparency in relation to Member States' approach to the declassification of waste, in particular with regard to case-by-case decision-making and the outcome of verification by the competent authorities, as well as the specific concerns of Member States and competent authorities regarding certain categories of waste.

The final determination whether the conditions laid down in Article 5 or in Article 6 of Directive 2008/98/EC as amended by this Directive are fulfilled remains the exclusive responsibility of the Member State based on all relevant information provided by the holder of the material or waste.

Furthermore, Directive 2009/1009/EC mentions that for certain recovered wastes, such as struvite, biochar and ash-based products, within the meaning of Directive 2008/98/EC, a market demand for their use as fertilizing products has been identified. Furthermore, certain requirements are necessary for the waste used as input in the recovery operation and for the treatment processes and techniques, as well as for fertilizing products resulting from the recovery operation, in order to ensure that the use of those fertilizing products does not lead to overall adverse environmental or human health impacts. For EU fertilizing products, those requirements should be laid down in this Regulation. Therefore, as of the moment of compliance with all the requirements of this Regulation, such products should cease to be regarded as waste within the meaning of Directive 2008/98/EC, and it should, therefore, be possible for fertilizing products containing or consisting of such recovered waste materials to access the internal market. To ensure legal certainty, take advantage of technical developments, and further stimulate the incentive among producers to make more use of valuable waste streams, the scientific analyses and the setting of recovery requirements at Union level for such products should start immediately after the entry into force of this Regulation. Accordingly, the power to adopt acts in accordance with Article 290 TFEU, should be delegated to the Commission in respect of defining, without unnecessary delay, larger or additional categories of component materials eligible for use in the production of EU fertilizing products.

Article 42(2) of Regulation (EU) 2019/1009 requires the Commission to assess biochar without undue delay after 15 July 2019, and to include it in Annex II to that Regulation if that assessment concludes that EU fertilising products containing that material do not present a risk to human, animal or plant health, to safety or to the environment, and ensure agronomic efficiency. Such an assessment has been concluded by the Commission based on a report by the Commission's Joint Research Center ('JRC') on technical and market conditions for a possible legal framework for the manufacturing and placing on the market of specific safe and effective fertilising products derived from STRUBIAS. The report includes technical proposals on eligible input materials and process conditions for STRUBIAS production pathways, quality requirements for STRUBIAS materials, and quality management systems. The report also provides information on the added value that the STRUBIAS materials could provide for food security, food safety, environmental protection, and the EU fertilising and agricultural sector.

In a meeting held during 23 - 24 of November 2020, the scientific committee completed the evaluation of the report prepared by the Joint Research Center¹. The aforementioned report evaluated all

¹ <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/technical-proposals-selected-new-fertilising-materials-under-fertilising-products-regulation>

STRUBIAS products (STRUvite, Blochar and AShes). The result of the meeting was the proposed amendment of the Directive 2009/1009/EC, which is expected to be approved officially in March 2021 and will be put in effect along with the rest of the Regulation on July 16, 2022.

The text of the amendment amends Annex II of the Regulation (EU) 2019/1009, which refers to the component materials and adds to the categories of component materials (Part I) precipitated phosphate salts and derivatives. It provides the materials that can be used as raw material for the production of these components, the terms of the production process as well as quality standards. Finally, it amends Annex IV of the Regulation, which sets out the procedure for checking compliance with the Regulation.

3 Purpose - Object of the Road Map

The purpose of this document is to support public authorities in the formulation of policies that recognize fertilizers deriving from livestock waste and incentive the adoption of innovations tested. In addition, this road map aims at:

- Raise awareness among policy makers about the economic and environmental benefits of the introduction of innovative technologies tested, through the divulgation of the evaluation activities results.
- Raise awareness of local, regional and national public authorities about the strengths and weaknesses of actual policies in their influencing effect on the adoption by SMEs (Small and Medium Enterprises) of innovations for livestock waste management.
- Advocate public actors on the strategic policies they can set up in order to incentive the adoption of innovations for livestock waste management through their direct involvement in the formulation of policy guidelines and organization of regional thematic round tables.

4 The Road Map

As part of Action 4.5 of the program "Re-Live Waste - Improving the capacity of the private and public sector in innovative, sustainable and profitable use of livestock waste" on the transfer of knowledge to public and policymakers, a round table discussion was held on the promotion of the production of struvite in European Regulation 1009/2019/EC. Taking into account the difficulties currently faced in the transfer of innovation to the agricultural and agro-food sector as well as the lack of technical-economic knowledge, it is well understood that both innovation and knowledge transfer should be activated in a sufficient and fruitful way in order to provide answers to the issues raised by the Re-Live Waste program.

More specifically, the main burdens that Re-Live Waste need to overcome to be successful are:

1. The limited coordination between entities that deal with the transfer of knowledge and innovation, and between these and agricultural businesses,
2. The lack or insufficiency of tools used to evaluate and discriminate between the various initiatives,
3. The need to improve the quality of information on new technologies and
4. The reduced willingness and ability of businesses to innovation

In this regard, the following actions are necessary on the promotion of the production of struvite:

- Struvite production: An opportunity: livestock waste producers are currently facing significant environmental and financial challenges in their effort to comply with their legal obligations. The struvite precipitation from waste recovers nutrients that would be otherwise dispersed in the environment, saving environmental and economic damages. Disseminating a project like Re-Live Waste to the interested stakeholders shall intend to underline the opportunities of struvite production. Actions towards this direction shall include:
- Organisation of initiatives aiming at promoting the opportunities and benefits of struvite production to waste producers.
 - Engagement of researchers, innovators, industry representatives and policy makers to effectively promote through special policies such as the CAP funds the production and use of struvite.
- Innovation and knowledge exchange in funding and policy making: Unfortunately, there seems to be a gap between researchers, innovators, industry, and politicians when it comes to innovation and knowledge exchange. In the chain of decisions that leads to formulating the lines of intervention of regional agriculture, research and technical assistance have ultimately played a minor role compared to the weight exerted by politics. Actions that could mitigate this problem are deemed necessary and shall include:
- Enhancing the link between the institutions and individuals that produce innovation and knowledge, the industry, and those who govern the allocation decisions in the use of funds (institutions). It was proposed to establish a permanent commission, integrated by different stakeholders (politicians, University researchers and technician) to look for different technological solution to the problem.
 - Promote information exchange through research and applied research projects, such as the Re-Live Waste, to facilitate cooperation and the exchange of good practices and this is essential for mutual enrichment.
 - Conduct relevant stakeholder (industry, universities etc) consultation within the Regional Commission for Productive Activities.