

NUTRIENT MANAGEMENT PLAN FOR ZEMGALE

D.T2.9.1 (English Summary)

June 2022



European Union

European Regional
Development Fund

SUMMARY

The primary objective of these recommendations is to guide the establishment of a system for the identification of biomass and nutrient flows, in particular phosphorus and nitrogen. As a result, it would be possible to plan the locations of new biogas plants, as well as other activities that have an impact on the local nutrient balance. Biogas plants are recommended as one of the most sustainable ways of processing biomass, taking into account the renewable energy generated and the possibility to produce high-quality organic fertilizers.

At present, nutrient-related information is not considered when planning new biogas plants and animal housing and it is not directly collected and analysed in the activities of public authorities. Further preparation of cartographic material requires a unified, high-quality data collection and storage system, which can be regularly supplemented so that planning and decision-making activities consider up-to-date information appropriate to the current situation.

In the view of rapid increase in mineral fertilizer prices, as well as the overall transition of the European Union towards ensuring the circular nutrient chain process, it is necessary to emphasise the possibility of ensuring the implementation of the nutrient life cycle and the efficient use of these elements in agriculture, i.e. in the further production of food, as well as in the cultivation of other crops, through the production of biogas from various biological wastes, which are currently underutilised. Increased processing of bio-waste of food and plant origin (e.g. straw) has been proven to be an effective approach to biogas production thus, it is an opportunity to increase the amount of organic fertilizer produced, which improves the soil, but reduces the import of fertilizers:

- nutrients generated in the region remain in the region, no new areas of shortage or surplus are formed
- the need to import nutrients is reduced, thus reducing the economic dependence on imports of mineral fertilizers.

In the context of biogas production and the nutrient chain, it is essential to promote the circular economy's way of thinking:

waste = raw materials = significant resources

Biogas production in Zemgale region is currently taking place with a focus on the production of heat and electricity, as well as on the processing of agricultural biomass. When switching to biomethane production, including new types of biological waste, as well as increasing the capacity of biogas plants in general, it is necessary to comprehensively assess how nutrients imported into the region during this process can affect soil quality in Zemgale, as well as timely eliminate potential pollution threats in the future. The development of the biogas industry includes the potential to develop it both ways:

- as a self-evident, fully necessary subsector for modern agriculture
- as an export sector by processing digestate into an easy-to-transport form

The current situation in Zemgale region, considering that it is the region in Latvia with the highest agricultural activity and the biggest number of biogas plants, provides an opportunity to pay attention to nutrient management already now in such a way as to take preventive account of the experience of other countries of the Baltic Sea region and to ensure sustainable nutrient circulation in the agricultural sector.

Essential aspects to ensure that no nutrients enter the surrounding waters and air:

- storage of raw materials and digestate in storage facilities of appropriate construction
- regular visual control of the infrastructure
- monitoring of groundwater and surface water (in particular when storing silage)
- reduction of nutrient losses by covering the storage of raw materials and digestate with gas-tight covers, as well as recovering the released gases formed under these covers

When assessing the possible locations of new biogas plants, it is necessary to take into account the calculations already carried out and the prepared cartographic materials on nutrient concentrations in the soil in order not to create risks from increased values of elements in the future. In short, the construction of stations should be carried out in areas with high availability of raw materials and low nutrient concentrations in soils, but it is equally important to consider whether the construction of a plant at a site with a higher nutrient concentration could currently reduce potential pollution if the digestate produced is processed in such a way that it is easily exported outside the region, so to equalise the distribution of nutrients on a regional scale. Thus, being aware of the current situation, it is possible to use this information for effective planning of nutrient circulation, logistics and accumulation both in Zemgale region and abroad.

Objective and vision for balanced biomass management in Zemgale region

Objective - biogas production plays an important role in ensuring a balanced circulation of nutrients in Zemgale region, it successfully promotes the management of biomass that would otherwise release valuable nutrients into watercourses and volatile compounds in the air as a result of biodegradation.

Vision - the development of the biogas sector is aimed at utilizing the comprehensive opportunities offered by the process, including energy, bio-waste processing and nutrient circulation aspects. It is considered an essential precondition for the production of organic and sustainable fertilizers, as well as for its export to other regions, in order to avoid potential contamination in the future by increased nutrient concentrations in the soil, as is observed in other countries. To reduce the amount of biological waste, biogas production uses all potential raw materials, which are not yet recycled, but are scientifically justified to ensure high-quality biogas yield, as well as the chemical content of digestate, which corresponds to the needs of crops. Planned biogas production and digestate management is one of the conditions for sustainable nutrient management in Zemgale region, which would reduce potential environmental pollution with nutrients and ensure that excessive accumulation of nutrients in the soil is not formed, thus reducing the impact of the agricultural sector on the environment and the surrounding citizens in the future.

Balanced nutrient management with the involvement of biogas plants, regionally and on a larger scale, is an integral part of sustainable agriculture, energy, waste recycling, the importance of which is essential to be assessed now in order to avoid possible negative consequences for the future operation of these types of activity.

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The Sustainable Biogas project worked together with the biogas sector and various stakeholders to reduce nutrient discharges from the whole production chain of the biogas production: from the handling of raw materials to the production and to the safe utilisation of nutrient-rich digestates.

According to the results of the project, sustainable nutrient management in biogas production requires careful consideration when planning, permitting and operating the biogas facilities so that the regional nutrient balance is considered, storages for the feedstocks and digestates are adequate and appropriate, and digestate application is based on the plant needs. Improving the quality of recycled nutrients and promotion of their use are needed. In addition, the reconciliation of the partly contradictory objectives for sewage sludge management - pollution prevention, nutrient recycling and climate change mitigation - should be continued.

The project, funded by the EU Interreg Central Baltic Programme, was implemented by the John Nurminen Foundation, the ELY Centre for Southwest Finland, the Finnish Biocycle and Biogas Association, Latvian State Environmental Services, and the Latvian Biogas Association.