

## Alternative crop nutrient providers (Green Fertilisers / Biofertilisers, biostimulants / Biochar)

### What is the challenge?

A full accounting of energy use in EU agriculture, according to recent research published in the framework of this project, suggests that around 50% of all energy used in EU agriculture is associated with the production and consumption of chemical fertilisers, in particular with nitrogen fertilisers. The production of these chemical fertilisers is based on fossil fuels, often natural gas. This illustrates that for the EU agricultural sector to move towards sustainable production systems a significant transformation is required in the production of fertilisers, and it is for the benefit of the EU to substitute them with alternative nutrient providers, preferably locally produced. Such products are green fertilisers, biofertilisers/biostimulants and biochar. Green fertilizers are nitrate-based mineral fertilizers with the same chemical and physical composition as fertilizers produced with fossil fuels (natural gas, coal, oil), but with a much lower carbon footprint because they are produced with renewable electricity (hydro, wind, solar) and renewable feedstocks (biomethane, green hydrogen). Hence, they are directly related to RES and reduce the indirect energy impact of farming, but also the impact on the environment. Biofertilizers are substances that contain microbes, which help in promoting the growth of plants and trees by increasing the supply of essential nutrients to the plants. They comprise living organisms which include mycorrhizal fungi, blue-green algae, and bacteria. Biochar is mainly used in agriculture to enhance soil fertility, improve plant growth, and provide crop nutrition. As a result, it improves the overall farming productivity. There is a series of policies to be implemented to proceed in the diffusion of such alternative nutrient providers.

### Policy Recommendations

#### EU Level:

- Promote R&D processes that support the **replacement of fossil fuels** with RES in the production of chemical fertilisers.
- **Support industries**, through subsidies, that produce and/or shift their production processes to green fertilisers.
- Promote the use of **biomethane and green hydrogen as a substitute** of natural gas in the Haber-Bosch process.
- Through a range of market incentives, **ensure the long-term cost and price competitiveness of green fertilisers** as compared to fossil-based fertilisers.
- Develop **education and extension processes** that provide information to farmers on the benefits of using green fertilisers, biofertilizers, biostimulants and biochar in their production systems.
- Identify and support the development of products that improve the **quality of soils and support carbon sequestration** such as biochar and local biofertilisers.
- Promote further the use of alternative crop nutrient providers through the **Common Agricultural Policy (CAP)**. Develop a long-term EU strategy that supports the **elimination of fossil fuel dependencies** in fertiliser production and use across the EU.
- Support the development of local networks that **prioritize the production of local biofertilizers** sourced from local feedstocks.
- Promote R&D processes that investigate the **long-term potential of biochar to improve soil fertility** and support the production of biochar.
- Promote **demonstration projects and pilots** that showcase to farmers how to use biofertilisers, biostimulants and biochar and the respective applications.
- Provide a financial incentive to industry that uses **pyrolysis and gasification** technologies of agricultural biomass to produce biofuels or electricity and biochar as a by-product.

#### Member States Level:

- As already done in Poland, rational fertilisation practices can be achieved by an **obligation to carry out fertiliser plans** under the Rural Development Programme.

- Soil regeneration through **co-financing lime application in highly acidified soils** should be applied, as already done in Poland.
- Measuring water pollution by nitrates from over-fertilisation should be implemented in all countries (Greece, Poland and other countries has already done it) to set guidelines and conditions to minimise the risk of nitrogen losses to water reserves.
- In Poland, about 50% of soils are light. Increasing the supply of organic carbon to them in the form of biomass is an inefficient method for carbon sequestration because the supplied carbon cannot be effectively bound for a long period of time. An alternative is **the introduction of biocarbon** with a long residence time. Problems with taking steps in this direction include the **high cost** of certified biocarbon and the corresponding lack of interest among producers in agricultural applications. Economic support for farmers and producers is essential if biocarbon applications in practice are to grow. And we would like this to happen and for agriculture to have access to certified biocarbon. Instead, we would like to avoid scattered and uncontrolled biocarbon production by farmers for environmental reasons.
- In Italy, after 3 years from its drafting, on 16 July 2022 the New European Fertilizer Regulation 2019/1009 officially entered into force in Italy. It is called the New Regulation because it abrogates the EC Regulation n.2003/2003 which until now has regulated community mineral fertilisers. Furthermore, it modifies the EC Regulation n.1069/2009 laying down health rules relating to by-products of animal origin and derived products not intended for human consumption and the EC Regulation n.1107/2009 relating to the placing on the market of plant protection products. The types of fertilizers within the European Union multiply, and new types of fertilizing products are integrated such as organic fertilizers and biostimulants, which in Italy finally find a univocal and incontrovertible definition, finally establishing themselves as a valid and regulated reality, for a more sustainable agriculture.
- In the Netherlands, there is a policy that offers tax incentives for farmers that invest in climate smart applications (e.g., Recovery from N and P from organic manure, to use as alternative for artificial fertilisers). Farmers have the choice to: (i) deduct 75% of investment costs from their income on a self-chosen moment (a year with a high income) or (ii) deduct 27-45% of the investment as extra costs to lower their income in the year of investment.

## Expected Impacts

- **Reduced greenhouse gas emissions:** The development of green fertilisers produced using RES can lead to significant GHGs reductions.
- **Enhanced biodiversity and soil health:** The use of locally produced biofertilisers and biochar can improve the quality and life of European soils.
- **Positive environmental externalities:** Reduced use of chemical fertilizers and increased use of biofertilisers can have positive environmental externalities such as reduced pollution and oxygen depletion in water bodies.
- **Improved public health:** Reduced use of chemical fertilizers and increased use of biofertilisers can help to reduce the risk of exposure to harmful chemicals, contributing to improved public health outcomes.
- **Increased rural development:** The promotion of locally produced fertilisers from local feedstocks can support rural development, creating new jobs and business opportunities in rural areas.



  
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ID 101000496