POLICY BRIEF NO.4

NUTRI-CHECK NET
OPTIMISING CROP NUTRITION

Title

Improving fertilizer planning in Poland, introduction of a new method for determining soil nutrients based on plasma analysis and the Mehlich 3 method.

Objective

One of the most important problems in Polish agriculture today is the high cost of fertilization. In agricultural cultivation, alongside fuel costs, this is the most significant cost category. In order to rationalize fertilization, chemical analysis of soils and fertilization planning with the help of fertilizer programs should be promoted. Currently, only some farmers in Poland perform soil analyses. The strategic plan for the common agricultural policy introduces a new eco-scheme: "Development and compliance with a fertilization plan - basic option and option with liming". Farmers receive financial support for soil analysis and the use of fertilizer applications. In 2024, the CAP Strategic Plan provides for co-financing of up to 3,779,000 ha, while farmers have registered only 1,916,673 ha. One of the reasons for this is the long wait for the results of the analyses – the main burden of testing rests on 17 public laboratories. At the same time, thanks to support from the National Recovery Plan, it has been possible to purchase state-of-the-art equipment, which should be used as widely as possible, as well as a new soil analysis method and the InterNaw fertilizer application.

One of the most modern methods of determining soil components is the Mehlich 3 soil analysis method, which is being implemented worldwide. It is based on analysis using a modern plasma analyzer, which is one of the most modern laboratory devices of the twenty-first century. The extraction solution in this method extracts many fertilizer components - macro- (P, K, Mg), sulfur, and microelements. It is a very fast process, many times shorter than the standard Egner-Riehm and Schachtschabel methods. This method significantly reduces the consumption of reagents, electricity and water.

Above all, it shortens the laboratory's working time. Thanks to support from the National Recovery Plan, 17 national laboratories currently have an ICP MS (Induction Coupled Plasma Atomic Emission Spectrometry ICP MS) plasma analyzer. Although the equipment itself is expensive, mass analyses are extremely cheap and, above all, fast. The Mehlich 3 method uses a very short five-minute shaking period.

Methodology

- As agriculture in Poland is intensifying, high-yielding species such as wheat, rapeseed, maize, and sugar beet are being introduced, which require not only high fertilization with basic nutrients but also micronutrient control. Mehlich 3 method, according to the price list proposed by the Ministry of Agriculture, the determination of micronutrients (such as boron, copper, manganese, zinc, and iron) costs an additional approx. €1.50.
- In the Nutricheck project, in collaboration with its sister project, Horizon Europe– NBSoil, we are comparing the traditional method of analysis with the Mehlich 3 method. Using a sampling kit mounted on a quad bike, samples are taken from different soil types on farms belonging to CNC farmers. Each sample is analyzed using traditional methods and the new method.

Key findings

- The results obtained so far show that the Mehlich 3 method is accurate and allows for more precise determination of phosphorus fertilization, as it takes into account the possibility of this element being blocked in the soil. Several dozen tests have already been carried out on various types of soil, from the lightest to the heaviest. The results were then compared and used to develop fertilization plans for three main crops.
- Preliminary results have been presented during webinars organized by Nutricheck. The principles of the new method and its effects are presented. A comparative study of both methods will be published in 2026.
- A system for precise soil sampling and the results of the new method was also presented at the National Field Days.

Policy Implications & Recommendations

- Popularization of the method will allow for better use of modern laboratory equipment and increase the precision of fertilizer recommendations. It will accelerate soil analysis during critical periods and facilitate fertilizer planning.
- The necessary equipment is already available in chemical and agricultural laboratories throughout the country. Efforts should be made to ensure that the equipment is used to its full potential.
- Laboratories are financed by the state budget, and the costs of analysis in Poland are not high. However, farmers should be encouraged to carry out soil analyses more frequently and to rationalize fertilization. Until a few years ago, fertilizers were relatively cheap, so little attention was paid to their precise application. After the Russian invasion of Ukraine, fertilizer prices rose sharply.
- Currently, both the economic factor, i.e., the profitability of using nutrients, and the environmental factor, i.e., preventing overfertilization of land, are becoming crucial.
- It is also important to make better use of the funds available under the eco-scheme "Development and compliance with a fertilization plan - basic option and option with liming," which has not been sufficiently utilized to date.
- Work on popularizing rapid analytical methods will be a very important element of AKIS in the coming years.

Key References

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