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Yara discovers impact of mineral fertilizer for effective nutrient management in farming

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The long-term trial (LTT) was conducted at Yara Internationalâ??s Hanninghof research center in DÃ¼lmen, Germany, and studied the long-term effects of nutrient management in farming. The study concludes that balanced application of mineral fertilizer is part of sustainable crop production, with minimal environmental impact.

Established in 1958, the LTT portrays the pivotal role of balanced nutrition in soil health maintenance. The research findings address the challenges facing the global food system, and the increasingly urgent need for effective resource management to ensure a resilient food system while protecting the environment.

The global food system is faced with fundamental challenges: We need to produce more nutritious food to feed a growing world population, while transforming the way in which food is produced, to build healthier soil, reduce greenhouse gas emissions and create a more sustainable food system. This study shows that applying the right nutrients, in the right amount, at the right time and at the right place, brings both environmental benefits and farmer profitability," says Rejane Souza, SVP Global Innovation at Yara International.

Key findings from Hanninghof LTT

- **Increased soil health:** Application of mineral and organic fertilizers increased soil organic carbon (SOC) compared to the treatments without any fertilizer. This was also observed in many long-term studies around the globe; e.g., in Magruder LTT at Oklahoma, Aula et al. (2016) reported a significant increase in soil organic carbon content through the application of either nitrogen and phosphorus, or nitrogen, phosphorus and potassium combined compared to plots without any fertilizer.

- **Increased water use efficiency:** The use of nitrogen, phosphorus, potassium and magnesium fertilizer resulted in the highest water use efficiency compared to omitting nutrients or using just manure alone. Omitting nutrients decreased water use efficiency by up to 63%.
- **Improved profitability:** Application of the mineral nutrients; nitrogen, phosphorus, potassium and magnesium fertilizers as a balanced nutrition resulted in the highest yield and income of crop. Omitting nutrients reduced crop yield and resulted in an economic loss of between 89 and 812 USD per hectare.

The study, titled *Effect of Balanced and Integrated Crop Nutrition on Sustainable Crop Production in a Classical Long-Term Trial,* was conducted by scientists Melkamu Jate and Joachim Lammel. The Hanninghof trial involved crops grown on 16 plots of loamy sand soil that were given either organic fertilizers, mineral fertilizers (Nitrogen, Phosphorus, Potassium and Magnesium), various combinations of the two or neither of the above.