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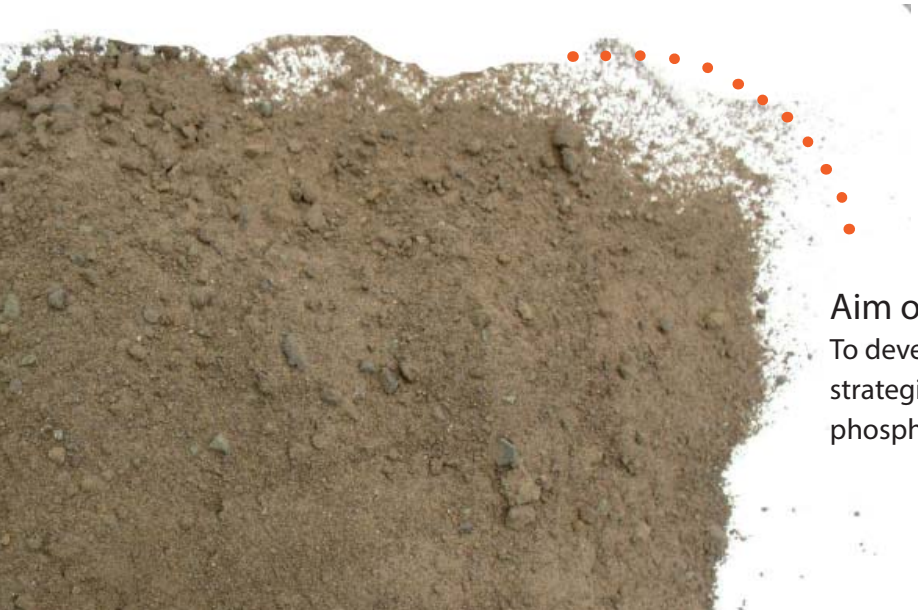
CORE organic II

IMPROVE-P

– Assessing the suitability of recycling phosphorus fertilizers for organic farming

IMPROVE-P



Aim of the project:

To develop and evaluate sustainable strategies for increased recycling of phosphorus and other nutrients

Main outcomes

- A high proportion of organic farms have a very low and low availaiable soil phosphorus (P) status
- Plant P availability of many recycled P fertilizers (RPFs) is higher than that of phosphate rock
- Potentially toxic elements (PTEs) are not the main constraint limiting nutrient recycling
- Many currently not permitted RPFs (e.g. struvite, digestates) have lower potential harmful effects on soils than permitted inputs (e.g. composts)
- Uncertainties on 'emerging' organic pollutants in RPFs and veterinary drugs in (conventional) manures remain, but cur rent risk assessments of sewage sludge application indicate low risk to human health and the environment
- Approaches to reduce the risks from organic pollutants in RPFs have several shortcomings (e.g. losses of C, N and S, lower P recovery rates, increased energy inputs and GHG emissions)
- The inherent soil P mobilization potential is high in a biologically active soil
- There are significant differences in the acceptability of RPFs among countries

Background

Organic farming systems rely on the efficient use and recycling of available resources. Currently, some mineral nutrients like phosphorus are used only once to produce food. Subsequently, they are lost due to poor recycling of organic wastes back to farmland. Simultaneously, P balances calculated for organic farming indicate that often more P is removed with the products than applied as fertilizer. Consequently, this leads to decreasing amounts of plant available soil P. There is an urgent need to improve the recycling of P from urban areas and the food industry, back to cropland.

Differences in early root growth vigor in spring

The Improve-P project partners

Recommendations for end-users

- Better access to existing data on farm soil analyses is needed, e.g. from national databases, etc.
- There is a need for better outbalancing P exports via sold products by adequate RPFs
- If a farmer do need external P inputs RPFs should be preferred over phosphate rock
- There is a need for an ongoing process of reconsideration of the sources and treatments acceptable for P recycling
- A revision of the current fertilizer legislations addressing newly emerged RPF sources is currently needed
- The choice of adequate RPFs is dependent on the soil pH A balanced assessment of RPFs should adjust the needs of present and future generations
- Breeding of varieties towards more efficient P mobilization is a mean to reduce adequate P levels in soils, and increase utilization of nutrients from applied RPFs
- To maximize P recovery and utilization it is important to look at the rotational scale P efficiency. Where one crop is not efficient at utilizing soil P (e.g. potatoes) it should be followed by a crop known to be an effective P scavenger.
- Organic stakeholders are ready to accept RPFs, as long as means are taken to ensure sufficient purity, safety and environmental efficiency of such products.

Relevance

The project outcome provides a broad base of information for policy makers, stakeholders and the scientific community. The obtained results will facilitate a fact based improvement of the societal nutrient cycles and are transferable to other regions of the world.

New and important research questions

- More comprehensive sustainability assessments of RPFs including social and economic effects
- Screening of organic pollutants and in depth studies on the impact of organic pollutants on soil (biodiversity, key functions) and human health
- Research into more efficient and environmentally-friendly technologies for P recycling
- Elaboration of more comprehensive methods for definition of threshold values for most important pollutants and contaminants
- Designing crop rotations and farming systems to maximize utilization of RPFs

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Related projects

http://www.phosphaterecovery.com/,
http://www.p-rex.eu/,
http://www.recophos.org/,
http://www.phosphorusplatform.eu/,
http://www.phosphorrecycling.de/

Further information

This project is funded via the ERA-net CORE Organic II by national funds to each partner. CORE Organic II is a collaboration between 21 countries on initiating transnational research projects in the area of organic food and farming. CORE Organic II is funding 14 transnational research projects.
Read more about the project at the CORE Organic II website: http://www.coreorganic2.org/improve-p and in Organic Eprints: http://orgprints.org/view/projects/IMPROVE-P.html

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