

A mature market for recycled nutrients in 2030

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The phosphorus challenge is deeply rooted in the way we produce our food and manage our waste. By mining useful resources from our waste streams, we are able to mitigate the potential risks of scarcity, geopolitical dependency and environmental pollution. Eventually we might become self-sufficient in our nutrient supply by smart routing of organic waste streams back into our food and feed production system.

Solutions to *recover* nutrients are already rapidly emerging. We are well capable of extracting phosphorus from wastewater, animal manure and other types of organic waste. Not always, however, are these nutrients actually *recycled*. To genuinely close the nutrient cycle it is essential to match the supply side to the demand of the end-user.

One key to successful recycling is to start at the end of the value chain, at the ultimate customers of recycled nutrients. Potato farmers naturally demand an entirely different composition of fertilizer than a tomato horticulturist, and a pig feed producer compiles its product differently from a chicken feed producer. The requirements in quality and quantity of individual nutrients like phosphorus, nitrogen and potassium are widely varying, and are not always taken into account by the part of the value chain that is responsible for nutrient recovery.

Therefore, on top of explicating the different kinds of demand for recycled nutrients, we also need to pro-actively couple the tail end with the rest of the value chain. This approach asks not only for technical innovations, but above all for an organizational change. How do we re-design the value chain in a way that is beneficial for all parties? If we are able to create dedicated products that match the demand of specific end-users, we might be making fast steps in actually closing nutrient cycles.

Of course there are several other hordes to be taken that currently prevent the rapid advance of a European market for recycled nutrients, including legislative and financial factors. By harmonizing legislation of waste treatment throughout Europe, by creating incentives for companies to create value out of organic waste streams and by involving green investors in nutrient recycling we might be able to accelerate our current activities.

However, we need to look further ahead. On the long term we envision a system in which organic waste streams are fully separated into re-usable components, upgraded to valuable products and brought back into our food and feed system, without wasting a single nutrient. It is our aim to recycle 40% of recoverable nutrients by 2020, and to recycle 100% by 2030. Nutrients can both be recycled on a local scale in a decentralized set-up as well as be exported to nutrient-scarce regions through a centralized system, as long as the design of the value chain is tailored to the demand of the end user. For that purpose it is essential to bring together all parties throughout the value chain and keep developing innovative ways of recycling. We are looking forward to it.