Phosphorus Recycling: Switzerland as Trailblazer

July 25, 2019 | Andri Bryner
Topics: Wastewater | Biodiversity | Climate Change & Energy | Society | Organisation & Staff | Ecosystems | Pollutants | Water & Development

Phosphate supplies are limited and found in only a few countries. Mining and transport of this nutrient are costly. It is therefore becoming increasingly important that phosphorus be recovered and reused regionally, and Switzerland, with a functioning phosphorus recycling economy, can lead the way.

In Zurich last week, some 200 experts discussed the future of the essential nutrient phosphorus. Without phosphorus, no cell, plant, or animal can function. But all over the world a large quantity of phosphorus is lost due to inefficient use and because refuse and wastewater are not recycled. The element has become an unwanted fertiliser in rivers and lakes, in many places to such an extent that it has become a threat to species and ecosystems. In addition, commercial supplies of phosphorus often contain cadmium, which contaminates the soil.

The recycling business and agriculture have to work together more closely

The workshop organized by ETH Zurich, EPF Lausanne and the aquatic research institute Eawag showed that the possibilities of recycling phosphorus from wastewater, liquid manure and refuse have to be better coordinated with the needs of agriculture. Switzerland, which at present imports most of the phosphorus it needs, has what is necessary to become a trailblazer in this field: phosphorus recycling is already legally required, and researchers have demonstrated the practical suitability of various processes. In order to hold to the Swiss deadline set for 2026, interdisciplinary cooperation, above all between recycling and agricultural experts, must be intensified. Recycling has to yield a phosphorus product that is optimally available for crop plants. In addition, business models must be developed that make the cycle worthwhile.

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Permanent optimisation is necessary

At the Zurich conference, the first topic of discussion was where the conventional management of phosphorus encounters its limitations. In the USA, for example, ploughing of the earth has been largely given up, which certainly reduces erosion, but in some places, this has led to an accumulation of phosphorus in the topsoil. From there it can easily be washed away into the nearest body of water when it rains, where it leads to harmful eutrophication. The effectiveness of all the measures adopted and processes carried out have thus to be constantly revisited, says Eawag researcher Christian Stamm. And adjustments need to be made where necessary, so that the solving of one problem does not lead to the creation of the next.

By using manure and liquid manure, agriculture has always carried out phosphorus recycling to a certain extent. But zones with intensive animal husbandry and arable land are often widely separated, leading to long transport distances.
(Photo: Wolfgang Ehrecke, pixabay)

These ashes from sludge can be used to produce phosphorus fertiliser low in harmful substances. Regional phosphorus cycles can thus be created.
(Photo: Sebastian Wälti, CC BY 4.9)

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Automated separation of the mineral struvite from urine in a collaboration of Eawag with the University of KwaZuluNatal in South Africa. Struvite can be used as phosphorus fertiliser. (Photo: Eawag)

Financing / Collaborations

The IPW9 Congress is supported by the Federal Office for Agriculture and the Federal Office for the Environment, the Swiss National Science Foundation, the World Food System Center (ETHZ), Eawag, the EPFL, the ETH Zurich, the Soil Science Society of Switzerland as well as several companies.

Related Links

9th International Phosphorus Workshop in Zurich

Info on Phosphorus Recycling (foen)

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