



Improved management of phosphorus needed to conserve resources

A recent study has found that improved management of phosphorus in the EU would reduce reliance on imported phosphorus, in addition to reducing damage from excess phosphorus in the environment. This could be achieved through the appropriate use of fertilisers and greater recovery and recycling of phosphorus from all waste sources.

Phosphorus, nitrogen and potassium are essential minerals required by all living organisms. The majority of phosphorus used in the world is mined from phosphorus rock, which is a non-renewable resource. About 90% of the world's phosphorus reserves are found in China, the US, Russia, Morocco and the Western Sahara, where it has been estimated that today's recoverable reserves will be depleted within the next 150 to 400 years depending on consumption and on the assumption of reserves.

Plants remove phosphorus from the soil, which must be replenished by phosphate fertilisers in modern agricultural systems to produce high crop yields. Many years of fertiliser application in the EU-15 have produced an accumulation of phosphorus, and imports of phosphorus fertilisers have consequently declined since the late 1990s. In contrast, demand for phosphorus fertilisers is rising in newer Member States in Central and Eastern Europe, as well as in the developing world. Excess application of fertilisers can pollute water bodies. Landfill sites are also a source of phosphorus pollution.

This study analysed the flow and stocks of phosphorus in the EU-15. Phosphorus is imported into the EU-15 as phosphate ore and fertiliser, and in goods including food and animal feed. Within the EU-15, flows of phosphate were analysed between five main processes: agriculture (inputs e.g. fertilisers); industry, trade and commerce (e.g. food processing); consumption (e.g. of food, detergents and garden fertilisers); wastewater treatment (from domestic and industrial sources) and waste management (e.g. the production of compost).

The analysis suggests that the majority of phosphorus in the EU-15 is used by industry, trade and commerce and in agriculture processes. For example, about 90% of the phosphorus imported into the EU-15 is in the form of fertilisers, amounting to around 4.1 kg phosphorus per person per year (kg P/cap/yr). Fertilisers and animal feed represent the greatest amount of phosphorus found in the agricultural sector; larger quantities of manure are applied to agricultural soils than fertilisers, which results in a high accumulation of phosphorus in the soil, about 8.6 kg per hectare, or 2.9 kg P/cap/yr, on average.

In addition to losses to agricultural soils, phosphorus is lost to landfills, at 1.4 kg P/cap/yr, and to the hydrosphere (soils and water bodies) at 0.55 kg P/cap/yr. Recycling only accounts for 0.77 kg P/cap/yr.

Based on this study, the researchers offer some suggestions for improving the management of phosphorus in the EU. These suggestions include achieving a balance between fertiliser inputs in agriculture, with the phosphorus removed by harvesting; recycling phosphorus in domestic and industrial waste, which would otherwise end up in landfill; ensuring all households have connections to good sewage systems and cesspits; and by upgrading wastewater treatment plants that do not currently treat wastewater for phosphorus content. This last method could recover up to 85% of the phosphorus found in wastewater. It is suggested that EU-15 imports of phosphorus could be reduced by up to 50% through a mixture of technical and management measures such as the implementation of P-recovery technologies from sewage sludge or optimized fertilising practice.

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Contact: helmut.rechberger@tuwien.ac.at; christian.ott@tuwien.ac.at

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