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Lack of reporting on phosphorus supply chain dangerous for global food security

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Source: Stockholm University

Summary: A new study shows that while Phosphorus is a key element to global food security, its supply chain is a black box. This can lead to social, political and environmental issues, which in turn can create phosphorus supply crises.

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FULL STORY

Our global food production system uses 53 million tonnes of phosphate fertilizers annually, processed from 270 million tonnes of mined phosphate rock . Estimates show up to 90% phosphate loss from mine to fork . A considerable part of this loss is phosphate pollution in water, some of which creates "dead zones," areas where little or no marine life can survive. With an increase in food demand by 60% towards 2050, our food production system will need even more phosphate fertilizers. But where do the fertilizers come from and where do they go?

UN estimates a population increase to 9 billion by 2050, correlated with a 60% increase in food demand. In a world where almost a billion people are undernourished and where we waste up to half of all food we produce, this will pose new challenges to our global food supply chain and production system. A key variable for food production is the supply of phosphate fertilizers, most of which come from the mining and processing of phosphate rock. Only a handful of countries produce and export phosphate rock and phosphate fertilizers in a phosphate market that is tending towards a Moroccan monopoly. The later stages of the supply chain also see up to 90% losses and the transformation of phosphorus from a valued resource into one of the main causes for eutrophication.

A new study conducted at Stockholm University and the University of Iceland shows that while Phosphorus is a key element to global food security, its supply chain is a black box. This can lead to social, political and environmental issues, which in turn can create phosphorus supply crises. The results are published in the article "Opening access to the black box: The need for reporting on the global phosphorus supply chain" in *Ambio*, A Journal of the Human Environment.

"Cradle-to-grave reporting along the phosphorus supply chain can reveal the untold story about the social, environmental, ethical and economic price we pay for the food we see on our supermarket shelves. It can also help countries -- most of which are dependent on phosphate imports -- tailor better policies to decrease the vulnerability of their agricultural sector" says Eduard Nedelciu, researcher at the Department of Physical Geography at Stockholm University and main author of the study.

The study, which is part of a larger European research project called Adaptation to a new Economic Reality identifies four main challenges with reporting on phosphorus and phosphate fertilizers. First, terminologies and methodologies that are used to report on phosphate deposits are not harmonized and sometimes not transparent - this makes estimations of reserves and resources inaccurate and unreliable. Second, the phosphorus supply chain has up to 90% losses, which are poorly documented. Losses occur along all segments of the supply chain and this fragmentation of information makes it hard to accurately report on how much is lost and where. Better reporting could help design methods to decrease losses and increase efficiency. Third, there are environmental and social consequences occurring along the supply chain of phosphorus. For example, mining and processing phosphate rock is polluting water bodies and is dangerous to human health. Moreover, the phosphorus that leaks from agricultural land and sewage systems into the water can cause eutrophication and the so-called "dead-zones": areas in our oceans and seas where life cannot be supported anymore. But there is a social and ethical aspect to phosphorus too. Phosphate rock is increasingly mined from contested areas, such as Western Sahara, in what has been described by some as "illegal exploitation." Fourth, open access to data along the phosphorus supply chain is lacking. The authors reinforce the idea that public knowledge on phosphorus and its supply chain is necessary due to its direct link to food, a basic human right. Also, reporting on phosphorus can help better assess progress on a number of global indicators for sustainability, such as the Sustainable Development Goals.

Marie Schellens puts the study into perspective: "Phosphorus information is power. Reliable and regular data gathering can leverage corporate social responsibility as well as political action. Both are needed to tackle many of the issues identified along the supply chain. Transparency can foster a sustainable and socially just supply chain for decades to come."

Story Source:

Materials provided by **Stockholm University**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Claudiu-Eduard Nedelciu, Kristín Vala Ragnarsdóttir, Ingrid Stjernquist, Marie Katharine Schellens. **Opening access to the black box: The need for reporting on the global phosphorus supply chain.** *Ambio*, 2019; DOI: 10.1007/s13280-019-01240-8

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