

Anthropocentric uses of phosphorus: flows quantification and potential for recycling in Ontario

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Abstract

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1. Introduction

2. Methods

2.1. Spatial resolution

2.2. Temporal resolution

2.3. Estimation of phosphorus flows

2.3.1. Agricultural sector

2.3.2. Industrial sector

2.3.3. Urban sector

3. Results and discussion

3.1. Phosphorus flows in Ontario

Showing an overview of the P flows in the province. The use of figures summarizing all the flows of the province in the shape of Sankey or network flow figures could be so great

Figure ?? summarizes the phosphorus flows in the province of Ontario. It can be observed that the flow of phosphorus through the anthropogenic activities are divided into 3 independent

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networks, i.e., the flow of phosphorus involved the production and processing of food (including the treatment of wastewater), the flow of phosphorus used in the steel and chemical industries, and the phosphorus involved in the forestry industry.

*3.2. Phosphorus recovery techniques (**This section could be Supplementary Material**)*

Brief overview of potential P recovery techniques for each sector

3.2.1. Agricultural sector

3.2.2. Industrial sector

3.2.3. Urban sector

3.3. Potential of phosphorus recovery in Ontario

Assessment of different scenarios of P recovery in Ontario, P imports that would be saved, reduction of P dependency of the province, etc (all implications related with mass-balances)

3.4. Economic implications of phosphorus recovery in Ontario

Economic costs or saving derived from the recovery of P in the province and all implications related with economy

3.5. Implications on food sovereignty of phosphorus recovery in Ontario

Implications on food production self-sufficiency derived from the (partial) recycling of P. Discussion on the improvement of the food production system resiliency against disruptions of the global supply supply chains (e.g., current context derived from the COVID-19 pandemia and the war in Ukraine)

3.6. Gaps of knowledge

4. Conclusions

References