

## ***Interactive comment on “Global Phosphorus Recovery for Agricultural Reuse” by Dirk-Jan D. Kok et al.***

**Z. Yuan (Referee)**

yuanzw@nju.edu.cn

Received and published: 30 April 2018

Phosphorus is a critical nutrient for livings on the Earth and its sustainable supply is very important for food security. So the recovery of phosphorus from agricultural wastes is an important way to approach sustainable phosphorus supply. This manuscript talks about the phosphorus recovery potential of agricultural wastes and is important for sustain phosphorus supply. However, some critical issues need to be considered so as to make it more robust. (1) The manuscript needs to define the phosphorus wastes in section 1.1 so as to help readers understand what you concern about. in this section 1.1, the manuscript tries to talk about the importance of recovering phosphorus wastes into resources, especially the nutrients from rural and urban wastewater? However, all phosphorus wastes look like those in rural and urban

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wastewater? Section 2, Identifying where in the world phosphorus-laden wastewaters confirms that the phosphorus wastes are those phosphorus in wastewater? The scope of phosphorus is critical important to understand the methods and results of the manuscript and so please clarify it clearly.

(2) I am confused about the method of determining global market price of phosphorus. The phosphate rock price changes with consideration of phosphate rock supply and demand as shown by authors, as well as other factors such as transportation distance and political issues. Phosphorus chemical products will change in the same way. What you mean the price? it is the price of phosphate rock, phosphorus chemical products (if so, what kind of product?), or the recovered fine phosphorus? or even phosphorus wastes? please explain carefully.

(3) With regards to formula (1) what you mean the phosphorus throughout rate? the direct phosphorus inputs? outputs? or direct and indirect phosphorus inputs or outputs? Furthermore, recovery efficiency depends on the treatment technologies and collected rates (maybe more factors), which differ a lot for urine and excreta. I suggest authors define the production density clearly and explain the formula carefully.

(4) With the phosphorus demand density, it is estimated without considering the phosphorus in the soil? What is the demand density? the new input (balance of theoretic demand and content in soil), or the total theoretic demand of crops? not include the demand of animals? please explain and clarify.

(5) Again, in the section 2.2, it looks like phosphorus content only in wastewater and not include those in solid wastes? If so what about the phosphorus in solid wastes? and in most cases, they are transferred place by place. For example, in animal breeding plants, some collect them together and some separate them, which will change your results completely and so please clarify it clearly.

(6) I am totally confused about the trade model, to my best knowledge, the phosphorus wastes are more suitable for recycling locally and can not be trade in large scale be-

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cause it is cheap and the cost will be higher if the transportation distance increases. So it will be more reasonable to recycle phosphorus wastes locally, even they can be produced organic fertilizer. Furthermore, the phosphorus deficit can be met with trade of phosphate rock, phosphorus chemical products, or crops, and different product trade will change the model totally. Please explain the difference and what and how they affect the results, especially for the quantification of trade flows.

(7)the issues above will change the results totally and so if these issues were solved, please analyze the results completely.

(8)Figure can be deleted from the manuscript considering it is the basic data. Figure 2 is confusing and what do you mean with phosphate rock? the production? the use or consumption? theoretic demand? or supply capacity? I also suggest authors move the figure 3 and figure 4 to supporting information.

(9) English expressions need to be polished so as to make it more understandable with scientific basis.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-176>, 2018.