

Interactive comment on “Production and application of manure nitrogen and phosphorus in the United States since 1860” by Zihao Bian et al.

Anonymous Referee #2

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This article presents a dataset about manure N and P production and use in the United States of America and its evolution in time. It is globally well written. However, my opinion is that it lacks of precision, discussion about main hypothesis and clarification of the main findings.

More particularly, in the introduction, nutrients in manure are mainly presented without considering nutrients in mineral fertilization while they are related with them by the bio-physical N and P cycles including the environmental consequences of losses of some of N and P components. In the introduction more precision is required, for example in definition and characterization of manure. (line 70 and followings). For example urea is not always the main N component and is not always readily usable by plant (toxicity for young plants). N composition of manure depend of many factors (excretion, ...

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fermentation dynamic and thus evolution during manure storage). There is confusion between excretion and manure after storage. So it is not always clear what is included within the term manure or N produced (N straw included?, only excreted? Before or after volatilisation?). I would also emphasize, in a circular approach, the notion of N and P source and sink at local/global level. There is a lack of clear identification of the mean objectives of the paper and the underlying hypotheses.

In the method section I would add a summary explaining the main steps as introduction of the method section. When information from other works or methods are used, like at line 120, I recommend to explain them briefly and add some summarizing values (as for Line 166 manure nutrient recoverability rate) Some hypothesis are done and should be better explained eg. Line 126 (spatial distribution of livestock). I recommend to use only SI metrics. Regarding the statistics presented I wonder if it would not be more appropriate to present them as median and percentiles. In the result and the discussion sections there is a need for better explanation of the results observed at local scale and their consequences. I would also expect discussion about the relation between P and N evolution if possible including mineral fertilization or biological fixation of nitrogen. I was also surprised by the difference for P between production and application. The fate of P and the losses have to be explained and validated. In the discussion section the main hypotheses like those of line 126 cattle distribution or line 176 regarding evolution of crop yield over time have to be discussed. Can the peak and decrease in N production around 2008 be explained? I would add data in the section lines 280-285 and expect explanation about the observed differences. To me the conclusion is more a summary than a conclusion. It can also be improved.

References have to be added for all the statements like at line 53, 69 I would reformulate lines 54 to 60, 66 to 69, 211.

Line 174 maize instead of Maize Line 179 - =1? Line 203 (mean \pm standard deviation) in the material and method section Lines 254 -256 in the material and method section Line 274 remove the "our" Line 282 Kellogg et al. (2000), and Yang et al. (2016) within

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brackets

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