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Biogeosciences Discussions

Interactive comment on "Localising the nitrogen imprint of the Paris food supply: the potential of organic farming and changes in human diet" *by* G. Billen et al.

Anonymous Referee #1

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The manuscript "Localising the nitrogen imprint of the Paris food supply: the potential of organic farming and changes in human diet" by Billen et al. provide a nice example of how local data can be used to provide interesting insight for ongoing discussions. The authors have worked already on the Seine watershed and use these data now to investigate how sustainable food production in an metropolitan area can be achieved and what the consequences were. They provide thoughts for two ongoing debates: the food-miles and the level of meat-consumption (e.g. demitarian diet). The discussions are balanced and the conclusions have been made carefully. I believe the article will be a useful contribution in the scientific literature on "nitrogen" and "food" research. While I don't have major comments to the manuscript, please consider the specific comments

below:

Abstract, line 3 ff: Sentence starting "Nowadays. . ." too long, should be revised. English of the manuscript is generally very good, however, occasionally a sentence appears to be too long or interlaced.

Abstract; p10981/11. Use of term (carbon) 'imprint' . . . why don't you use the more established term footprint?

Introduction, line 20 [and other locations]: 'orientation' . . . specialisation?

p10981/21. There must be weblinks/references accompanying these groups, otherwise it will be impossible for the reader to check or inform himself.

p10982/2. Please check sentence "extend . . . a very long distance"

p10982/13. It will be interesting also to distinguish between per capita intake and per capita consumption (including all wastes between delivery and intake). You should introduce the terminology as early as possible in the manuscript.

p10983/11. Add comma before weblink

Figure 1. The range in soybean input does not correspond to any range in the outputs of the animal-producing agland, but the upper limit is used (total output of Agland kg N/cap/yr. Please indicate which of the output fluxes are associated with uncertainty thus that the import of soybean cannot be constrained. What is the reason of the uncertainty for soybean imports: are the statistics not given good quality on feed concentrates purchases?

Figure 1. The text suggests that 80% of the cereal-producing region is being "exported". This is not indicated in the figure. Instead an export of 10.6 kg N/cap is indicated from the animal-producing area. Is this to show the balance with the soy-imports? If so, I would suggest to also indicating the exports from the other region – or better restrict to numbers with reference of one Parisian inhabitant. Furthermore, if

the 10.6 kg N/cap are exported they do not contribute to the protein consumption of inhabitants in Paris, and in the text the required area/cap of 0.054 ha instead of the used 0.2 ha/cap should be quoted (p10985/5). If on the other hand the 'export' of 10.6 kg N/cap in reality is the protein contained in crop products used to feed the animals, then please chose another term than 'export' which is confusing in the figure; also the arrow should not point out of the box, because in fact this nitrogen is recycled.

p10985/19. This means that 92% of the area used for food production to feed Paris is for animal products; considering also SA imports, 94% of the area required is for food production. How does this compare with other estimates?

Figure 1. Inhabitant: inputs=8.0, outputs=7.3, pie diagram=7.7. Why these differences? crop fluxes. input=3.9; output=4.8. why these difference? Is this figure with the (better) figure 3 consistent???

p10985/18. Is this dilution calculated for agland surface area of for total surface area? What is the share of agland in the regions considered?

p10986/20. It were clearer if the equation would be formatted 'as equation' rather than built-in into the text.

p10986/26ff. Sentence unclear. Do you mean '70% of temporary grassland is used for nitrogen-fixing crops? Please revise sentence.

Table 1. This table is very well constructed, very transparent and hugely informative!

Figure 3a. What is the balance for the non-fixing crops? Total input=9905 kg N km-2 yr-1, total output=10445 kg N? Same difference also for scenario b); smaller but still existent difference in scenario c). Scenario c: 765 instead of 770 kg N vegetable products to population? This would close balances and give the same total protein intake of 1285 kg N as in the other scenarios. Please add unit to figure-caption. Would it not be more direct for the reader if the numbers were in absolute values (kt N) instead of relative (kg N km-2 yr-1)?

p10987/10. The text cites a total population in the Paris agglomeration of 4 million inhabitants. Table 1 indicates an area of 92381 km2 and a population density of 183 cap km-2. This would give almost 17 mio inhabitants. Please clarify.

Figure 6. Same comment as for Figure 1 with respect to 'export'.

Figure 5. This seems not to be referred to in the text??

p10991.3ff. I am not sure if the comparison with the report from Westhoek et al. (2011) holds. Leip et al. (2011) have shown that there is a strong correlation between imported animal feed and N-surplus in European countries. Thus already the effect of reducing imports of protein-rich feedstuff will have a reduction of N-inputs to the hydrosphere as a consequence. Furthermore, IMAGE simulates a reduced meat-consumption in an economic framework, while economic aspects are ignored in the current analysis. Nevertheless, the restriction of import of animal feed will undoubtedly have global effects as well. The discussion of Westhoek et al. (2011) is well placed in the last paragraph, but the comparison should be done a little bit more carefully.

Interactive comment on Biogeosciences Discuss., 8, 10979, 2011.