

Interactive comment on “Greenhouse gas emissions and reactive nitrogen releases from rice production with simultaneous incorporation of wheat straw and nitrogen fertilizer” by Longlong Xia et al.

Anonymous Referee #2

Received and published: 26 May 2016

Xia et al. investigated GHG emission and Nr losses from rice production in response to applications of N fertilizer and wheat straw. They looked into the total environmental costs incurred by the GHG emission and Nr losses. Such study is important for the comprehensive evaluation of impacts of GHG and Nr losses on environment. The methods used in this study are appropriate, and the results are well discussed. I recommend it for publication in ‘Biogeosciences’, if the following questions are well considered.

Specific comments: Abstract: Authors employed the meta-analysis to calculate the

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various Nr losses. As an important part of this study, the results of the meta-analysis should be simply presented in the abstract. Moreover, it would be better if the abstract is concisely shortened, since some findings in the current version were insignificant, e.g., L34 'while methane emission . . .wheat rates increased'.

L71-72. Specify the current water and straw application methods.

L140. Using the relationship of straw input rate and SOCSR of previous study to calculate the SOC changes in this study is fine, since both of the studies have similar climatic conditions, cropping history and agricultural practices. But the uncertainty should be noticed and can be discussed in the result and discussion part.

L193-205. The environmental cost evaluation is interesting. But, why treated N₂O as a GHG when conducted this evaluation, since it is both a GHG and Nr species?

L275-280. This discussion needs to be concise, since the effect of N fertilizer on CH₄ emission is beyond the focus of this study.

L289-290. The calculation of the N₂O emission factor needs to be specified in the methodology.

L345. Does the straw application affect the Nr losses (e.g., N₂O and NH₃ emission) and the subsequent calculation of Nr intensity?

L377-378. I don't think the GHGI and Nr have to have some specific relationship, although the N production and fertilization can both affect them.

L428. The 'ecological compensation mechanism' is a good idea to encourage farmers to adopt knowledge-based agricultural managements. To make it clearer, authors need to provide more details about that rather than just giving a mention.

Some further remarks Although the main text is generally well written, some grammar errors should be corrected carefully. L 72, delete 'the' L 98-101, long sentence, needs to be split. L102, N₂O should be 'nitrous oxide (N₂O)' L116, delete 'an' L196, 'was'

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should be 'were' L230, replace 'to a reasonable rate' with 'reasonably' L233, delete 'without threatening food. . .study' L252, replace 'produced' with 'showed' L335, 'manufacture' should be 'production' L348, delete the sentence L427, 'has' should be 'have' L443, delete 'as well' Tables 1-6, the abbreviations in the table titles should be self-explained.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2015-620, 2016.

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