

## ***Interactive comment on “Net global warming potential and greenhouse gas intensity in rice agriculture driven by high yields and nitrogen use efficiency: a 5 year field study” by X. Zhang et al.***

### **Anonymous Referee #2**

Received and published: 18 February 2016

**General Comments** The authors have attempted to test agro-ecosystem dependent variables against a comprehensive set of controls related with the global perspective of GWP, and have tried to relate the study with the food security. The scope of this study is too large to detail all the measurements and their dynamics. Provided this paper is revised, it could be useful for relevant farming community, interesting to the scientific community and potentially important for the climate change studies. This paper should be published after filling up the significant gaps identified and correcting the specific and/or technical problems in the manuscript:

There are two major problems which need to be resolved before this research is pub-

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lished: 1. The C contents of the biomass (harvested crop=grains/paddy + straw) have gone un-accounted for in equations, although grain yield has been accounted for in equation 3 for GHGI calculation. However, in either case the crop straw is not mentioned (accounted). Crops grains as well as the wheat and rice straw accumulate a significant amount of C. As well, it is not clear how the total C balance of the agro-ecosystem was calculated. It is unclear how wheat grain and rice paddy and their straws have been accounted for in C balance and GWP calculations. The relative contributions of different GHGs on a global time scale are not even briefly mentioned. The “N” in the abbreviation “NGWP” is redundant. Instead negative GWP (cooling) and positive GWP (warming) could be simpler to be used. 2. As the measurements were made from the same plots over years, therefore, repeated measures ANOVAs should be used, although year could also be taken as a fixed variable at the same time to see differences between years.

**Specific Comments** 1. Authors have presented the conclusion in the abstract in a clear, concise and comprehensive manner 2. 5 years field study for this experiment is appropriate as it provides larger data set for processing to conclude with less uncertainty 3. The terms GWP and Food Security are very important and need to be defined in introduction section 4. Please provide a brief rationale for this research with Food Security 5. The comments by the other referee are tired not be repeated here 6. It could be very interesting if the GWPs be related to the annual (or seasonal) temperature and precipitation. 7. Fig. 1 may not be needed in this paper as the climate is not discussed in results section or related with other variables 8. In the title, “Net” is redundant

Page 18885 Line 6: add “equivalent” before “emissions” Line 7, 8: putting the abbreviations in brackets could be more meaningful Line 13: “, i.e., N1, N2, N3 and N4,” is redundant as these are already defined earlier Line 24: why is the word “cost” here? Page 18886 Line 4, 5, 6: Conclusion cannot be made on the basis of hypothesis, therefore, please remove this conclusion. Page 18887 Basal fertilizers- what was rate? Page 18888 Line 7: space or “.” Is required after mL Line 13: why different size

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brackets are used when same sized could be used? Table 2. The 2ND column CH4 values could be rounded off to no decimal point while the SD could be rounded off to a single decimal point.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/12/C8678/2016/bgd-12-C8678-2016-supplement.pdf>

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Interactive comment on Biogeosciences Discuss., 12, 18883, 2015.

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