

Reviews and syntheses: Greenhouse gas emissions in natural and agricultural lands in sub-Saharan Africa: synthesis of available data and suggestions for further studies

D.-G. Kim¹, A. D. Thomas², D. Pelster³, T. S. Rosenstock⁴, and A. Sanz-Cobena⁵

General Comments

The authors have done a notable job of bringing a lot of data into one article; however the structure at present is not acceptable. Due to the structure of the ‘results and discussion’ section it reads very much like a literature review made up of a list of examples which seem tediously linked. There has not been much actual synthesis, more just reporting on what individual studies have done. It would be far more informative to see more instances of ‘90% papers reviewed showed that...’ as opposed to “x found Y, but Z found A”. I would suggest starting this section with the summary of GHG emissions section then go on to discuss individual findings with more actual synthesis. The authors also make the error of not addressing the massive elephant in the room as to WHY there is so little data from Africa. It’s not simply a matter of scientific priorities but a massive socio-economic challenge! Mass poverty, extreme droughts, civil unrest, political instability, scientific funding/priorities etc. etc. are the main reason these data gaps exist. The authors seem to ignore this fact and suggest that it is as simple as someone deploying some cheap technologies such as chambers and IRGAS – noting that IRGAs are NOT a cheap technology! Unfortunately it is not that simple. There is certainly a point to be made that static chambers can be very cheap and require little know how to use but what about the analysis – where and how much will this cost?

Given these two rather large problems I have found with the paper I would find it difficult to accept for publication at this time. I believe there is a need for this paper as summaries are always incredibly useful to researchers but without major revisions it is hard work to read (structure), need more synthesising and the social aspect needs acknowledging.

Specific comments

1. You need to establish some consistency with your units throughout the manuscript. It is confusing how you keep jumping from Pg to Gt to Kg etc... Pick one and stick with it through the manuscript using $\times 10^x$ where necessary. As it is it is very confusing and one must constantly be going back to check which unit you were in. It is best practice in science to use SI, in which case you should use kg and make use of $\times 10^x$.
2. Results/Discussion: Start this section with data from 3.4 so that it does not read like an introduction.

Page	Line	Comment
16481	8	I would consider reporting these data in CO ₂ -eq. At present these GHG data are not comparable to each other.
	11	Make use of abbreviation GHG
	16-18	How were they different?
	22	“croplands and type and...” does not read well. Please restructure
16482	2	Change: “and WITH natural and agricultural lands contributed CONTRIBUTING 76.3...”
	3	Change ‘Africa’ to ‘African’
	5	Change: “options on emissions.” To “options for emissions”

	8	Remove 'and' and change to 'involving international'
	10	Redefine greenhouse gas as 'GHG'
	12	'land use' to 'land uses'
	20	Place comma after 'wetland'
16483	2	"For example, CO2 eq emissions from..." Are you talking just about CO2 or about all the GHGs? You need to be clear. Using the terminology you have is not standard scientific practice and is confusing for the reader. CO2-eq is a unit for standardising non-CO2 GHGs for comparison to CO2 and should not be used to describe the sum of all 3 GHG emissions. Additional confusion comes when you have stated 'CO2 eq emissions' then report in terms of carbon! This section needs to be reworked to make it clear!
	17	I don't think fig 2 and 3 are particularly informative as you have stated all the information here in the text. Consider removing as they do not really add anything to your point.
16485	19-23	Split this into 2 sentences.
	24	Remove 'These' and start sentence with 'Statistical...'
16487	1-7	There is no original hypoth testing or statistical analysis here. Merely a list of examples where other authors have found causes of fluxes. It seems the authors have not been systematic in their approach and are picking and choosing data to write about. It would be much more informative for a review such as this to say "70% of papers found temp affected CO2 flux in natural lands..."
	8 onwards	Much smarter analyses could have been done to summarise the data in the literature than just reporting a range of values
	8 onward	None of this seems suitable to be called results or discussion...it reads like an intro. Where is your analysis?
16495	3 & 10	Throughout MS you have used the American spelling of 'fertilizer' but on line 10 you use the British spelling. Be consistent through manuscript with you use of 'z' and 's'.
	13-18	I would be VERY cautious to make these statements as you are reporting on 1 study. This tells us very little...it tells us about one place at one time and certainly no generalisations should be made about other grazing grasslands across Africa!! Acknowledge this as a limitation!
16496	1	Why have you suddenly switched to using kg CO2 when everywhere else you have used Mg?! I have identified 4 different units being used through the MS (Mg, kg, Gt, Pg) when it should be 1! Do not be lazy and copy units from papers – make the conversions and the paper would be much easier to read.
	10-15	I don't think you can make generalisations and draw conclusions from just 2 studies!
16499		This section needs to come first in the results/discussion section. This is your results, lead with this
16500	5-9	I would be cautious about making these bold claims when gardens only used 2 studies!!!!
16501	9	Stop switching units!!
16503	3 onwards	But why is Africa studies less? Because it comes with more challenges...you need to acknowledge this!!