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Interactive comment on "Mitigating N_2O emissions from soil: from patching leaks to transformative action" *by* C. Decock et al.

Anonymous Referee #1

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The discussion Decock and colleagues is a well written piece of thought provoking challenges, issues and the need of interdisciplinary science for N2O emissions reduction. This is of very high importance and clearly will be a great challenge for soil scientist involved in N2O emissions research. The need to balance emission reductions with food and energy security is one of the main challenges facing researches and policy makers. The discussion article provides an interesting view point and and what is required to achieve that from the respective research themes. However, I do feel that the discussion lacks a section on bringing these research themes together and how this could be achieved. How will the mix of sciences help a sustainable reduction in N2O emissions, fundamentally how will mitigation be achieved in this way. The authors cover all aspects independently in the various sections but it would be good to have a final syn-

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thesis of mitigation approach and what are realistic targets that could be achieved with this interdisciplinary approach, and where those targets would be the greatest. Specific comments: P906 L15. Field measurements of N2O fluxes are common and carried out in all sorts of environments, different systems, crops, at different scales. The authors mention that more are needed, but I'm wondering how much more is needed here? In theory there will always be a corner in the world somewhere, where a eddy covariance tower, a flux chamber has not been installed. To understand N2O emissions will every crop, every agricultural system in every geographical location need to be monitored in order to fully understand N2O emissions? is the existing dataset that is out there in published work, dating back decades underused to aid the modelling aspect. I see a never ending "requirement" for more field emissions monitoring. Surely that is not sustainable from a research perspective, and how much more science will we gain by just monitoring one more agricultural system? Are new technologies a better target for investment, eg remote sensing, rather than more flux chambers? p907 l11. Jointly design experiments. How would that work realistically? Think this is a difficult challenge. And should be further explored. I do believe this is the right way to go, but are the research funders/institutions/ providing the foundations for that kind of approach. p909 L25. The word chosen here are clever regarding developing countries being" resource limited". But fundamentally or part of that limitation is lack of N fertilizers. Using "N fertilizer" is not an attractive word for this discussion as its aim is to use less and increase N sue efficiency. But many parts of the world are in lack of synthetic fertilisers (mainly for economic reasons). but fixing this issue would enhance food production in areas that need it most. I think this need mentioning, despite that overall "we" wish to reduce N fertilizer use. Think for developed countries s this rule applies, but for developing countries it is only fair that N fertiliser should be more readily accessible at either subsidised costs. Although only short term-mid term solution but nonetheless a solution (or part of) food security and alleviating mal nourishment.

Interactive comment on SOIL Discuss., 2, 903, 2015.

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