

## ***Interactive comment on “FORUM paper: The significance of soils and soil science towards realization of the UN sustainable development goals (SDGs)” by S. D. Keesstra et al.***

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Reply to the topical editor and referees of SOIL for the paper: FORUM paper: The significance of soils and soil science towards realization of the UN sustainable development goals. (Keesstra et al) First of all we would like to thank the reviewers for their time and effort to improve our paper and for the compliments they made about our paper. One other issue that need to be solved is that in the first version of this paper one co-author was accidentally not taken up in the author list: Boris Janssen (also one of the guest editors of the special issue. I want to ask to take up his name. Secondly, we would like to remove FORUM paper from the title and just have 'The significance of soils and soil science towards realization of the United Nations Sustainable Devel-

C1

opment Goals.' To efficiently answer the comments of the reviewers we have copied the reviews in this document and put our replies to the comments in italics and in blue colour beneath each section. Anonymous Referee #1 The forum paper tackles the inevitable role of soil science community in achieving the Sustainable Development Goals (SDGs) and as such discusses the possible directions of further development of the soil science agenda in the coming years. The paper demonstrates the relevance of soil science for SDGs through the links between ecosystem services and soil functions connected to trans-disciplinary SDGs. It provides insights in the six main issues to which the soil science could have crucial contribution and discuss the action to be taken. The paper is of a great relevance for the soil science community and for achieving the SDGs and I fully support its publication. I do have only few remarks that might improve the readability and presentation. Answer: many thanks for the compliments.

1. the six key issues are described in six short essays. Each of them has its own style and way of presentation, what makes reading of section 3 attractive. On the other hand, the direct and quick comparison between the essay outcomes is difficult. A summary table, which would include: (example for first essay) 1. key issues –identified by experts (role of soils for food security) 2. related SDGs (1,2,3) 3. main challenges (necessity of fast growth of food production vs. smallholder farming, climate 4. Change impact, soil degradation, biodiversity conservation) 5. opportunities for change rooted in soil science: (restoring soil productivity and ecosystem function) 6. way to move forward soil science can address: (innovative “precision agriculture”, system approach to nutrient acquisition and management, agroecological strategies, soil food web and nutrient and water use efficiency). Answer: We invited recognized experts ( identified in a footnote) in the various fields to reflect on the six major issues. This they did and we therefore would prefer to keep the essays as they are and not rephrase them following a specific , standardized format as suggested .

This would improve the link to sections 4.1, 4.2. Other possibility would be to divide each essay to subsections concerning the bullet points above. Ideally a subsection

C2

/column “role of soil science” would be added.

Answer: We feel that we have addressed the role of soil science already extensively in sections 4.4 and 4.5. We see little opportunity to further extend this as we fear that the paper could become repetitious if we would add more sections.

2. Section 4: Actions to take. According to the title, the readers might seek the answers to questions “which action to take to tackle the SDGs”. The interdisciplinary research, system approach managed from soil scientist in the centre, and awareness raising are named together with many constraints. The complexity of the problem is sufficiently and effectively described (in all three subchapters), but might sound overwhelming for soil scientist as it requires change in paradigm within and without of the soil science community. Answer: we fully agree that what we are arguing for will indeed need a change in paradigm within and outside the soil science community. So be it. The matter is complex and making it sound too simple will not serve our goal. But, indeed, the paper presents a major challenge.

The action to be taken within and without the community should be stated and distinguished more clearly. Answer: We feel that we did so already in considerable detail in sections 4.4, 4.5 and 4.6 and in the recommendations. As is, we see little possibility to clarify our statements which we consider to be as clear as possible, considering the complexity of issues being discussed.

There are positive examples in other disciplines in meeting the political and societal constraints that might be used to describe the way “how to take the action”, which might be the question of the reader. Answer: this is a most useful comment. We added a sentence indicate ‘how to take action’.. We refer now to the climate research community that has effectively communicated their science to the public and to policy makers.

Section 4.5, it would be interesting to state how to proceed with the outlined agenda beyond the International Year of Soil 2015, in the International Year of Pulses, which

C3

have also connection to soils. Answer: Thank you very much for this idea, but rather than refer to the somewhat nebulous International Year of Pulses, we refer now to the paper of Montanarella in Nature, discussing how to proceed after the IYS.

Technical comments: p.10, line 177-181, there is no social science and economics in figure 1 Graphical abstracts address the issues discussed in article much better than Figure 1. Could the graphical abstract be used instead of Figure 1 Answer: The graphical abstract is basically a (simplified) merger between Figure 1 and the two tables in the article. We feel that it is easier for the reader to show them separately in the paper. Unclear meaning of small blue and red circles with white numbers in the graphical abstract. Answer: The figure we made as graphical abstract is already a figure with a very density of information, so we feel we should not add anything more. We agree the figure needs some time to absorb, but we think the colours are indicative and, if studied a bit longer, should speaks for themselves.

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C4