

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.

D. Arrouays (Referee)

dominique.arrouays@orleans.inra.fr

Received and published: 16 February 2016

I like this paper.

I think it is timely and well suited to a FORUM paper.

I have a couple of remarks and suggestions.

Essay 1 (page 5) Most of the references concentrate on soil degradation and negative aspects. I think it would be helpful to add more references under bullets i) to iv) to illustrate some success stories and show that there are effective solutions for managing soils for food security

C1

Essay 2 page 6. "Soil eutrophication appears to create favourable conditions for pathogens survival" So, what? What do you propose?

Essay 3: page 6, line 3 of the Essay 3. I do not agree with the sentence "Soils cover almost all of the ice free terrestrial land surface". especially within the framework of SDGs. On the contrary I would insist on the fact that soils are a limited resource in terms of area, and in terms of the area we can act on. End of page 6 (Box essay 3): "it is also likely" .remove "are" . Page 6. Section on irrigation. It is said that 800 to 1100 km³/y are used for irrigation. in comparison, the additional 30km³/y proposed seems nearly negligible. So I think the example should be re-written to make it more convincing.

Essay 4, page 8. last section. there is an i missing at equivalents

Essay 5, page 8 line 5. I had in mind much larger numbers of 'species' by square meter than these figures of 5,000 to 10,000. please check and include references. end of the section "still largely unknown" there are some recent paper about earthworms abundance and diversity in Europe, and on soil microbial diversity in France, you may cite them to show recent advances

Essay 6 page 9 line 10 of the box, there is a (ref) missing Last sentence. I'm not a native English speaker, is "possibility of those products" correct?

lines 348-360. Is there a "policy behaviour scientist" in the list of authors? I would be very careful in writing this.

line 389-390. Do you have a reference for the widespread indiscriminate use of ptf? You should admit too that often there is no other choice than using them.

Lines 413-414. This is mainly true for cultivated soils and grasslands, on the other hand, in many forested parts of the world, organic carbon accumulates because there is no biological activity and increases acidity. The carbon pool we need for biodiversity is a "living" carbon pool, not accumulation of acid O layers.

C2

lines 419-421. I think you are very optimistic about monitoring changes in SOC with sensors. Given the error of measurement they have by now, and given the rate of change in SOC, it will take nearly 50 or 100 y to prove a change. Moreover SOC are not so relatively easy to measure and to monitor given their high short-scale spatial variability. Same for lines 368-370, for remote sensors it is even worse because of atmospheric effects, vegetation cover, etc. Same again for lines 430-431. "preferably by remote sensing" this is a very dangerous assumption. First it is not yet operational at all, second, if I am a funding agency, I will never give you again one cent for real measurements but tell you, okay, just look at the satellites images, some of them are free !

Recommendation. I'm surprised not to find anything about data collection and data sharing.

Throughout the text, I'm also surprised that there is not ref to the recent reports delivered by the ITPS, and even not to paper by Montanarella et al on this and in this journal.

Refs

The paper by Montanarella in Nature is published, please add issue and line numbers.

Overall a nice paper for the FORUM.

Interactive comment on SOIL Discuss., doi:10.5194/soil-2015-88, 2016.