SOIL

Discussions

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Interactive comment on "Targeting the soil quality and soil health concepts when aiming for the United Nations Sustainable Development Goals and the EU Green Deal" *by* Antonello Bonfante et al.

Anonymous Referee #1

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The topic of the paper is very actual, and the definition of soil health and quality are still strongly debated. The authors explained their ideas about these definitions and proposed an innovative approach to calculate soil health and quality indices by using simulation models. The idea to use yield-gap concept to quantify the effect of soil health/quality on one of the most important soil functions, which is "biomass production"" is a good idea, in my opinion. Such approach could also allow to quantify the economical return of soil health and quality, in the future. For the actual topic and for the innovative approach to quantify the soil quality/health indices, the paper is worthy of

publication. There are only few sentences to clarify and to improve before publication, following the specific comments: 19: dot after "biomass production" 91: reported some references for measurement of SOM by proximal sensors, e.g. by Vis-NIR or others. 112-113: It's not clear as quality concept added values to health concept. Does soil quality take in account the texture? Soil health is calculated on three different soil texture classes, therefore it coarsely takes in account the texture. Please, explain better this part. 114-115: Since "Phenoforms" is a concept reported several times in the paper and in the eq. [1], probably you should better clarify if it is only a concept of "soil status (eroded, compacted etc.)" or if it can be also quantified with a number. It's not very clear for the readers. 181: A dot before "It assumes. . . ." 194, eq[1]: it's not clear. From the equation, lower values seem to be calculated for healthy soils, because minimum yield gap between phenoform and reference. From the data reported in tab.2, higher values of SH seem to correspond to healthier soils. Please, clarify. In case of lower SH values corresponded to healthier soils, you should probably modify the equation (for example adding 1-), otherwise it is misleading. 204: "express" instead of "exprss" 280: "Parameters" instead "parametera" 355: dot at the end 359-360: Since most of your work is focused on the effects of soil on primary production function, you should introduce the economical importance of soil health and soil quality. Moreover, your work is based on soil series, but you should briefly introduce the concept of the "short range spatial variability" of the soils. Within a field, two or more soil types with very different soil health and quality could be there. A detailed soil map, also by the use of proximal and remote technologies, allow to characterize the soil spatial variability (and then SH and SQ) at high detail. The site-specific approach to preserve soil health and quality could be basic to save resources and yield in a climate change context. Please, try to briefly introduce this theme in your discussions.