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How to feed environmental studies with soil information to address SDG 'Zero hunger'

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As pledged by UN Sustainable Development Goal (SDG) 2, there should be zero hunger, food security, improved food nutrition and sustainable agriculture by 2030. Environmental studies are essential to reach SDG 2. Soils play a crucial role, especially in addressing 'Zero hunger'. This study aims to discuss the connection between the supply and demand of soil data for environmental studies and how this connection can be improved illustrating different methods. As many studies are resource constrained, the options to collect new soil data are limited. Therefore, it is essential to use existing soil information, auxiliary data and collected field data efficiently. Existing soil data are criticised in literature as i) being dominantly qualitative, ii) being often outdated, iii) being not spatially exhaustive, iv) being only available at general scales, v) being inconsistent, and vi) lacking quality assessments. Additional field data can help to overcome some of these problems. Outdated maps can, for example, be improved by collecting additional soil data in areas where changes in soil properties are expected. Existing soil data can also provide insight in the expected soil variability and, as such, these data can be used for the design of sampling schemes. Existing soil data are also crucial input for studies on digital soil mapping because they give information on parent material and the relative age of soils. Digital soil mapping is commonly applied as an efficient method to quantitatively predict the spatial variation of soil properties. However, the efficiency of digital soil mapping may increase if we look at functional soil properties (e.g. nutrient availability, available water capacity) for the soil profile that vary in a two-dimensional space rather than at basic soil properties of individual soil layers (e.g. texture, organic matter content, nitrogen content) that vary in a three-dimensional space. Digital soil mapping techniques are based on statistical relations between soil properties and environmental variables. However, in some cases a more mechanistic approach, based on pedological knowledge, might be more convincing to predict soil properties. This study showed that the soil science community is able to provide the required soil information for environmental studies. However, there is not a single solution that provides the required soil data. Case studies are needed to prove that certain methods meet the data requirements, whereafter these case studies function as a lighthouse to other studies. We illustrate data availability and methodological innovations for a case study in Kenya, where the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) aims to contribute to SDG 2.