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Can we use citizen science to upscale soil data collection?

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Citizen science approaches are still relatively rare in soil sciences. However, the Tea Bag Index (TBI) has been successfully implemented in projects all over the world.

Our citizen science project "Expedition ERDreich – Mit Teebeuteln den Boden erforschen" (EE) aims to upscale open soil data by applying the TBI as well as other soil assessment methods all over Germany. Beside the strong focus on creating awareness for soils and its functions we want to answer the following questions:

- Is it possible to upscale citizen science projects to obtain large quantities of open soil data?
- Are soil datasets from citizen science projects of sufficient quality to be used in soil science and for soil modeling?

The project will combine aspects of co-production as well as environmental education. Co-production means, soil data will individually be compiled by citizen scientists with the support of a team of scientists from a network of project partners. While conducting various soil assessments and experiments participating citizen scientists will be given background information and guidance meant to educate and to raise awareness about soils and soil quality.

We are aiming to involve a broad spectrum of citizens from various backgrounds, for example school children, students, farmers, forest owners, gardeners, municipal administrations, and of course soil scientists.

Within the project citizen scientists will submit turnover data from their location, together with information on the sampling sites, as well as information on soil properties like pH value, soil texture, and soil color. This information will be complemented with climatic and geo-scientific co-variables by the scientific project team.

So far we identified the following main challenges:

- How can citizens from various backgrounds and in various geographical locations be addressed and involved in the project?

- How do we get high quality soil data while still teaching soil awareness?
- How do we address the complexity of soils in soil education?
- How do we manage the quality of data and identify potential errors?
- How do we communicate data management procedures to keep the project as transparent as possible?
- What and how can we give back an added value to citizen scientists?

- How do we involve citizen scientists in the scientific progress beyond collecting data and beyond the current projects timeframe?