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SOIL Geo-Wiki: A tool for improving soil information

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Crowdsourcing is increasingly being used as a way of collecting data for scientific research, e.g. species identification, classification of galaxies and unravelling of protein structures. The WorldSoilProfiles.org database at ISRIC is a global collection of soil profiles, which have been ‘crowdsourced’ from experts. This system, however, requires contributors to have a priori knowledge about soils. Yet many soil parameters can be observed in the field without specific knowledge or equipment such as stone content, soil depth or color. By crowdsourcing this information over thousands of locations, the uncertainty in current soil datasets could be radically reduced, particularly in areas currently without information or where multiple interpretations are possible from different existing soil maps. Improved information on soils could benefit many research fields and applications. Better soil data could enhance assessments of soil ecosystem services (e.g. soil carbon storage) and facilitate improved process-based ecosystem modeling from local to global scales.

Geo-Wiki is a crowdsourcing tool that was developed at IIASA for land cover validation using satellite imagery. Several branches are now available focused on specific aspects of land cover validation, e.g. validating cropland extent or urbanized areas. Geo-Wiki Pictures is a smart phone application for collecting land cover related information on the ground. The extension of Geo-Wiki to a mobile environment provides a tool for experts in land cover validation but is also a way of reaching the general public in the validation of land cover.

Here we propose a Soil Geo-Wiki tool that builds on the existing functionality of the Geo-Wiki application, which will be largely designed for the collection and sharing of soil information. Two distinct applications are envisaged: an expert-oriented application mainly for scientific purposes, which will use soil science related language (e.g. WRB or any other global reference soil classification system) and allow experts to upload and share scientifically rigorous soil data; and an application oriented towards the general public, which will be more focused on describing well observed, individual soil properties using simplified classification keys. The latter application will avoid the use of soil science related terminology and focus on the most useful soil parameters such as soil surface features, stone content, soil texture, soil plasticity, calcium carbonate presence, soil color, soil pH, soil repellency, and soil depth. Collection of soil and landscape pictures will also be supported in Soil Geo-Wiki to allow for comprehensive data collection while simultaneously allowing for quality checking by experts.