SOIL Geo-Wiki: A tool for improving soil information

Ratislav Skalsky[1], Linda See[1], Steffen Fritz[1], Juraj Balkovič[1], Marijn van der Velde[2] and Michael Obersteiner[1]

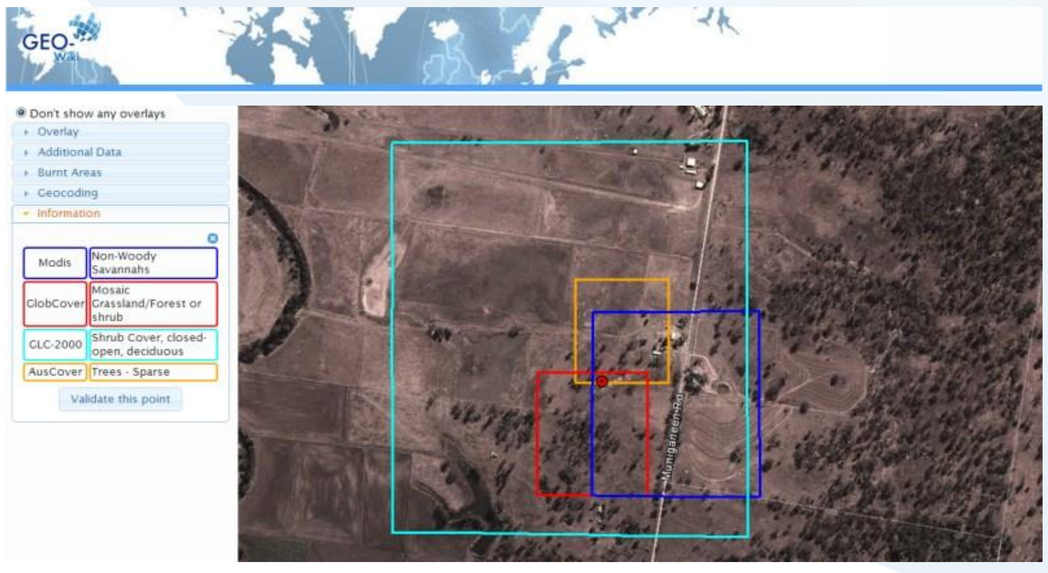
[1)] International Institute for Applied Systems Analysis (IIASA), Ecosystems Services and Management Program, Schlossplatz 1, A-2361 Laxenburg, Austria
[2)] European Commission Joint Research Centre, Institute for Environment and Sustainability – MARS, I-21020 Ispra (VA), Italy

Crowdsourcing is increasingly being used as a way of collecting data for scientific research. Many soil parameters can be observed in the field with or without specific knowledge. 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.

Here we outline a proposal for collecting a set of soil properties both by experts as well as a number of different target groups based within the general public. The proposed system would use Geo-Wiki, which is a crowdsourcing tool developed for land cover validation at IIASA.

Geo-Wiki (www.geo-wiki.org)

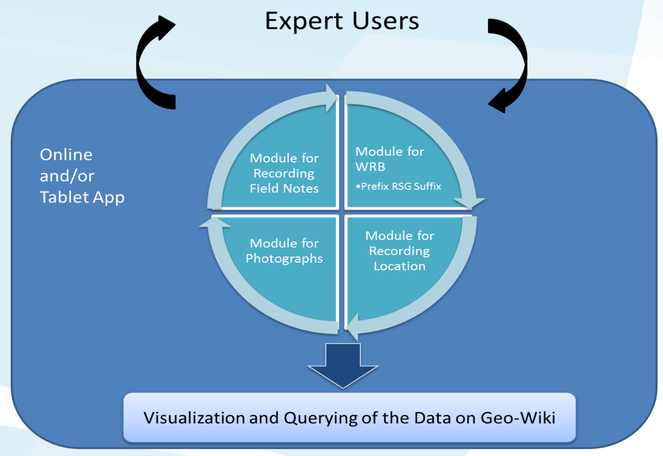
Geo-Wiki *is a visualization, crowdsourcing and validation tool for improving global land cover. Several crowdsourcing campaigns have been run in which volunteers have classified land cover to create a database for calibration and validation of future land cover products. Inputs collected from the users are recorded in a database, along with uploaded photos. Several branches are now available, which are focused on different aspects of land cover validation, e.g. validating cropland extent or urbanized areas. Geo-Wiki now has more than 3,500 registered users. The Geo-Wiki Cropland Capture game is the latest application for involving the public in crowdsourcing cropland data.*



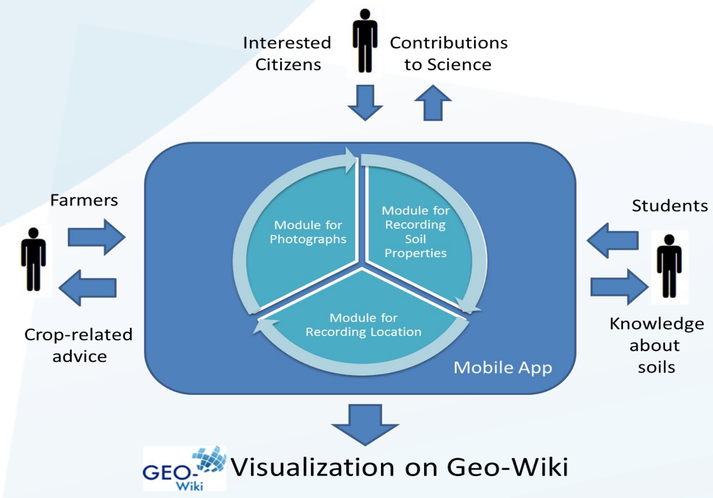
Geo-Wiki Pictures *is a smart phone application for collecting land cover related information on the ground. The extension of Geo-Wiki to a mobile environment provides a tool for experts in land cover validation but also a way of reaching the general public or other interest groups in the validation of land cover.*

Proposal for the SOIL Geo-Wiki Branch

A: *An expert-oriented application, which will be mainly for scientific purposes and will use specific soil science related language (e.g. a soil classification system). The system is largely designed for data sharing, visualization of the data on Google Earth and for downloading.*



B: *An application oriented towards the general public, which will be more focused on describing well observed, individual soil properties using simplified classification keys. Specific soil science related terminology will not be used in order to reach out to a lay audience.*



Simple soil plasticity field test

1 Introduction: *Being moist, soil can be formed to and hold some shape. A close relation exists between soil texture and soil plasticity. The finer the soil texture is, the more plastic the soil is.*

2 Equipment: *container with water, measurement belt, hard pad (e.g. clip board).*

3. Soil sampling and sample preparation: *take small amount of the soil (volume of about 1 - 2 cm3) from the soil layer which should be explored. Than if:*

- *sample is moist or dry – add water to the sample and mix (by squeezing) the sample between the fingers (thumb and index finger) of both hands. Add water again until the soil is not plastic and well formable (could not work with very sandy or silty samples).*
- *sample is wet – mix it in the hands until it loses excessive water. Test sample from time to time as described belove.*

Well prepared sample is moist, but not wet. After pressed against palm does not leave other traces than moist patch (no moist patch or mud means that sample is too dry or too wet, respectively).

4. Performing test: *Take the sample and do the following:*

- *try to roll a wire on the pad. If possible roll until the wire has diameter of 6 mm.*
- *Take 4 cm long wire and hold it by one and lift up so that it is parallel to the pad. Test whether wire holds its shape (does not break down, not bending down). If yes then*
- *continue with rolling the wire until it has diameter of 4 mm and take 4 cm long piece and lift it as described above. If it holds its shape then*
- *continue with rolling until it has diameter of 2 mm. Test if it holds shape after lifting up.*

5. Evaluating test:

Class	Key
not plastic	*Not possible to roll a wire*
slightly plastic	*Possible to roll a wire with 6 mm in diameter, which hold its shape*
plastic	*Possible to roll a wire with 4 mm in diameter, which hold its shape*
very plastic	*Possible to roll a wire with 2 mm in diameter, which hold its shape*

Properly prepared soil sample and wires rolled

References: Schoeneberger, P.J., Wysocki, D.A., Benham, E.C., Broderson, W.D., (Eds.), 2002. *Field book for describing and sampling soils. Version 2.0*. Lincoln, NE : USDA-NRCS, 105 p