Delivery of Spatially Explicit Soils Information in Western Kenya

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Abstract

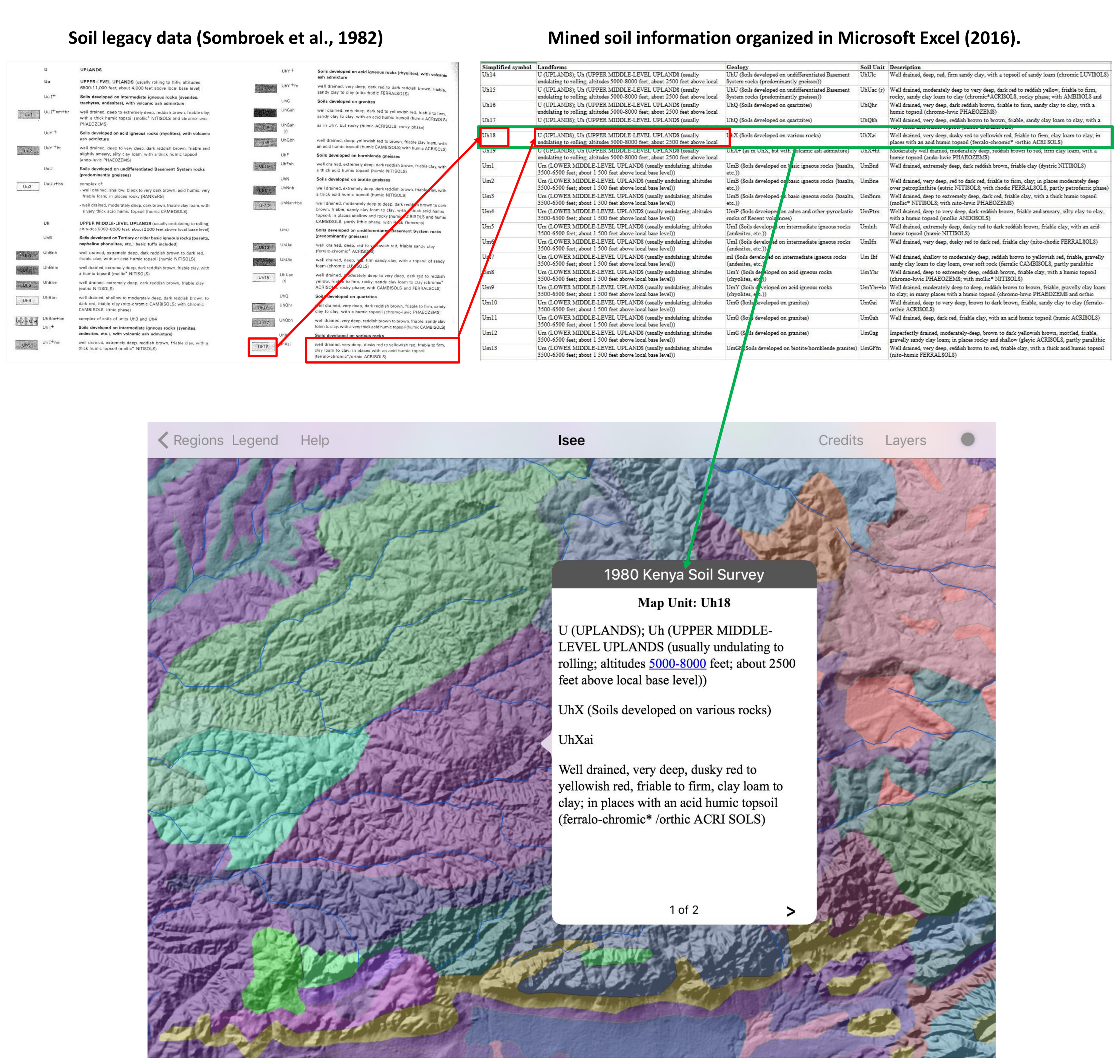
As population continues to rise, smallholder farmers in Sub-Saharan Africa face increasing challenges for obtaining sufficient food, fiber and fuel. Efficient and effective extension services are needed to improve Africa's agriculture. We developed a digital soil class map that captured the specific soils within the Uasin Gishu plateau, their respective soil management approaches, and crop suitability specific to each soil type. We tested the delivery of this map in the field in western Kenya using a custom app on a mobile tablet that accessed a server via the cell phone network.

Objective

To develop a prototype platform that could be used by agricultural extension officers and government agencies to deliver agronomically relevant, spatially explicit soils information in the Uasin Gishu plateau in western Kenya.

Methodology

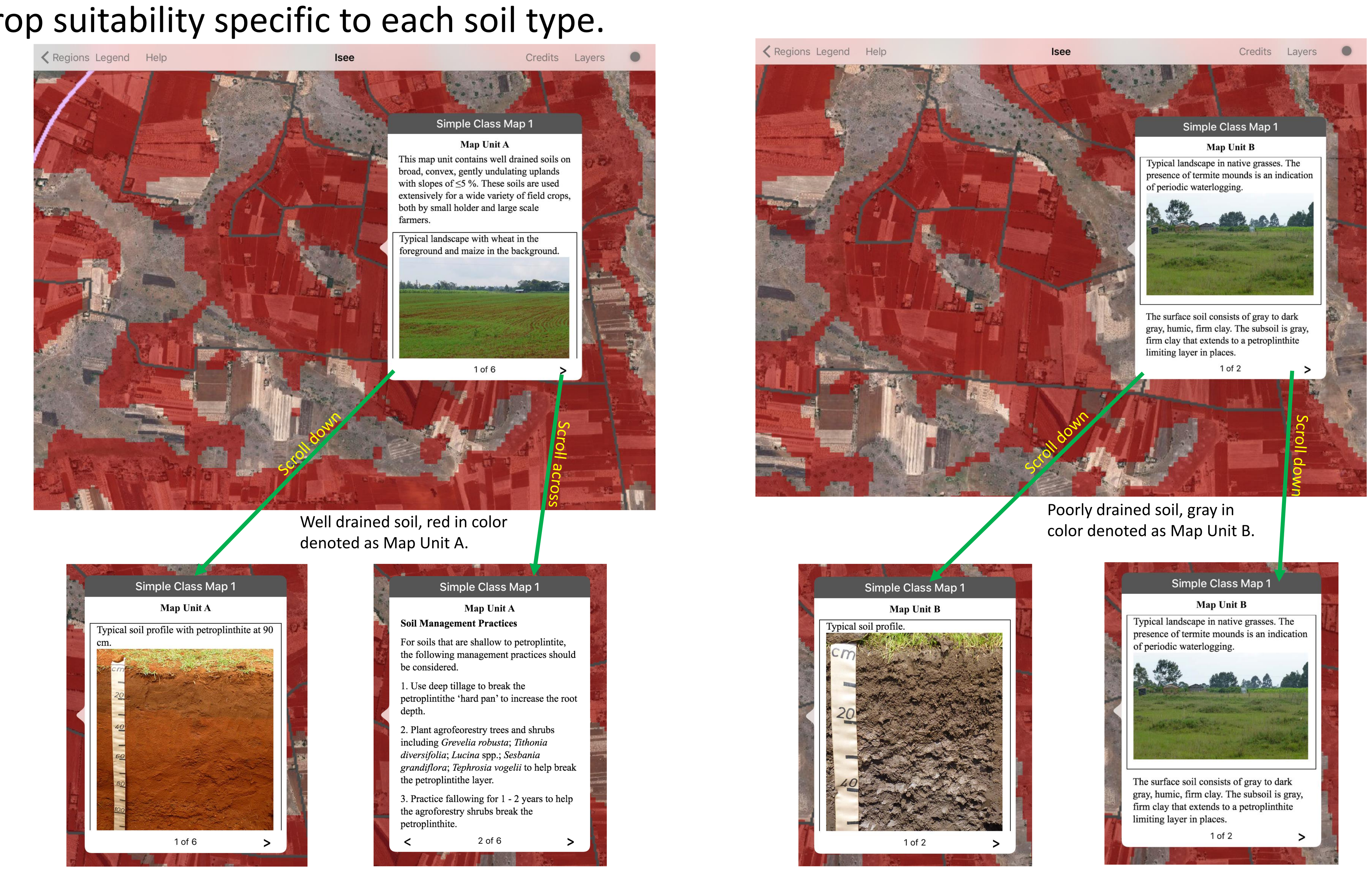
Soil information was mined from the Exploratory Soil Map of Kenya (Sombroek et al., 1982). This information was entered into Microsoft Excel and the concatenate function was used to create text strings for display in a digital soil map. The Integrating Spatial Education Experiences (Isee) app (https://appsto.re/us/nbdy7.I) was used to deliver spatially explicit information in the field.



Captured soil information displayed on a portable device showing specific soil information of a soil mapping unit. Different colors denote different soil mapping units.

Results

This approach was also used to deliver spatially explicit soils information for a simple soil class map that was produced by digital mapping techniques that captured the specific soils within Uasin Gishu plateau along with their respective soil management approaches, and crop suitability specific to each soil type.



Typical soil profile of the well drained soil, Map Unit A. | Soil management practices associated with Map Unit A | Soil Profile of Map Unit B | Typical landscape of the poorly drained soil, Map Unit B

Conclusion and Future Work

We proved that we could deliver spatially explicit, legacy soils data via portable electronic devices in the field in rural western Kenya. Our original concept was to capture expert knowledge from extension educators familiar with the area. This was more difficult than we had anticipated. We have since discovered that some existing Kenya soil surveys already have considerable information on crop suitability, soil management approaches, and other properties. We are working on ways to capture this information and make it available digitally on our mobile platform.

Testing the delivery of soil information via the cell network using a portable device

References

Sombroek, W. G., Braun, H. M. H., & Van der Pouw, B. J. A. (1982).Exploratory soil map and agro-climatic zone map of Kenya, 1980. Scale 1: 1,000,000. Kenya Soil Survey.

Acknowledgements

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