Science Societies

Affordably estimating soil carbon for Sustainable management in sub-saharan Africa

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Hannah Livuza uses the reflectometer to estimate soil carbon. Photo by Regis Chikowo.

Quantifying soil carbon is essential: soils with high organic matter are healthy and buffered against extreme weather. Such soils are a win-win for society as they produce large, stable yields and act as a storage pool for soil carbon, which reduces greenhouse gas emissions. In much of the world, lab-based analysis of soil carbon is prohibitively expensive while online soil carbon maps are unreliable for informing management and policies within communities, watersheds, and individual farms.

Researchers tested an inexpensive (US$350), open source, field-portable reflectometer to estimate soil carbon. Results, published in the *Soil Science Society of America Journal*, found that across 1,100 Africa RISING farms in Malawi, the reflectometer provided accurate estimates of soil carbon status at both the field and community scale and reliably predicted whether a crop would respond to fertilizer. These carbon estimates relied purely on data an extension officer or technician could collect on-site: reflectance spectra, texture class, and slope class.

This inexpensive reflectometer substantially outperformed the online, continental-wide Africa Soils Information Service maps of soil carbon. It is a powerful tool to monitor soil carbon in sub-Saharan Africa, revolutionizing management advice by providing information on this key soil status indicator at the field level.

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Ewing, P.M., TerAvest, D., Tu, X., & Snapp, S.S. (2021). Accessible, affordable, fine-scale estimates of soil carbon for sustainable management in sub-Saharan Africa. *Soil Science Society of America Journal*. **https://doi.org/10.1002/saj2.20263**

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