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The ESPOCH Bioknowledge Center and the soil health

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Abstract

The ecology of ecosystems and agroecosystems cannot be understood without recognizing the relationships and interactions between the subsystems above and below the soil. Understanding these relationships, their changes, and their resilience capacity will enable the development of management and restoration proposals. These new challenges of sustainable resource management require actions at different levels, which is why the Escuela Superior Politécnica del Chimborazo [ESPOCH] has implemented a Center for Bioknowledge aimed at contributing to the training of individuals with high analytical capacity and innovative approaches that facilitate inter-learning among students, farmers, and technicians in the province of Chimborazo. The Bioknowledge Center develops processes of teaching, outreach, and research in biodiversity and soil health. The work proposal on soil health stems from the problem of a lack of evidence regarding the role of soil in the resilience of agroecosystems. Therefore, in collaboration with Fundación Ekorural, Universidad Técnica del Norte and Universidad Técnica de Cotopaxi, a research project has been developed to test methods for assessing soil health and learning and research processes to identify and evaluate practices that improve soil health. So far, seven methodologies and indicators have been developed for assessing soil health in degraded ecosystems, natural ecosystems, and agroecosystems with different management types in the central highlands of the country. These methodologies have focused on soil life at macro, meso, and micro levels, applying innovative methods to identify and quantify soil life. Preliminary results indicate that natural ecosystems have been found to have an average of up to 45 earthworms, compared to just two individuals in degraded ecosystems. Similarly, in natural ecosystems, organisms with key ecological functions, such as organic matter decomposition and biological control agents like sarcophagids and springtails, were identified, in contrast to pests found in agroecosystems. This highlights the importance of applying easy-to-use and replicable methods that allow for the assessment of the impact of practices on soil health. The challenges of this work are to finalize the research with a set of methods and indicators that enable us to define which productive practices are more regenerative in degraded soils.

Keywords: Soil ecology, Ecosystems, Interlearning, Validation of methodologies