

**Forthcoming project supported by the National Science Foundation (USA)
A multiple-scale study of human and nonhuman causes of soil acidification in SW
Hungary**

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Identifying the human and nonhuman drivers of soil degradation helps develop policies, practices, and social institutions that do not undermine vital soil productivity functions. Existing studies, however, seldom analyze the variability of nonhuman factors over time and space. Human impact on a soil's ability to buffer against pH shifts (acid neutralizing capacity or ANC) is generally understudied, even though decreasing ANC (acidification) can result in degraded water quality and a loss of soil fertility. There have also been few attempts to understand the connection between social institutions and soil degradation in East Central Europe. Major social changes since the late 1980s make this region especially appropriate for discerning linkages between environmental impact and social institution. Unfortunately, research remains largely limited to pre-1989 human impact at national scales and continues to ignore the effects of nonhuman factors. The objective of this two-year project is to investigate the interaction between farming and soil ANC in SW Hungary. The study will consider whether and how farming, other human activities, or nonhuman processes lead to changes in ANC and, if farming is the main cause, whether local or larger-scale processes mostly affect farming practices. Data will be gathered, processed, and entered into a GIS with the aid of Hungarian and US assistants through the following activities: semi-structured interviews, soil and manure sampling and analysis for commercial and subsistence plots, and archival and documentary research on regional atmospheric deposition, soil monitoring, land-use, socio-economic factors, and local histories. Using largely multivariate statistical techniques, the investigation first consists in assessing rates of change in soil ANC, then identifying the principal influencing factors, and subsequently determining the degree to which ANC can be explained by local environmental practices.

The study results will be used to test current theories on human-induced soil degradation by considering soil ANC and the heterogeneity of soil dynamics over time and space. More specifically, they will help evaluate theories of environmental degradation in East Central Europe by investigating the relationship between local management practices and soil conditions. The project's larger impact will be to broaden the purview of both social and physical sciences by combining theoretical and methodological approaches from both. The database and GIS exercises generated from the findings will enhance course content for students at SUNY New Paltz. Underrepresented groups will be involved by recruiting Roma ("Gypsies"), who rarely figure as scientific researchers, and women, whose representation is especially rare in the physical sciences. The project will thereby provide an opportunity to improve scientific career chances for individuals from such backgrounds and enhance the image of these underrepresented groups. Rural development projects in Hungary will be sensitized to the pitfalls of ignoring differential access to and control over agricultural resources and to the skills and knowledge of the local Roma minority. Finally, the project will contribute to the understanding of nonhuman factors' active roles in human-induced environmental

change so as to help devise sounder environmental policy and practice at local, national, and European Union levels.