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Saving Mt. Elgon’s Soils — How Relevant Is Farmers’ Knowledge in a Rapidly Changing Environment?

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Abstract

Uganda’s Kapchorwa district is reportedly one of the most productive areas in the country. However, the area is heavily characterised by population pressure, strong soil nutrient depletion, erosion, and poor yields. Soil maps or recent information regarding soil degradation are not available. Local soil knowledge combined with scientific analysis may be a valuable tool for the localisation of problem areas in this region and development of mitigation strategies. Combining local soil knowledge with scientific methods increases relevance and accuracy of results as well as acceptance in local communities. Additionally, a comparison between scientific methods and local knowledge can uncover best crop management scenarios and knowledge gaps. To identify the validity of local soil knowledge for evaluating soil degradation, the following questions are examined: (i) what soil properties do local farmers use to identify soil types; (ii) how adequate are the soil properties to describe soil fertility; (iii) how adaptable are the soil properties to a rapidly changing environment.

Eight focus group discussions (FGDs) at four different altitudes on Mt. Elgon completed soil classification exercises. The FGDs also rated soil fertility and discussed best practices for management and cultivation. Additionally, 72 farmers from 35 villages participated in questionnaires about soils on their farms, and ranked their fertility. Soil samples from 135 fields were analysed for pH, plant available nitrogen (N), phosphorus (P), potassium (K), soil organic carbon (SOC), soil colour, and soil texture.

Farmers used soil colour, texture, and crop yields to classify soils. The farmers in all groups showed a very high awareness of their soils and occurring degradation. They described decreasing soil fertility with decreasing altitude. The soil analysis confirms this observation, as there is a decreasing gradient of nutrient availability with decreasing altitude. The comparison of the scientific analysis and the farmers’ selected soil properties, however, showed that the properties are inadequate in identifying indicators of soil degradation. The costs and efforts of remediating a degraded soil outweigh mitigating the cause of degradation. Therefore, farmer tailored monitoring tools shall be constructed to identify early warning indicators of soil quality decrease, as well as the corresponding mitigation techniques.

Keywords: Degradation, local knowledge, Soil colour, soil fertility, soil nutrients, texture, Uganda