Saving Mt. Elgon's Soils

How Relevant Is Farmers' Knowledge in a Rapidly Changing Environment?

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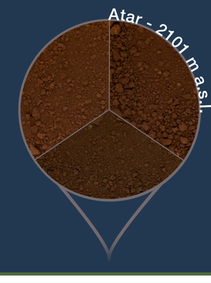
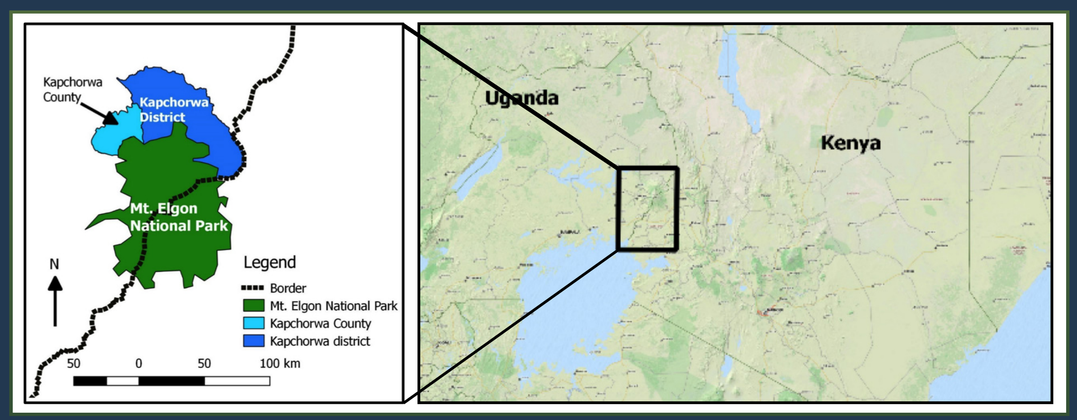


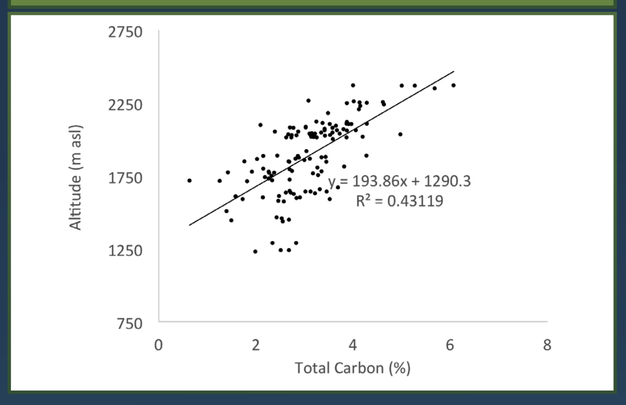
Introduction

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. 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.

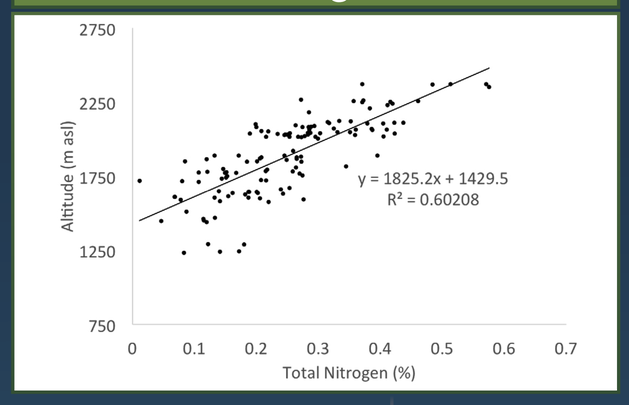
To identify the validity of local soil knowledge for evaluating soil degradation, the aim is to identify the soil properties local farmers use to identify soils, their adequacy in describing soil fertility, and their adaptability to a rapidly changing environment.



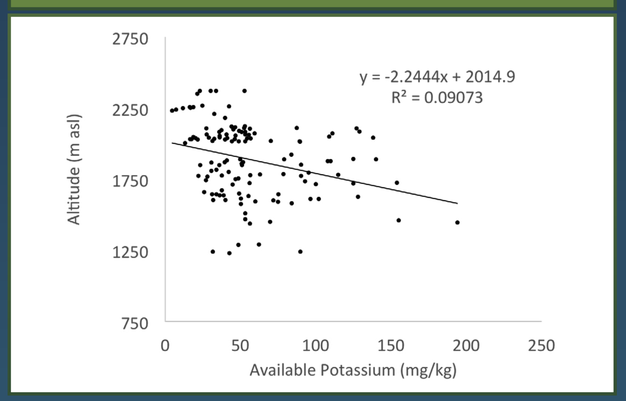
Carbon



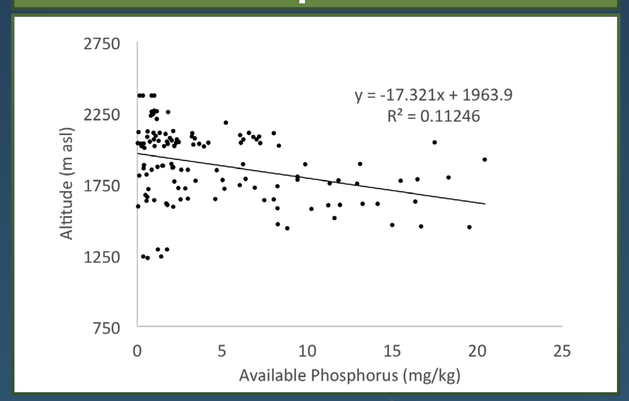
Nitrogen



Potassium



Phosphorus



Results

Farmers' Perspective

- Farmers from FGDs use soil texture, colour, depth, and crop yield to evaluate soil fertility
- Colour was the most important identifier, the darker the higher the fertility
- Four soils identified during the household interviews: black (90%), brown (5%), red (4%) and white (0.8%)
- Most used for farming is the black soil, mainly found in higher altitudes

Munsell Soil Colour Chart

- Using Munsell soil colour charts eight colours were identified
- Munsell colours predominantly found dark brown soil (56%) and very dark brown soil (16%)
- No trend with altitude , nutrient content, or soil properties

Soil properties

- Total N and C content both increase with altitude, available P and K decrease
- pH decreases with altitude and ranges from 4.5 to 7
- There is no correlation with Munsell colours or farmer colours with the measured soil properties
- No evidence of higher yields in higher altitudes as crop choice varies based on altitude

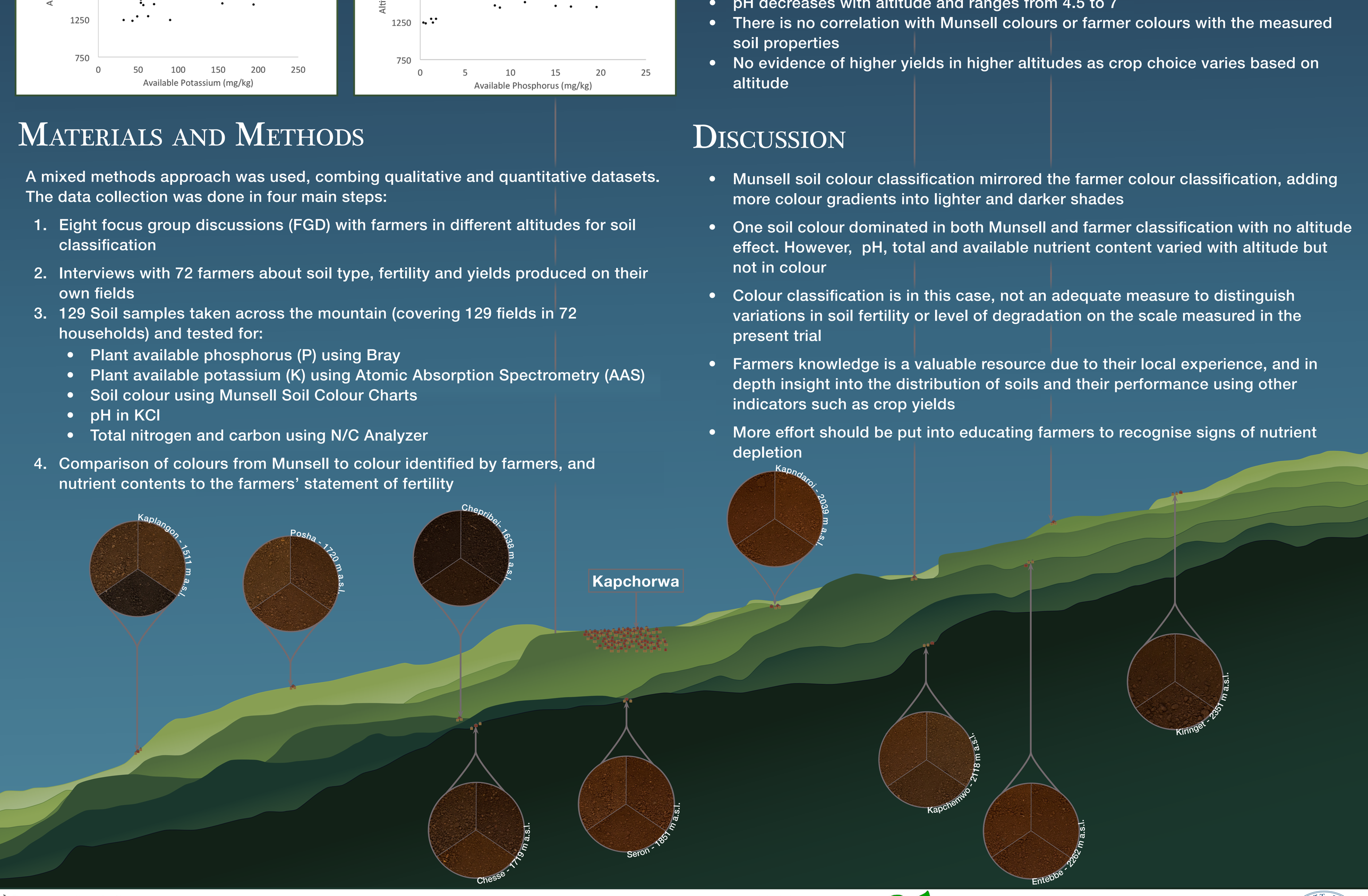
Materials and Methods

A mixed methods approach was used, combing qualitative and quantitative datasets. The data collection was done in four main steps:

1. Eight focus group discussions (FGD) with farmers in different altitudes for soil classification
2. Interviews with 72 farmers about soil type, fertility and yields produced on their own fields
3. 129 Soil samples taken across the mountain (covering 129 fields in 72 households) and tested for:
   - Plant available phosphorus (P) using Bray
   - Plant available potassium (K) using Atomic Absorption Spectrometry (AAS)
   - Soil colour using Munsell Soil Colour Charts
   - pH in KCl
   - Total nitrogen and carbon using N/C Analyzer
4. Comparison of colours from Munsell to colour identified by farmers, and nutrient contents to the farmers' statement of fertility

Discussion

- Munsell soil colour classification mirrored the farmer colour classification, adding more colour gradients into lighter and darker shades
- One soil colour dominated in both Munsell and farmer classification with no altitude effect. However, pH, total and available nutrient content varied with altitude but not in colour
- Colour classification is in this case, not an adequate measure to distinguish variations in soil fertility or level of degradation on the scale measured in the present trial
- Farmers knowledge is a valuable resource due to their local experience, and in depth insight into the distribution of soils and their performance using other indicators such as crop yields
- More effort should be put into educating farmers to recognise signs of nutrient depletion



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The profiles of Mount Elgon are staggered from the front to the back for visibility and clarity reasons. They are arranged radial along the hillside from south to north. The highest altitude for all profiles (so at the right border of this poster) is at 2516 m a.s.l..

Each circle displays the soils of one random household of the marked village. The soils of three different fields are shown: (1) field close to the household, (2) field with a medium distance from the household, (3) field far from the household.

The altitude refers to the village and not to the specific household or fields.

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