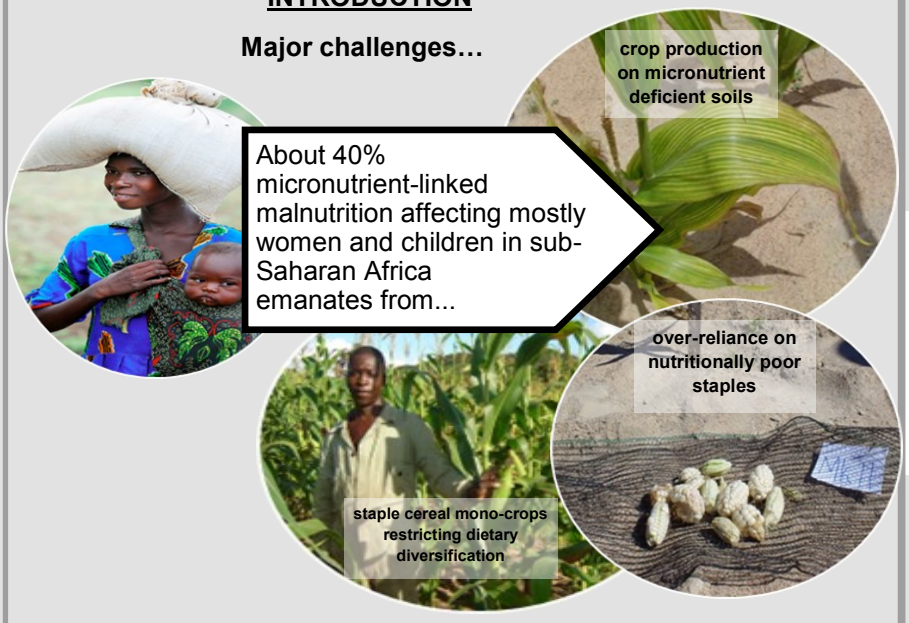
GEOSPATIAL VARIATION OF BIOAVAILABLE MICRONUTRIENTS IN TROPICAL SOILS AND IMPLICATIONS FOR CROP AND HUMAN NUTRITION

Muneta G. Manzeke[1] Florence Mtambanengwe[1], Michael J. Watts[2], Martin R. Broadley[3], Paul Mapfumo[1]
[1]University of Zimbabwe – SOFECSA Research Group, Soil Science and Agricultural Engineering, University of Zimbabwe, Harare, ZIMBABWE;
[2]Inorganic Geochemistry, Centre for Environmental Geochemistry, British Geological Survey, UNITED KINGDOM
[3]School of Biosciences, Sutton Bonington Campus, Leicestershire, University of Nottingham, UNITED KINGDOM ; manzekegrace@gmail.com

INTRODUCTION

Major challenges…



- This work builds on preliminary findings which reported that improved soil fertility management practices and changes in fertilizer formulations to include micronutrients can result in better staple cereals quality (Manzeke et al., 2012; 2014).
- To efficiently address malnutrition on-farm, this study will match spatial variability of micronutrients to farmer soil fertility management and quality of produce to inform appropriate nutrient input.

METHODOLOGY

Overall research approach

Key steps

1. Identify and characterize food sources consumed by farmers to determine their nutritional value and contribution to ameliorating micronutrient malnutrition.

2a. Geo-spatial mapping of farms
b. Relating soil geo-chemistry to nutritional quality of crops in farmers' fields

3. "Best-fit" agronomic bio-fortification on-farm experiments to develop options for enhanced micronutrient (iron, selenium and zinc) availability to maize, small grains and cowpea

4. Analysis to define factors governing soil-plant micronutrient transfers in crops and grain analysis

Main tools employed

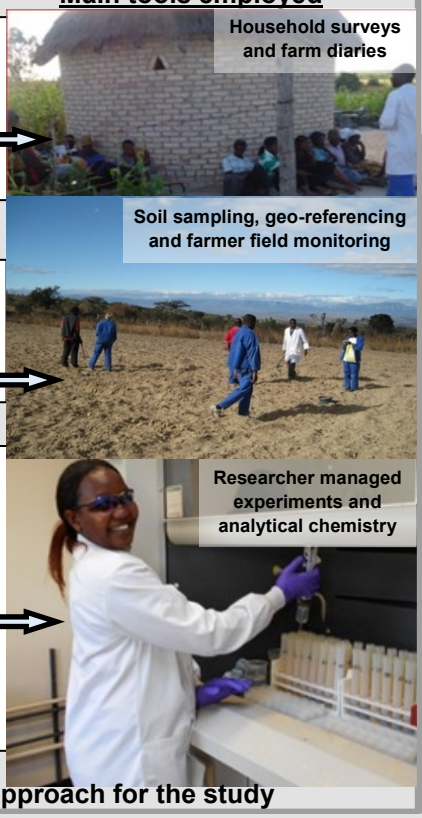


Figure 1: Methodological approach for the study

STUDY SITES

- The study will be conducted in 3 smallholder districts varying in soil type (Figure 2a) and agro-ecology (Figure 2b) beginning December 2015.

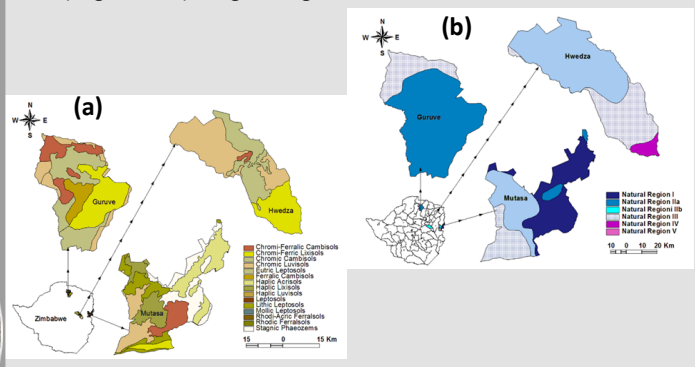


Figure 2: Study sites showing variations in (a) soil type and (b) agro-ecological zones

- Mutasa is predominantly Natural Region (NR) 1 receiving >1000 mm year^{-1}
- Guruve: NR 2a (>800 mm year^{-1})
- Hwedza: NR 2b and 3 (650-750 mm year^{-1})
- Rainy season is uni-modal from November-March
- Maize is the main crop grown for subsistence
- Small grains and legumes are often allocated smaller portions of land.

EXPECTED OUTPUTS

1. Soil maps showing the distribution of Fe, Se and Zn.
2. Knowledge on the influence of soil geochemistry and agro-ecology on the nutritional value of staple cereals and cowpea in agriculture.
3. Publications in peer-reviewed scientific journals.
4. Research briefs informing agriculture and health policies on role of soils and agronomic bio-fortification in combating malnutrition

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