







# Soil fertility variability as influenced by resource endowment and farmer knowledge in smallholder farming systems of DR Congo

## ISAAC BALUME<sup>1</sup>, GENEROSE NZIGUHEBA<sup>2</sup>, BERNARD VANLAUWE<sup>2</sup>, GEORG CADISCH<sup>1</sup> CARSTEN MAROHN<sup>1</sup>, FRANK RASCHE<sup>1</sup>

<sup>1</sup>University of Hohenheim, Inst. of Agricultural Sciences in the Tropics, Germany <sup>2</sup>International Institute of Tropical Agriculture Nairobi, Kenya





#### www.foodsecurity.de RESULTS AND DISCUSSION



- Smallholder farms in South-Kivu, Eastern DR Congo, exhibit a high degree of soil fertility variability as driven by socioeconomic and biophysical factors.
- Soil variability often translates into differences of resource endownments for individual households.
- The objective of this study was thus to study the extent of soil fertility variability in selected sites of South Kivu to design best-fit technologies for soil fertility imrovement.

#### **MATERIALS AND METHODS**





Fig 1. Study area and sampling sites in South-Kivu, CR Congo.
 ➢ Study sites: Bushumba Centre, Mulengeza in Kabare North district and Madaka and Luduha in SW of Bukavu.

Fig 2. Soil fertility properties controlled by typology and soil fertility perception.

- ANOVA of soil fertility indicators resulted in significant differences between sites (*p*<0.001), but not between resources endowment.
- Madaka has shown to have good nutrient status except limitation for available P (*p*=0.05).
  Farmers' perception on soil fertility was proven for most of the soil properties assessed (*p*<0.001).</li>
- Typology based on land ownership: wealthy (>2 ha), intermediate (1-2 ha), poor (<2 ha).</p>
- Soil Fertility classes: Good and degraded soils.
- $\succ$  Soil depth: top soil (0-20 cm) and subsoil (20-50 cm).
- > Total households investigated: 96.
- Soil properties investigated: total soil N (N<sub>t</sub>), soil organic C (C<sub>org</sub>), plant available P (P<sub>av</sub>), soil pH.

#### ACKNOWLDGEMENTS

BMZ through the "LegumeCHOICE" project, Food Security Center (FSC) and IITA CORAFWECARD for financial support.

### **CONCLUSION AND OUTLOOK**

Soil fertility was highly variable between implementation sites, fertility classes and soil depth, while it was not linked to wealth status of the household. Hence, designing best-fit technologies for soil fertility improvement should recognize the wide variability in soil fertility occurring even within farms.

Contact: Isaac.balume@uni-hohenheim.de

With financial support from the

Federal Ministry for Economic Cooperation and Development



