Introduction and objective

- Human-induced pressure on soil resources is expected to vary across South Kivu due to variability in rainfall, soil types and land use, and differing socioeconomic conditions (population density, access to land, agricultural extension services, road infrastructure, access to markets). But few reliable data on land degradation in Kivu are available.

- Understanding farmers’ perceptions of land degradation provides insight into the real limits of agricultural production processes (e.g., Okoba et al., 2005) and is a prerequisite for guiding land conservation actions.

- This study aimed at assessing how the diversity in biophysical and socioeconomic contexts in the Kivu dorsal affect crops choice, farming practices and the resulting status of soil degradation as perceived by farmers.

Study area

- The Kivu dorsal is located in the eastern part of the DRC (Fig. 1).
- 8 watersheds in 4 Territories: Kalehe, Kabare, Walungu, Idjwi.
- Survey conducted within 55 villages dominated by smallholder farming systems.

Methodology

- Study area
- Map of profiles analysis for crops, farming practices and four farm types.
- Human-induced pressure on soil resources is expected to vary across South Kivu due to variability in rainfall, soil types and land use, and differing socioeconomic conditions (population density, access to land, agricultural extension services, road infrastructure, access to markets). But few reliable data on land degradation in Kivu are available.
- Understanding farmers’ perceptions of land degradation provides insight into the real limits of agricultural production processes (e.g., Okoba et al., 2005) and is a prerequisite for guiding land conservation actions.
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Profiles of crops and farming practices by farm types

- Four farm types were identified based on household available resources. Farm types 2 & 3 are not significantly different, while farm types 1 & 4 are significantly different and opposed.
- Wide diversity of crops (Fig. 2).
- Crops vary by farm type (p<0.0001).
- Different combinations of farming practices in each farm type.

Perceived soil degradation status

- Index of land degradation varies from 1.66 to 2.89 across watersheds (on a scale from 0 to 4) (Fig. 3a).
- Topographical location explains major differences in farmer’s perception of the status of degradation (Fig. 3b).
- Significant differences (p<0.0001) in farmer’s perception of the status of land degradation across watersheds (Fig. 3c).

Types of soil degradation

- Significant differences (p<0.0001) are observed in farmer’s perception of the three types of degradation: soil erosion (Fig. 4a), soil depletion (Fig. 4b), and loss of organic matter (Fig. 4c), soil compaction.
- For all three types of degradation (Fig. 4a,b,c), the Kalu watershed has a high proportion of fields with severe and very severe degradation status.
- Soil erosion is the main cause of degradation for more than 74% of farmers (Fig. 4a).
- Soil compaction is mainly viewed as a consequence of soil erosion (Fig. 4d).

Correlation between degradation status and relevant variables

- A positive correlation is observed between population density and degradation status (r=0.64): Watersheds with high population density have also high frequencies of severe and very severe degradation status (Fig. 5a).
- A positive correlation is observed between plot altitude and degradation status (r=0.72) (Fig. 5b).
- Crops and farming practices adopted by most of farmers in the study area have positive correlations with degradation status (Fig. 5c).
- Negative correlation is observed between average land area and degradation status (Fig. 5d).

Conclusions

- Heterogeneity observed in biophysical and socioeconomic contexts affected the status of degradation as perceived by farmers.
- Crops and farming practices vary depending on each site and their available means.
- Strong links were observed between the status of degradation and the topographical location, the crops as well as the practices adopted in farmer’s fields.
- Analysis of soil degradation processes was better understood after analyzing biophysical and socioeconomic contexts of the concerned areas.

Reference