Introduction and Objectives

- Long-distance cattle transhumance (Fig. 1) is a widespread dry season phenomenon across West Africa. However, transhumant herds may degrade the environment, although the dung deposited (Fig. 2) may improve soil health and the ecology of rangeland soils.

- To elucidate further, the effects of two grazing intensities and three vegetation types (VT) were evaluated on soil quality of rangelands in two municipalities of northern Benin.

Sites

- The municipalities of Sinendé and Tchaourou in northern Benin (Fig. 3), two host areas for cross-border cattle transhumance were chosen.

- The three representative VT of these locations were: Open forest/woodland savannah; wooded savannah/shrub savannah and crop field mosaic.

- Strong (ST) and weak (WT) transhumance zone were delineated with local community help and based on existing transhumance maps.

Results

Table 1: Effects of transhumance zone and vegetation type on selected soil properties of rangelands in northern Benin.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ST</th>
<th>WT</th>
<th>Cfm</th>
<th>Of/Ws</th>
<th>Ws/Ss</th>
<th>VT</th>
<th>TZ</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (t/m²)</td>
<td>183.2</td>
<td>145.4</td>
<td>143.3</td>
<td>151.75</td>
<td>196.6</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>± 83.61</td>
<td>± 46.65</td>
<td>± 70.16</td>
<td>± 63.06</td>
<td>± 67.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OM (%)</td>
<td>2.1</td>
<td>2.2</td>
<td>2.1</td>
<td>2.7</td>
<td>1.7</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>± 0.91</td>
<td>± 0.66</td>
<td>± 0.66</td>
<td>± 0.72</td>
<td>± 0.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>6.6</td>
<td>6.3</td>
<td>6.4</td>
<td>6.4</td>
<td>6.5</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>± 0.66</td>
<td>± 0.55</td>
<td>± 0.51</td>
<td>± 0.72</td>
<td>± 0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Soils pH was neither affected by vegetation type nor by transhumance.
- The organic matter content was similar across transhumance zone, but varied across vegetation type.
- Soil compaction was significantly affected by vegetation type and transhumance.
- This reflects a strong pressure exerted by cattle on the soil.

Conclusion

- Transhumance affects soil compaction but does not affect its fertility.
- Moving herds strategically from one pasture to the other, may help decrease rangeland soil degradation, and improve its quality and productivity.
- Further studies must evaluate the appropriate carrying capacity of rangelands to avoid soil compaction while taking advantage of the dung deposited for soil health improvement.

Acknowledgements

We are grateful to the Volkswagen Foundation, Hannover, Germany for funding this research and the local communities for facilitation of the study.