

Development of an indicator to assess wetland degradation based on soil, water drainage, and human-related landscape

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Wetlands are rich ecosystems that provide goods and services to communities. They are home to abundant biodiversity, and their role in climate mitigation is well-established. These ecosystems lie at the interface between terrestrial and aquatic systems. However, they have rapidly declined over the past decades due to environmental stresses and human activities. In sub-Saharan Africa (SSA), particularly in the eastern Democratic Republic of Congo (DRC), anthropogenic practices related to agriculture and brick production have significantly degraded these wetlands. Various indicators have been developed to assess soil quality, but there is limited documentation on the relationship between these indicators and the anthropogenic factors influencing them. This study elaborated a Wetland Soil Degradation Index (WSDI) by combining data on soil quality, human-related landscape factors, hydrological regimes, and land use types. The index was experimented in two wetlands in eastern DRC. An indicator was developed and adjusted using a combination of GIS and remote sensing approaches alongside soil profile analyses. The overall WSDI score averaged 0.52 across the two study sites. However, it varied significantly based on land use type, with the highest values in areas where bricks are produced (0.62), followed by agricultural zones (0.52), while intact zones had a lower score of 0.28. The index was also higher in completely drained areas (0.72) compared to partially drained (0.48) and intact or not drained zones (0.28). Significant correlations were found between the WSDI and human-related landscape factors, notably the proximity of villages, rural settlements, and roads. The increase in wetland degradation is strongly linked to road accessibility and the distance to other human landscapes. The monitoring of this indicator confirms a gradual degradation pattern, starting from the wetland edges and progressing toward the center. Therefore, it is essential to question the future of these wetlands and explore possible management scenarios.

Oral presentation