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Peatlands and potatoes; organic wetland soils in Uganda

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Land use change in Uganda's wetlands has received very little research attention. Peat soils dominate the papyrus wetlands of the south west of the country, but the areas they are found in have been increasingly converted to potato cultivation. Our research in Uganda set out to (a) document both the annual use of and changes to these soils under potato cultivation, and (b) the extent and condition of these soils across wetland systems. During our research we found it was necessary to develop locally appropriate protocols for sampling and analysis of soil characteristics, based on field conditions and locally available resources. Over the period of one year we studied the use of the peat soil for potato cultivation by smallholder farmers in Ruhuma wetland and measured changes to surface peat properties and soil nutrients in fields over that time. Farmer's use of the fields changed over the year, with cultivation, harvesting and fallow periods, which impacted on soil micro-topography. Measured soil properties changed over the course of the year as a result of the land use, with bulk density, nitrogen content, potassium and magnesium all reducing. Comparison of changes in soil carbon stocks over the study period were difficult to make as it was not possible to reach the bottom of the peat layer. However, a layer of fallow weeds discarded onto the soil prior to preparation of the raised potato beds provided a time marker which gave insight into carbon losses over the year. To determine the peatland extent, a spatial survey was conducted in the Kanyabaha-Rushebeya wetland system, capturing peat depths and key soil properties (bulk density, organic matter and carbon contents). Generalised additive models were used to map peat depth and soil characteristics across the system, and maps were developed for these as well as drainage and land use classes. Comparison of peat cores between the two study areas indicates spatial variability in peat depths and the influence of neighbouring mineral soil hillslopes. Our work provides valuable insight into the condition and use of these tropical peat soils, which are under-researched yet highly depended upon by local communities, with wider climate impacts. Cultivation of these peat soils has implications for their future sustainability and use, and having insight into the impacts of land management on these soils improves local and national level capacity for better soil management.