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STATUS OF SOILS IN UGANDA

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Sustainable
soil and fertilizer
management for Africa:
a case study from Uganda



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Status of soils in Uganda

- Uganda has a total area of 241,038 km², with a land area of about 236,000 km² and the arable land is about 6,900,000 ha (WB, 2023)
- Agriculture is the backbone of Uganda's economy contributing about 24.1% GDP and 33% export earnings in FY 2021/22 and it employs about 70% of the population
- The agricultural sector is based on exploiting the natural resources, soil inclusive
- Soils are the basis of all life-support systems, performs important ecosystem services, and are vital sources of food, fibre and raw materials.
- Uganda is endowed with a wide range of soil types with different characteristics and capabilities



Current status of Uganda soils

- An estimated 41% of Uganda's land is experiencing degradation (Vågen, et al., 2016)
- Soils are of low inherent fertility (N and P limiting)
- Severe soil erosion is estimated to be $5 \text{ t ha}^{-1} \text{ yr}^{-1}$ on average, reaching about $30 \text{ t ha}^{-1} \text{ yr}^{-1}$ in the highlands (IAEA, 2021)
- Soil erosion hotspots are the Highlands (most productive areas of the country) and cattle corridor (with 75% of livestock population)
- The rate of degradation and soil erosion costs about 17% of the country's gross domestic product (GDP)



Current status of Uganda soils

- Nutrient mining through soil erosion, crop harvest and non- or limited use of external sources of nutrients
- Nutrient loss (N, P and K) is estimated at $87 \text{ kg ha}^{-1} \text{ yr}^{-1}$ (Wortmann and Kaizzi, 1998)
- Negative nutrient balances of -21, -8 and -43 of N, P, and K (Zake, 2018) and across all Agroecological Zones (Kaizzi et al., 2006)
- The soils have become acidic
- Soils have lost organic matter and major nutrients (Zake 2018)



Challenges

- Soil fertility is low to medium and is on the decline
- Annual fertilizer use is low in the range 0.23 -1.5 kg ha⁻¹ far below the average of 8 kg ha⁻¹ in sub-Saharan Africa.
- Only about 5% and 24% of agricultural households in Uganda use fertilizers and organic manure, respectively
- Invasion of fragile ecosystems is on the increase notably; wetlands, forests and highlands for settlement and agricultural activities
- Nutrient mining has worsened the low inherent soil fertility and its decline



Limitations

- The existing policies and legislation supporting soil management are inadequate
- Insufficient capacity and lack of coordination and networking among the existing institutions
- Lack of awareness among land users of appropriate soil management techniques
- Stakeholders abandoning recommended soil management practices e.g., farmers destroying terraces in the highlands
- Demographic challenges



- Limited capacity in terms of knowledge and skills among practitioners and technicians on Sustainable Soil Management
- Laboratory services with obsolete equipment, ill equipped and limited to few areas for example currently they are limited to NARO and some universities may be three and the end users are out there
- Insufficient land and soil information which hinders proper land use planning and development
- Limited stakeholder knowledge on use of organic and inorganic fertilizers along the 4Rs Nutrient Steward (**R**ight Source, **R**ight amount, **R**ight time and **R**ight application method)

