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Kumbu yams: Nutrition dense, underutilised staples for equitable, climate smart food systems and rural livelihoods

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Abstract

Growing food and nutrition insecurity in Africa is closely linked to narrow, cereal dominated systems that marginalise indigenous staples and constrain health oriented diversification. Kumbu yams (Nyake, Mwende, Jaseh), a wild *Dioscorea* complex from the Mount Cameroon Region, are positioned here against the reference staple *D. rotundata* to evaluate their potential as next generation “super staples” for climate smart, nutrition sensitive food systems. Semi structured questionnaires administered to 583 respondents across 41 villages ($p = 0.05$) showed that Kumbu is either a “wild yam in process of domestication” or “in process of extinction”: only 38.4 % of households still cultivate it, 69.3 % report severe seed scarcity, 30.7 % prefer other yams, and 68.1 % cannot distinguish cultivars, indicating rapid erosion of indigenous knowledge and genetic resources. Building on this diagnostic, Morphological and molecular characterisation resolved Nyake, Mwende and Jaseh as three distinct candidate *Dioscorea* species, >99 % similar at genus level and closely allied to wild African yams (*D. praehensilis*/*D. abyssinica*), suggesting shared evolutionary origins and high likelihood of new species to science. Agronomic trials established sett propagation, combined with beneficial microbes and poultry manure, as a practical low input package, raising yields up to $37,075 \pm 2,392 \text{ kg ha}^{-1}$ versus $9,569 \pm 549 \text{ kg ha}^{-1}$ under minisett, while simultaneously reducing tannins and phytates by up to 84 % and increasing ascorbic acid. Comparative nutritional profiling demonstrates that all three Kumbu cultivars deliver more than double the metabolisable energy of *D. rotundata* on a dry weight basis, with substantially higher protein, useful fat, ash (mineral proxy) and exceptionally elevated vitamin C ($1,716\text{--}2,412 \text{ mg } 100 \text{ g}^{-1}$), other vitamins alongside safe dietary levels of tannins, phytates and oxalates. Thus, while *D. rotundata* remains a conservative bulk energy staple, Kumbu clearly emerges as a high value, nutrient dense, health promoting yam complex ideally suited for nutrition sensitive agriculture, value added product development and equitable rural income generation. We argue that strategic valorisation of Kumbu—through seed system support, on farm conservation, breeding to fine tune oxalate/alkaloid profiles and integration into extension programmes—could reposition this wild yam as “Africa’s next super staple” within tropical food system.

Keywords: Indigenous staples, kumbu yam, nutrition sensitive food systems, rural livelihood, underutilised crops