Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Fertiliser microdosing: a cost-effective approach to enhancing cereal yield in smallholder farming systems of sub-saharan Africa

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Abstract

Low soil fertility severely affects smallholder farmers in sub-Saharan Africa (SSA), where 80 % of cultivated land is degraded. Challenges in the region include deeply weathered soils, inadequate indigenous practices, limited capital, and high fertiliser costs. Nutrient losses from conventional fertiliser use result in low efficiency and poor ROI, leading farmers to use only 18 kg/ha compared to over 100 kg/ha globally. Appropriate solutions like Fertiliser Microdosing (FMD) which is the application of small amounts of nitrogen and phosphorus with seeds during sowing are urgently needed. This paper explains the principles of FMD, summarises evidence based limitations and advantages, and introduces practical recommendations for up scaling. The policy brief reveals how effectively FMD addresses (i) low crop productivity and low soil fertility of many SSA farming systems, (ii) low cash and capital availability of most smallholder farmers to purchase mineral fertilisers, and (iii) high losses of nutrients in conventional fertiliser applications. FMD increases cereal productivity with improved nutrient efficiency, particularly on acid sandy soils. The technology has been proven in many circumstances, but is not yet as widespread as it could and should be. This brief calls for policy measures to scale FMD use. Fertiliser distribution and support for FMD require collaboration among governments, NGOs, and private sectors. Recommendations include providing small fertiliser packages, developing efficient application technology, integrating FMD into agricultural programs, promoting holistic soil management, recognising FMD as strategic for smallholders, and reallocating subsidy funds for supporting this resilient and low-carbon smallholder farming technology. Promoting FMD aligns with Sustainable Development Goals (SDGs) 1 & 2, the Aspiration 1 and the vision of the Africa Agenda 2063 as well as FAO's agro-ecology principle of input reduction. In summary, supporting FMD adoption in SSA is a promising way of enhancing sustainability, poverty reduction, food security, and gender inclusion in farming.

Keywords: Agricultural policy, fertiliser microdosing, nutrient use efficiency, smallholder farming, soil fertility, sub-Saharan Africa

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