

Abstract

Low inherent soil fertility in the highly weathered and leached soils largely accounts for low and unsustainable crop yields in most African countries. But in particular, the major nutrients, nitrogen (N) and phosphorus (P), are commonly deficient in these soils. This scenario of nutrient depletion is reflected in food deficits and hence the food aid received continuously, specifically in sub-Saharan Africa. Undoubtedly, substantial efforts have been made in the continent to replenish the fertility of degraded soils in attempts to raise crop yields, towards self-sufficiency and export. Such efforts consist of applications of both organic and inorganic resources to improve the nutrient status of soils and enhanced nutrient uptake by crops, provided that soil moisture is adequate. Overall, positive crop responses to these materials have been obtained. Thus in the East African region, maize (staple) yields have been raised in one growing season from below 0.5 t/ha without nutrient inputs, to 3–5 t/ha from various nutrient amendments at the smallhold farm level. However, in spite of the positive crop responses to nutrient inputs, farmers are generally slow to adopt the soil fertility management technologies. In this paper we review the impact of some technologies, focussing the use of nutrient resources of different characteristics (qualities) in relation to improved crop yields, with an overall goal to enhance technology adoption. Thus, inorganic resources or fertilizers often give immediate crop responses, but their use or adoption is rather restricted to large-scale farmers who can afford to buy these materials. Organic resources, which include crop residues, water hyacinth and agroforestry shrubs and trees, are widely distributed, but they are generally of low quality, reflecting the need to apply large quantities to meet crop nutrient demands. Moreover, most organics will add N mainly to soils. On the other hand, phosphate rocks of varying reactivity are found widely in Africa and are refined elsewhere to supply soluble P sources. The recently developed soil fertility management options in East Africa have targeted the efficient use of N and P by crops and the integrated nutrient management approach. Some people have also felt that the repackaging of inputs in small, affordable quantities, such as the PREP-PAC described in this paper, may be an avenue to attract smallhold farmers to use nutrient inputs. Nonetheless, crop responses to nutrient inputs vary widely within and across agroecozones (AEZs), suggesting specificity in recommendations. We highlight this observation in a case study whereby eight soil fertility management options, developed independently, are being tested side-by-side at on-farm level. Farmers will be empowered to identify technologies from their own choices that are

agronomically effective and economically friendly. This approach of technology testing and subsequent adoption is recommended for technology development in future.