

PhD Topic: Use of soil organic amendments in vegetable production under smallholder farming systems in Southern Africa

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Abstract: Most smallholder farming systems in Southern Africa experience low agricultural productivity, leading to food and nutrition insecurity, poor livelihoods and low socio-economic development. In the case of smallholder vegetable farmers, low productivity results in a failure to meet the demand of high-value markets in terms of critical mass and quality and their produce is therefore relegated to less-valuable informal markets. Multiple factors interact to reinforce this trend, from pre-production to marketing in the value chain. These factors can be summarised as follows: pre-production: land tenure, water scarcity and irrigation infrastructure; production: poor soil fertility, pests and diseases, inferior crop varieties and high production costs; marketing: a lack of access to and the use of market information, a lack of cold-chain facilities, poor road networks and high transport costs. Smallholder farming conditions are likely to be worsened by the current trends of the depletion of the natural-resource base and of climate change and variability, which will thus further exacerbate the problem of food and nutrition security and sustainable livelihoods.

In sub-Saharan Africa, smallholder soils are mainly sandy and exhibit a variety of constraints: physical soil loss from erosion, nutrient deficiency, low organic matter and soil carbon, low pH (in other words, high acidity), aluminium and iron toxicity, poor water-holding capacity and a poor response to fertiliser, leading to reduced crop productivity. Soil-fertility depletion on smallholder farms is the “fundamental biophysical root cause of declining per capita food production in Africa”. The use of locally produced organic-soil amendments to improve crop productivity and soil health in smallholder farming systems is not new, although their use in smallholder vegetable production in combination with reduced inorganic fertilisers is limited and has not been examined systematically.

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