

## Impacts of soil amendments used in agriculture and their risks on water resources in South Africa: A Review

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### Abstract

Rapid population growth raises serious problems on global food security. Farmers are faced with challenges of limited land resource, poor soil fertility resulting in low crop yields, as a result of increasing demands of food security. The application of organic soil amendments have gained popularity in developing countries, and farmers are applying them in order to address their problem of lack of food security. Farmers are mindful of the benefits that organic amendments offer, especially in terms of improved crop yields, increased soil fertility, reduced fertilizer costs, and their overall contribution to sustainable agriculture. The addition of organic amendments like compost, manure, vermi-compost, biochar, and rock dust and sewerage sludge in the soil provides a better environment for root penetration and crop growth. These amendments improve soil structure and water holding capacity, the availability of nutrients, and better living conditions for soil organisms, which in turn promotes improved crop performance. To address the problem of limited land resource, farmers apply these soil amendments on sandy soils in order to increase their capacity to hold water and nutrients which can lead to contamination of water in nearby reservoirs when water outflows. Even though these amendments are beneficial to the soil, the accumulation of phosphorus and heavy metals in soils, the contamination of groundwater and soil with organic compounds, plant uptake of heavy metals and potential health impacts from pathogens and viruses raises concerns on the quantities and safety of certain organic amendments in agriculture. This review paper seeks to highlight the benefits, risks, advantages and disadvantages associated with the use of organic soil amendments in agriculture and their detrimental effects on water resources in developing countries. Further research on standardising the methods of soil amendments used by resource-poor farmers for rectifying low soil fertility is required and developing methods for municipal waste purification in order to remove heavy metals, toxins and pathogens.

Keywords: food security, organic amendments, risks, soil fertility, water resources