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Effects of Legume Precursors and Integrated Soil Fertility Management on Yield and Nitrogen Economy of Cereal Crop Production in Ethiopia

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Abstract

Prolonged continuous cultivation is posing problems to soil fertility and crop production. The use of legume precursors and integrated soil fertility management improved performance of subsequent and yield of cereal crops. The biological N₂-fixation of legumes as precursors and integrated use inorganic and organic fertiliser reduced the amount of nitrogen fertiliser applied to cereal crops. Higher mean grain yield of maize was obtained following faba bean and soybean without and with rhizobia inoculation than maize after maize. Higher agronomic efficiency, fertiliser N recovery efficiency and nitrogen use efficiency of maize were obtained from 55 kg N ha⁻¹ application as compared to 110 kg N ha⁻¹. Production of both highland and mid altitude maize varieties following faba bean and soybean with half recommended rate of 55 kg N ha⁻¹ improved mean maize grain yield and has been recommended for maize production in western Ethiopia. Production of maize and sorghum following sole haricot bean with recommended fertiliser rates significantly improved grain yield and recommended for sustainable production of maize and sorghum in the region. Application 50:50 % conventional compost and vermicompost based on N equivalency with recommended NP fertiliser rate gave better grain yield of maize and barley. Economic profitability of integrated use of 50: 50 % conventional compost and vermicompost based on N equivalency with recommended NP fertiliser for barley and maize production in the area. Further research is needed on the promotion of legume precursors and integrated use of inorganic and organic fertiliser on nitrogen economy of cereal production in Ethiopia.

Keywords: Compost, legume precursor crops, maize, nitrogen, vermicompost