

Dynamics of soil fertility in organic farming studies of maize - sunflower – green gram cropping system

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SUMMARY

Field experiments were conducted for two consecutive years (2003-04 and 2004-2005) at S.V. Agricultural College Farm (ANGRAU), Tirupati, Southern plateau and Hills zone of India on red sandy soils consisting Green gram was raised as residual crop during *summer* in a sequence of Maize sown in *Kharif* and Sunflower sown in *Rabi* with the imposition of the treatments to the first two crops of the sequence. There were fourteen treatments comprising of six different sources of nitrogen viz., farm yard manure, vermicompost, neem leaf manure, poultry manure, pig manure and fertilizer to supply recommended dose of nitrogen on equivalent nitrogen basis and one absolute control. All the seven treatments were tried with and without the foliar application of *Panchagavya*, thus making the total treatments to fourteen. Regarding the dynamics of various soil fertility parameters viz., soil organic carbon, available nitrogen, available phosphorus and available potassium, all of them were found built up to a considerable extent with the use of organic manures to maize and sunflower, while the application of fertilizer to maize and sunflower could just maintain the soil fertility status with neither considerable replenishment nor deterioration. As regards the balance sheet of soil available N, P and K, the highest positive balance of soil available nitrogen was found associated with neem leaf manure, and that of phosphorus was associated with poultry manure while that of potassium was with vermicompost. However, all the organic manures could result in higher balance than with application of fertilizer to maize and sunflower crops. Irrespective of the manurial sources, use of *Panchagavya* did not exert any noticeable effect on fertility enrichment of the soil.

Key Words : Green gram, Organic manures, Growth, Yield, Nutrient uptake, Economics

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With growing concerns about the human health, soil quality and environmental safety need has been felt to rethink over the existing agricultural practices especially the nutrient management. In order to meet the food grain requirement of the country like ours with burgeoning population, sustenance of higher productivity levels is also our bounden duty. Most of the Indian soils contain less than 0.5 per cent organic carbon. Unless it is raised to 0.9 – 1 per cent level, productivity of the soil can not be optimized

(Veeresh, 2002). In view of the resurgence of interest in alternative agriculture in recent years, organic farming has been considered to be sound and viable option in most of the countries. In this context, low external input, sustainable agriculture largely focusing on agricultural practices such as green manuring, recycling of crop residues, animal manure and inclusion of legumes in rotation are important. (Paikaray *et al.*, 2002). Huge quantities of organic materials such as farm yard manure, poultry manure, pig manure, vermicompost, green manures, and crop residues can substitute the inorganic fertilizers to a large extent to maintain productivity and environmental quality (Chaudhary, 2002). In light of the above, investigations were taken up for two consecutive years, with the objective of working soil fertility dynamics of Maize- sunflower-green gram cropping system.

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