# Optimization of Fertilizer requirement for Maize based on Yield and Rainfall variations from Permanent manorial Trials under Dry-sub humid Inceptisols

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## Abstract

An attempt has been made in this paper to optimize fertilizer requirement of maize through organic and inorganic sources based on field experiment conducted during rainy season 1996 to 2004 under a permanent manorial trial at Rakh Dhiansar. The experiments were conducted with 10 fertilizer treatments with combinations of N, P, K, FYM, crop residue and zinc sulphate nutrients. The influence of rainfall and organic and inorganic fertilizer on maize yield has been assessed based multivariate regression models. The location received a mean annual rainfall of 897 mm with a variation of 21%, while a mean treatment yield of 2329 kg/ha with a variation of 25% was attained during 9 seasons. A statistical assessment of treatments has been made based on sustainability yield index measured for each treatment over 9 seasons. Application of 100% recommended NPK fertilizer (60 - 40 - 20) kg/ha + ZnS04 @ 20 kg/ha was highly effective for maize with a maximum mean yield of 3172 kg/ha (120% increase over control) and a sustainability of 0.64, while application of 100% recommended NPK was. the second best with a mean yield of 3051 kg/ha (116% increase over control) with a sustainability of 0.61 during 9 seasons. The superiority of fertilizer treatments based on yield predictability and sustainability over seasons and an estimate of optimal fertilizer requirement for maximum productivity of maize under dry sub-humid inceptisols are discussed.

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## Keywords

Permanent manurial trial, rainfall variation, regression model, optimization of fertilizer.