

Integrated nutrient management in maize-legume-rice cropping pattern and its impact on soil fertility

ABSTRACT

Improved soil fertility is a precondition for increased crop production. Soil organic matter is a key factor in maintaining long-term soil fertility since it is the reservoir of metabolic energy, which drives soil biological processes involved in nutrient availability. Field experiments were conducted over three years during 2005 to 2007 at Bangladesh Agricultural University farm, Mymensingh, Bangladesh, using maize-legume-rice cropping pattern to see the effect of inorganic fertilizers along with organic manure and mungbean residue on soil properties and crop yields. For the first crop (maize), there were five treatments. After maize, seeds of mungbean and dhaincha (*Sesbania*) were sown as per treatments as legume crop. For rice (third crop), each of the treatments (T2 and T3 plots) were subdivided into six, so there were altogether 15 treatments. Integrated use of manure and inorganic fertilizers or Integrated Plant Nutrient System (IPNS) basis produced comparable seed yield of maize with the chemical fertilizers alone irrespective of moderate or high yield goal basis. The incorporation of *Sesbania* biomass and mungbean residue along with inorganic fertilizers for moderate yield goal produced identical grain yields of rice compared to fertilizers applied for high yield goal. After three years of cropping, the nutrient status of soils in control, fallow and mungbean residue removal plots showed a decreasing trend while incorporation of *Sesbania* biomass and mungbean residue had a positive effect on soil fertility. Therefore, addition of mungbean residues or *Sesbania* biomass to the fertilizer schedule ensures higher crop productivity and sustains soil fertility in maize-legume-rice cropping pattern.

Keyword: Inorganic fertilizer; IPNS; Organic manure; Soil fertility; Yield