Yield and Soil Nutrient Changes in Long Term Rice-Wheat Rotation in India

Major improvement in productivity of rice (*Oryza sativa* L.) and wheat (*Triticum aestivum* L.) have occurred in south Asia since 1965-1966 when Green Revolution began. However after the 1980s, yield stagnated or declined .we analyzed grain yield trends, soil C, N, P and K status and P and K balances in 14 yr rice-wheat experiment conducted at Punjab, India with 11 treatments comprised of various combinations of inorganic and organic sources of nutrients. Recommended levels of N, P and K were supplemented with N through farmyard manure (FYM), Wheat Chopped Straw (WCS) or sesbania (*Sesbania cannabina* Linn. and Merril). Soil parameters were analyzed in archived soil samples collected periodically from 1988 to 1999. Rice yield declines ranged from 0.07 to 0.13 Mg ha^{-1} $year^{-1}$ dependent on treatment. Wheat yields declined by 0.04 Mg ha^{-1} $year^{-1}$ with applications of 75 and 100 percent N-P-K fertilizer but were maintained over the 14-yr period in the other treatments. Total soil N and available P and K declined in all the treatments except with FYM, in which total N was maintained and available P increased. Total soil C was either maintained or increased with time. N and K depletion may have collectively contributed to the yield improvement, resulting in higher harvest index (HI). Results show that this cropping system may not be sustainable without increased K input to maintain soil K above efficiency level.