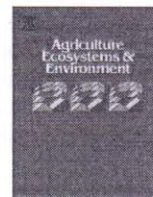




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Research Paper

Effect of seven years of nutrient supplementation through organic and inorganic sources on productivity, soil and water conservation, and soil fertility changes of maize-wheat rotation in north-western Indian Himalayas



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ABSTRACT

Sloping croplands require different nutrient management practices than levelled lands in order to check soil degradation. In order to check erosion *vis-a-vis* degradation, fertilization of maize (*Zea mays* L.)-wheat (*Triticum aestivum* L. emend Fiori & Paol.) crop rotation with organic manure supplemented with inorganic fertilizer is required. A seven year fixed plot field experiment under rainfed conditions was conducted comprising seven management practices in both maize and wheat crops: control (0), 100% NPK through inorganic fertilizers (100-0), 100% N through farmyard manure (FYM) (0-100), substitution of 50% N through four different organic manures viz., FYM (50 + 50 FYM), vermicompost (50 + 50 VC), poultry manure (50 + 50 PM) and *in-situ* green manuring (50 + 50 GM) of sunnhemp (*Crotalaria juncea* L.). Crop productivity, runoff coefficient, soil loss, and post harvest soil fertility parameters were assessed to estimate the effects of combined use of inorganic and organic sources of nutrients. The results indicated that 50 + 50 (FYM) could maintain significantly higher ($p < 0.05$) productivity of maize (18–74%) and wheat (10–77%) than 100-0 in different years. However, 50 + 50 (GM) resulted in higher reduction of runoff (16–40%) and soil loss (13–50%) than 100-0 in different years, leading to higher conservation of natural resources. Maize grain yield was significantly negatively correlated with run-off ($r^2 = 0.16$ with $p = 0.005$) and soil loss ($r^2 = 0.26$ with $p = 0.0001$). Our study concluded that combined use of chemical fertilizers and organic manures particularly FYM or GM may be considered as a feasible and environment-friendly option for soil conservation.