EFFECTS OF AN INTERCROP-BASED CONSERVATION BENCH TERRACE SYSTEM ON RESOURCE CONSERVATION AND CROP YIELDS IN A SUB-HUMID CLIMATE IN INDIA

V. N. Sharda, D. R. Sena, S. S. Shrimali, O. P. S. Khola

ABSTRACT. *The performance of an intercrop-based conservation bench terrace (CBT) system for controlling runoff and soil erosion and improving crop productivity in comparison to the conventional system of farming on sloping borders was evaluated in a sub-humid climate. Analysis of runoff and soil loss data revealed that the CBT system reduced runoff and soil loss by about 80% and 88%, respectively, compared to the conventional system, thus signifying a drastic reduction. The results of storm analysis suggest that the CBT system was very effective in reducing runoff and soil loss from storms of all sizes as compared to the conventional system. The major part of runoff (81.2%) in the conventional system was contributed by storms of less than 75 mm, whereas 88.8% of runoff in the CBT system was contributed by storms greater than 75 mm. The CBT system responded mainly to large storms due to the storage effects in the impoundment (recipient) area. The storage abstraction mechanism in the CBT system was further verified by event-based hydrograph analysis, drawing an inference that abstraction is a major factor in peak discharge attenuation due to storage routing. A comparison of the performance of an intercrop system with a monocrop system established the superiority of the former in reducing runoff and soil loss and improving crop productivity. The SCS curve number (CN) method was employed to standardize CN and initial abstraction values for both intercrop and monocrop based CBT and conventional systems. The initial abstraction term was estimated as 0.44 for CBT, as compared to 0.0156 for the conventional system of sloping borders. The CN values for intercrop-based CBT and conventional systems were estimated as 62 and 63, respectively, compared to 71 and 74 for monocrop-based systems. Predictive relationships between runoff and soil loss in both the CBT and conventional systems were established. The C factor of USLE was estimated as 0.31 and 0.28 for intercrop-based conventional and CBT systems, respectively, which can be utilized as a standard factor for estimation of soil loss for a system using USLE-based simulation modeling. Analysis of crop yield data revealed that the CBT system was about 18% more productive than the conventional system in terms of maize equivalent yields, primarily due to better in situ rainwater conservation. It is thus concluded that the intercrop-based CBT system is an economically viable alternative to the conventional system of sloping borders in conserving natural resources of soil and water and improving crop productivity in a sub-humid climate.*