



## Hedge row intercropping impact on run-off, soil erosion, carbon sequestration and millet yield

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**Abstract** Reducing run-off and soil loss are important determinants for maintaining productivity and sustainability on sloping agriculture lands. To control water induced soil erosion, a field study was conducted during 2010–2014 to assess the impact of hedge row intercropping on soil erosion, nutrient dynamics, soil moisture and yield of finger millet (*Eleusine coracana* L.) on 5 and 10% land slope in combination with conservation treatments. The treatment *Gliricidia* + Trench planting (G + TP) reduced run-off by 29%, soil loss by 45–48%, and loss of soil organic carbon (SOC), N, P and K by 42–47, 62–65, 54–58 and 51–56%, respectively over control. Similarly for *Leucaena* + Trench planting (L + TP), the values were 17–19, 27–40, 28–37, 42–50, 39–49, and 37–46%, respectively, over control. Reduced run-off in the G + TP treatment increased soil moisture storage by 11–29%. Intensive pruning of *Gliricidia*

plants for 5 years yielded greater fresh leaf biomass (12–17 Mg ha<sup>-1</sup> year<sup>-1</sup>), whereas *Leucaena* yielded only 4–5 Mg ha<sup>-1</sup> year<sup>-1</sup>. The SOC, N, P and K conservation efficiencies of G + TP were 42–47, 62–64, 54–58 and 51–56% on 5 and 10% land slope, respectively. *Gliricidia* hedge row intercropping showed promise for improving the conservation potential of the system by maintaining high productivity. Results of this study will act as a technical reference for the adoption of the *Gliricidia* based hedge row technology for increasing intercrop productivity as well as conserving soil resources in the Eastern Ghats sloping agriculture lands.

**Keywords** Agroforestry · Carbon sequestration · Contour hedge row · Trench · Soil erosion and conservation