Hydrological Impact of Bioengineering Conservation Measures on Cashew Plantations in Lateritic Soils of Konkan Region

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ABSTRACT

Hydrological impact of various bioengineering conservation measures viz. Half-moon Terraces + Vetiveria zizanioides + Stylosanthes scabra, continuous contour trench + Vetiveria zizanioides + Stylosanthes scabra, graded trench + Vetiveria zizanioides + Stylosanthes scabra, staggered contour trench + Vetiveria zizanioides + Stylosanthes scabra and semi-elliptical trench + Vetiveria zizanioides + Stylosanthes scabra on three-year old cashew plantations were assessed on lateritic soil of Konkan region in Goa State. The study revealed that the bioengineering measures tried in cashew plantation on hill slope had a significant effect in reducing annual runoff, soil loss and nutrients losses. Bioengineering measures reduced runoff by 5 to 12.8% as compared to no-conservation measure. Out of all the bioengineering measures, continuous contour trenches with Stylosanthes scabra and Vetiveria zizanioides, followed by staggered contour trenches with Stylosanthes scabra and Vetiveria zizanioides reduced runoff by 12.8 and 10.3%, respectively. Continuous contour trenches with Stylosanthes scabra and Vetiveria zizanioides reduced soil loss by 11 and 8 t.ha⁻¹.yr⁻¹ in cashew field, respectively. Minimum major nutrients losses were monitored in the treatment of continuous contour trenches with Stylosanthes scabra and Vetiveria zizanioides, followed by staggered contour trenches with Stylosanthes scabra and Vetiveria zizanioides, while the maximum nutrient losses was recorded in control plot. The highest soil and water conservation efficiency was observed in continuous contour trenches with Stylosanthes scabra and Vetiveria zizanioides (47.4%), followed by staggered contour trenches with Stylosanthes scabra and Vetiveria zizanioides (35.9%) and it was lowest (18.3%) in half-moon terraces with Stylosanthes scabra and Vetiveria zizanioides. It was concluded that the continuous contour trenches with Stylosanthes scabra and Vetiveria zizanioides as vegetative barrier was most efficient as compared to all other treatments for runoff, soil loss and nutrient loss reduction. Staggered contour trenches with Stylosanthes scabra and Vetiveria zizanioides was the alternative measure for reducing runoff and soil and nutrient losses in cashew land use.