

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.