VEGETATIVE HEDGES: A POTENTIAL SOIL CONSERVATION MEASURE IN IMMATURE RUBBER PLANTATIONS

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Establishment of vegetative hedges/biological bunds is one of the alternative measures to conserve soil and water. A field experiment to assess the effectiveness of different vegetative hedges for soil conservation in rubber plantation was initiated at Mundakayam Estate, Mundakayam, Kottayam district, Kerala (9^0 30'N latitude and 76^0 53' E longitude) during the year 2009. The average slope of the area was around 20 per cent and the average annual rain fall was 3000 mm. The vegetative hedges evaluated were vetiver (*Vetiveria zizanioides*), guinea grass (*Panicum maximum*), pineapple (*Ananas comosus*) and *Strobilanthes* sp. in comparison with a control without hedge. A continuous terrace of width 150 cm was constructed for rubber plants and a single row of vegetative hedges was planted along the edge of the terrace across the slope. The hedges were planted immediately after the planting of rubber and height of the hedges was maintained by regular pruning. Results of the study indicated that establishment of different types of hedges significantly reduced soil erosion up to the 4^{th} year of the plantation. Among the hedges, performance of vetiver was significantly superior and reduced 50 per cent of soil loss compared to control plots. Significant difference in growth of rubber was not observed in plots with and without vegetative hedges over a period of five years. Establishment of vegetative hedges provided a very effective means of terrace stabilization and retention. In control plots, 10 to 30 per cent reduction in width of the terrace was observed. Comparative study on the initial establishment of hedges showed that the success rate of establishment was the highest in vetiver and pineapple followed by guinea grass and *Strobilanthes* sp. The comparative evaluation of soil organic carbon (SOC) stock of different conservation systems showed that vetiver was the only system which possessed significantly higher SOC stock (62 t ha^{-1}) compared to all other systems. Considering the effectiveness of controlling soil erosion, terrace stabilization, success rate of establishment and soil carbon storage potential, vetiver was the best soil conservation measure in immature rubber plantations for sustaining soil and crop productivity.

Keywords: Biological bunds, Growth of rubber, Soil and water conservation, Terrace stabilization

INTRODUCTION

Soil erosion is one of the serious environmental issues in the world today that severely hampers agricultural sustainability and productivity. Of the world's agricultural land, about 80 per cent suffers moderate to severe erosion and 10 per cent suffers slight to moderate erosion (Speth, 1994). In India, it has been estimated that about 53 per cent of the total land area is prone to erosion and

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