

Soil Fertility Improvement on Degraded Upper Terraces Formed Behind Vegetative Contour Strips: Technology Verification

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Abstract

A major disadvantage associated with contour hedgerow systems to minimize soil erosion on the slope is the development of a soil fertility gradient resulting from soil redistribution within terraces formed behind vegetative buffer strips. Differences in crop yield between the degraded upper and more fertile lower part of a single terrace are commonly greater than 100 percent. On-farm experiments were conducted to assess farmers' strategies to overcome the negative effects of soil fertility scouring in natural vegetative contour strip (NVS) systems. Fertilizer treatments showed that in a hybrid maize crop the response slope for grain yield across a single terrace approached zero when mineral fertilizer allocations were biased towards upper terrace zones. However, at the rate of NPK-fertilizer studied, the higher application of nutrient inputs on degraded terrace zones did not improve fertilizer efficiency: overall crop yield did not significantly change compared to uniform NPK application. More research is required to identify methods for the sustained rehabilitation of the degraded upper terrace through raising soil organic matter levels.

1 Introduction

In contour hedgerow systems on the slope the redistribution of eroded soil from upper to lower alley areas between two contour strips during natural terrace formation results, irrespective of hedgerow species, in the development of a fertility gradient. The upper side of a single alley-way exhibits lower organic matter and nutrient content, lower soil pH and higher Al saturation, resulting in reduced crop yields (Agus, 1993). It has been hypothesized that these effects of soil fertility scouring are a major deterrent to the large-scale adoption of hedgerow systems,