

ชื่อเรื่อง

**Hedgerows and Mulch as Soil Conservation Measures on Steep Lands**

ชื่อผู้วิจัย

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### **Abstract**

A summary of the experience with vetiver and other grasses used in soil erosion research in Venezuela is presented. The need for accelerated data production through simulated tests in the field is highlighted. Four experiments were conducted under field simulated rainfall conditions at 1800 masl. in the mountain coastal range of Venezuela, with 5m length and 0.5m width plots and an average rainfall intensity of 55.6mm/h using a double nozzle rainfall simulator, on an Aquic Paleudult soil with different humidity contents and two 15% and 26% slopes respectively, in order to evaluate the efficiency of five different hedgerow conditions: 50 cm wide *Vetiveria zizanioides* (Vetiver), *Agapanthus africanus* (Lily), *Nephrolepis sp.* (Fern), *Andropogon citratum* (Lemmon grass) and no hedgerow, and five levels of pine needles: 0 Mg/ha, 0.5 Mg/ha, 1.5 Mg/ha, 3 Mg/ha and 5 Mg/ha used as a mulch. Overland flow was simulated in order to obtain equivalent slope lengths using a 0 l/min, a 2 l/min, a 6 l/min and a 14 l/min flow, representing a 2 l/min flow equal to an 80% rainstorm runoff similar to that obtained under humid and saturated conditions on a 5 m length bare plot. Hedgerows and mulch are good conservation measures, especially when they are combined. The residue requirements are less when the slope is protected by hedgerows, and larger intervals between hedgerows are possible provided there is mulch on the surface of the soil between hedgerows. Soil losses in wet conditions were reduced to less than 1 Mg/ha by combining any residue cover and a Vetiver hedgerow against almost 8 Mg/ha on the bare 5 m length plot. Equivalent slope lengths increased soil losses up 25 Mg/ha on a 40m equivalent length bare plot. For the same slope equivalent length condition there was a soil loss of only between 1-2 Mg/ha with the highest residue level applied and a loss less than 1 Mg/ha when the residues and the hedgerows were combined. Vetiver grass and Nephrolepis (Fern) were the most efficient hedgerows because of their high

density vegetative structure. Under dry soil and humid soil, slope effect was considerable but under saturated soil the slope effect was not evident. Runoff was also diminished by the residue cover and hedgerows but efficiency was poor under saturated conditions. Simulated rainfall allowed to reduce time and costs of experiments as compared with natural rain. A table is presented as a semiquantitative model to design spacing between hedgerows taking into account rainfall erosivity, soil erodibility, crop-management intensity and a minimum distance between hedgerows of 10 m.