NATURAL VEGETATIVE STRIP TECHNOLOGY: A "NO COST" PARADIGM THAT MAY HELP TRANSFORM TROPICAL SMALLHOLDER CONSERVATION

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ABSTRACT

Contour hedgerow systems using nitrogen-fixing trees have been widely viewed and promoted as important components of soil conservation in Southeast Asia to minimize erosion, restore soil fertility, and improve crop productivity. Although positive results have been observed and reported in a number of experimental and demonstration sites, farmer adoption is poor. This low adoption is associated with constraints of high labor requirements in establishing and managing hedgerows. However, the concept of contour hedgerows was a popular idea. We saw that some farmers experimented with the concept by placing crop residues in lines on the contour to form 'trash bunds'. These rapidly revegetated with native grasses and weeds and soon formed stable hedgerows with natural front-facing terraces. Other farmers tried laying out contour lines but didn't plant anything in them. These lines evolved into natural vegetative strips (NVS), which we later observed were superb in soil erosion control and reduced maintenance labor to a minimum. We examined each component of the process of establishing and maintaining low-labor hedgerow practices. The establishment of natural vegetative strips (NVS) requires only a fraction of the needed labor compared to the conventional contour hedgerow of tree legumes. The only labor required is the laying out of contour lines (about 2 person-days per hectare). A locally-led Landcare Association evolved to develop and share more effective ways of achieving a sustainable agriculture in the vicinity where the NVS practice was spreading. Landcare took responsibility for technology dissemination. The approach developed into a dynamic movement that now has 56 self-governing chapters, over 2000 members, and a municipal federation in Claveria. Currently over 600 farmers have installed NVS on their farms. It is quite uncommon for an effective soil conservation structure to be adopted by large numbers of farmers without public subsidies. Thus, we took note that perhaps we are witnessing the kind of low-labor, zero-cash-cost alternative that might have widespread applicability in other parts of the tropics where farming systems are similar.

1. CONSERVATION FARMING SYSTEMS FOR SLOPING LANDS

Conservation tillage is "any tillage system that reduces loss of soil or water relative to conventional tillage" (Lal, 1989). Slash-and-burn farmers were the initial adherents of conservation tillage. As population density increased, however, most farmers obtain an animal for draft power. This enables a household to intensively till a much larger area than is possible by hand hoe, at a fraction of the time and drudgery. They can plow and harrow frequently enough to control *Imperata cylindrica* and can hold their own against the annual grasses that invade frequently-tilled fields. Yet, as they gain the capacity to till their land more frequently, they exacerbate erosion, particularly since most dryland cultivators farm sloping fields. They find that retaining surface residue is impractical with animal power. So, their clean tillage accelerates soil loss to typical levels of 50 to 200 tons per hectare per year (Sajjapongse and Syers, 1995), rapidly wasting their soil assets at a rate 10 to 20 times the maximum soil loss tolerance limit.

Clean tillage was the path toward higher yields for small holders: it was the modern way to farm. But while it spread across the upland landscape, it accelerated soil loss at the farm and catchment level. Today, the sedimentation rates from Southeast Asian river systems are an order of magnitude higher than those of any other part of the world (Milliman and Meade, 1983). One way of conceptualize the pathway toward conservation tillage is to look at it in relation to both crop productivity and the sustainability of the soil and water resource base. Productivity generally increased as farming evolved from shifting cultivation to intensive tillage agriculture, in terms of yield per unit agricultural area. But in the process the health of soil and water resources declined dramatically. The new intensive methods produced more, but jeopardized the resource base. Recent approaches in conservation tillage aim to rebuild the sustainability of the land resources while further improving, or at least maintaining, productivity and profitability. But there is a long way to go.