Experiences of Small Farmers in Paraguay with Zero Tillage and Cover Crops. (A06-derpsch183012-Oral)

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Abstract:

Zero tillage in Paraguay has experienced a tremendous area increase from 20,000 ha in 1992 to about 1.3 million ha in 2002. The biggest adoption has taken place on mechanized farms and only about 6,500 ha (0.5% of total) is practiced on small farms. However, recently small farmers are increasingly using zero tillage technology to avoid soil degradation or to restore the fertility of degraded soils. This can only be achieved by looking at zero tillage as a farming system that includes green manure cover crops and crop rotations to maximize biomass production. The paper describes the basic equipment needed for zero tillage on small farms, consisting basically of seeding machines that can be pulled by one or two animals. For hand operated farms a special hand jab planter, developed in Brazil, or a pointed stick can be used for seeding. A knife roller to flatten cover crops is also a tool that should always be available on small farms, and a ripper, a herbicide sprayer and a lime and fertilizer spreader are useful tools in the system. The paper also addresses the frequently asked questions of how to start zero tillage on small farms and its applicability to very degraded soils. Green manure cover crops (gmcc) have been shown to be a key element in small farmer no-tillage systems. Most common summer species used in Paraguay are Mucuna pruriens, Cajanus cajan L. Millsp, Canavalia ensiformis L. DC, Crotalaria juncea L., Dolichos lab-lab, Vigna unguiculata L. and Calopogonium mucunoides L. These species are normally intercropped with maize, and planted about 80 days after maize seeding. After cover crops have been growing for about six to eight months, other cash crops are sown to benefit from the residual fertilizer effect and from the weed suppression of cover crops. This system has been compared with traditional systems without cover crops and to bare soil cultivation in on-station and on-farm experiments. Substantial yield increases have been achieved when cover crops preceded cotton and maize in the zero tillage system. In the case of tobacco only Mucuna pruriens and Crotalaria juncea L. produced substantial yield increases. To restore the fertility of very degraded soils it was necessary to use mineral fertilizers initially, otherwise biomass production of crops was very

low. Farmers income was increased by using zero tillage with cover crops and fertilizers compared to the traditional system with soil preparation and with fertilizer but without cover crops. Cassava (Manihot esculenta Crantz), a root crop, is also efficiently grown by small farmers in Paraguay with the zero tillage system. Depending on the variety, yields of cassava can be increased by up to 50% in zero tillage after black oats as a winter green manure cover crop, compared to the traditional system with tillage and without cover crops.

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