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Field Crops Newsletter - November 18, 2002

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Field Notes:

November 18, 2002

After 8,000 years, farmers are setting aside the plow.

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By plowing less and using no-till farming methods, farmers are getting higher crop yields and using less water, pesticides, and fuel. Soil erosion, equipment, and labor costs are reduced. For many years, agronomists have known that plowing isn't always good, but farmers have been reluctant to change for fear of reduced yields and a reluctance to deviate from the "norm".

With no-till, soil is not disturbed between harvesting one crop and planting the next. Seed are planted in stubble or sod instead of plowed soil. The goals of no-till are to leave as much of the soil surface undisturbed as possible, to prevent soil erosion, to reduce soil crusting, and to increase the organic matter content of the soil. Where soils are level or gently rolling, surface erosion is less of a problem, but in the hill country the best way to keep soil from eroding is to keep it covered; no-till does this by leaving residue on the soil surface and by allowing native vegetation or cover crops to hold the soil in place.

The United States has the largest acreage of no-till for a single country in the world, with over 46 million acres. The Brazil-Argentina-Paraguay region has over 59 million acres, with about 90 percent of Paraguay's mechanized farms using no-till. Both Asia and Europe are now beginning to adopt reduced tillage systems. The rate of adoption has been remarkable, according to Dr. Wayne Reeves, research agronomist at the USDA National Soil Dynamics Laboratory in Auburn, Alabama. Dr. Reeves is especially concerned with the effects of plowing on the release of carbon dioxide into the atmosphere. Each plowing destroys organic matter and causes the release of carbon dioxide. By not plowing, carbon is used to increase organic matter levels in the soil, which aids in the retention of moisture and plant nutrients.

Although the first large scale no-till plantings occurred in the United States in the seventies, there was little interest until the eighties when farmers began having severe financial losses. These problems were also related to the use of unbalanced fertilizers, delayed planting and harvesting, high fuel costs, and low commodity prices.

There were lots of instances where innovative farmers who tried no-till were ridiculed by their neighbors. In some cases farmers plowed up fields rather than be the only one using the different practice. However, most farmers who use no-till properly get excellent results. Many have been heard to say "If I had done this ten years earlier I would be in a lot better shape today".

There are years when no-till pays big dividends. Usually, these are the dry years when undisturbed soil supplies more water to the crop. Research has shown that at least a half inch of water is lost each time a field is tilled with an implement like a disk or chisel plow. These implements also destroy surface residue which helps prevent evaporation of moisture. Also, disturbed soil greatly reduces upward capillary movement of water, or the "wick" effect which

brings water upward to plant roots. Tillage also destroys the important mycorrhizal network which helps plants obtain both water and nutrients. In short, plants in undisturbed soil do not need as deep a root system as those in tilled soil. This fact is extremely difficult for many farmers to accept. Eliminating tillage from the system can be the equivalent of from 4 to 8 inches of rainfall or irrigation water, varying with soil type, length of time since tillage, slope, and other factors.

No-till has this year proven to be valuable in a wet year. With good rainfall during most of the season, all farming systems produced good yields, however with the onset of fall rains in September the conventionally-tilled fields quickly became too soft to support harvesting equipment. Fields where no-till had been practiced for two or more years supported machinery much better, allowing for quick return to the field following rains. Tilled fields have in many cases turned into virtual quagmires of mud and water where combines and cotton harvesters have been strained to their limits. Farmers have been forced to spend many thousands of dollars on larger tires, duals, and pusher units that in some cases have still not proven up to the task. No-till fields have been damaged as well, but in most cases harvesting has been possible because the firm soil supported equipment well enough to get the crop harvested. Some surface repairs may be needed in no-till fields, but nothing compared to the work and expense that will be required to get conventional fields back in shape next spring.

When reduced tillage and no-till methods were introduced in this area, producers were hesitant since their fathers and grandfathers had not farmed that way. Also, the more successful producers did not adopt it because they had plenty of good equipment and labor to do it the "old" way. A few innovative farmers who were willing to accept sound research results and try the system have shown that the new methods work well. There is no doubt that more time will pass before farmers fully adopt no-till as the "norm". Each time a new challenge emerges the system will be blamed and some will not be able to resist the temptation to return to the old ways. We still have much to learn about no-till, but we must face the fact that we never really learned all there was to know about conventional tillage either. All farming systems have their problems and challenges; we will have arrived when we learn to face and conquer them rather than throwing up our hands and running back to the past.