Strip tillage may be suitable alternative to no-till

AG SENSE

By Sangu Angadi

Sustainability of agriculture in the southern High Plains depends on improved agronomic practices that protect our limited soil and water resources, and reduce the cost of production. Unreliable precipitation patterns, high intensity rains causing erosion and declining irrigation resources make water the most important factor for limiting agriculture sustainability in the region.

Strong winds in the spring can cause erosion, increase evaporation loss of water and can also cause wind-blown sandblasting injury to delicate seedlings of crops in the region. At the same time, rising costs of energy and fertilizer are eating up the profitability of agriculture. In such situations, a successful no-till can benefit agronomic and economic sustainability of agriculture by reducing wind effects, increasing water use efficiency and reducing cost of production.

USDA-NRCS is making concerted efforts to increase no-till adoption in the region through EQIP programs. However, forage production and grazing are integral to rainfed and irrigated farming in the region, and it is perceived that these practices increase soil compaction. Therefore, adoption of no-till in the region is limited. Strip till, a relatively newer technology developed in the Midwest to reduce the cool and wet soil problems of no-till, may fit as an alternative to no-till in the region.

In strip till, farmers till a narrow strip of 5 to 7 inches wide and 6 to 8 inches deep and typically apply fertilizer at the same time at the bottom of the furrow. In the process, the farmer clears residue from the strip to improve energy exchange and creates a 3- to 4-inch high mound, thereby reducing soil compaction in the strip. In the spring, the mound settles down to create a firm seedbed and the farmer plants seeds into it, which is easier using a GPS guidance system. Thus, strip till is a no-till variation that leaves about 80 percent of the soil undisturbed and may integrate benefits of no-till and conventional tillage for better crop production. Strip tillage is done either in the fall or in the spring, but benefits seems to be greater if done in the fall.

The main benefit of strip tillage is the better seed bed, which will be warmer and drier for earlier planting in the spring, and can increase yield. Warmer seedbed improves germination and seedling vigor. Residue and untilled area around the tilled strip helps in water conservation, improves water use efficiency and at the same time reduces damaging effects of wind. Heaving-up soil in the planting row may reduce soil compaction problems for the seedling, but we do not know the inter-row compaction effects on crop performance.

Energy use is also reduced in strip tillage compared to conventional tillage. Strip till improves fertilizer use efficiency by placing fertilizer in the root zone. The potential benefits of strip tillage are numerous, but the actual contributions to sustainability in this area are uncertain. More research is needed on strip tillage under our semiarid conditions to realize all the benefits.

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