South Dakota Partnership for

No-Till Systems Technology Transfer

By

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Overview

Across South Dakota, the trend in crop production methods shows a tremendous increase into higher level management systems such as no-till farming. Changing to a no-till cropping system requires a higher level of management because it brings about profound changes in all components of a farming system. The SYSTEMS approach to no-till views changes in any one component in relation to how it affects other components and the system as a whole.

The comprehensive nature of the SYSTEMS approach to no-till requires substantial cooperation across disciplines and agencies in transferring technology to the end user. A project to address this need was initiated in May of 1997 and is initially scheduled to last two years. This project is a cooperative effort between the USDA-NRCS, private industry, Ducks Unlimited, South Dakota Department of Environment and Natural Resources, South Dakota No-Till Association, Hughes County Conservation District, South Dakota State University Cooperative Extension Service, and South Dakota Agriculture Experiment Station.

Locally-led, this project is a novel partnership approach to teaching no-till technology. It is designed to increase knowledge and help producers implement no-till cropping systems that are environmentally, agronomically, and economically sound. The No-Till Systems Technology Transfer Project is fostering 11 teams of farmers, county extension agents, Natural Resources Conservation Service, and private industry agronomists. These teams have been established to serve as local contacts to answer producer questions and provide on-farm assistance. Extension specialists and researchers provide intensive training at research and/or demonstration sites and at lead producer's farms to enhance the teams' working knowledge.

The teams help producers select appropriate choices in switching to an economically and environmentally viable no-till system. Once the switch is made, the teams are available to help "fine-tune" the system.

For more information about South Dakota's No-Till Systems Technology Transfer Project's structure visit the WWW at www.dakotalakes.com.

Accomplishments

Major accomplishments have included several workshops conducted at research farms and at lead producer's farms designed for the 11 technology transfer teams. This approach of training the team members in their own "back yard" has allowed them to modify the basic principles and practices of no-till systems to fit their area. Also, these small workshops provide valuable feedback for developing training materials and future research needed for no-till systems

development. In addition to, the general workshops have encouraged a formation of a state-wide farmer-to-farmer network which will facilitate the exchange of ideas more efficiently and effectively.

Another major accomplishment has been the development of three World Wide Web home pages. The "switchboard" home page www.no—till.com is designed as the hub for linking an individual to major no-till farming sites. The South Dakota No-Till Association home page is www.sdnotill.com which features the "SD No-Till Café" page which is an on-line discussion forum. Its purpose is to allow users to post and answer questions regarding no-till farming practices. The Dakota Lakes Research Farm Corporation home page is www.dakotalakes.com features background information about Dakota Lakes Research Farm, research results, and publications. Since January 1998 approximately 3,500 people have visited the web sites.

Teams' Challenges

Some of the challenges faced by the no-till technology transfer teams have varied across the state due to several reasons, i.e. climate, soils, alternative crops, profitability, etc. For example, in eastern South Dakota where typically a corn-soybean rotation is practiced, the challenge has been to encourage producers to diversify their rotations to combat pest problems. Likewise, in western South Dakota where typically the conventional tillage rotation is wheat-fallow, the challenge has been to encourage producers to diversify and intensify their rotations to take advantage of the additional moisture saved.

Another challenge no-till producers are facing in South Dakota and possibly world wide is solid animal waste application in no-till systems and not degrade surface water quality. Under the USDA Department of Agriculture and Environmental Protection Agency "Draft Unified National Strategy for Animal Feeding Operations" date September 11, 1998, states that all animal feedlot operations will develop and implement technically sound and economically feasible Comprehensive Nutrient Management Plans (CNMPs) to minimize impacts on water quality and public health. The USDA Natural Resources Conservation Service (USDA-NRCS) Field Office Technical Guide (FOTG) is the primary technical reference for the development of CNMPs for the animal feedlot operations.

Some matrixes of South Dakota's Field office Technical Guides have been developed from research data generated and gathered across the US. There has been a significant amount of research conducted outside of South Dakota examining the impacts of phosphorus loading from surface applying solid animal waste in conventional tillage, no-tillage, and pastureland. Amongst the research conducted on solid animal waste application on cropland, there is conflicting conclusions that surface applying solid animal waste on no-till cropland degrades water quality.

For example, a paper by R.C. Wendt and R.B. Corey titled "Phosphorus Variations in Surface Runoff from Agricultural Lands as a Function of Land Use" in 1980 in Journal of Environmental Quality stated in their conclusion that "Greatest losses of potentially available P in runoff occurred on recently tilled soils and on row crops. Management practices which reduce soil erosion and runoff, such as conservation tillage, should, therefore, reduce the pollution potential of runoff from these lands and reduce the overall impact of agriculture on water quality." They also go on to state "Surface applied manure does not appear to greatly increase the pollution potential of rainfall induced runoff on unfrozen soil". Conversely, A.N. Sharpley, T.C. Daniel,

and D. R. Edwards published “Phosphorus Movement in the Landscape” in 1993 in the Journal of Production Agriculture concluded “Phosphorus movement via erosion and runoff may be reduced by increasing cover through conservation tillage. Dissolved P concentration of runoff from no-till practices were greater, however, than from conventional practices. Reducing tillage operations also increased the portion of total P that was bioavailable in both dissolved and particulate P forms”.

Additionally, A. N. Sharpley and others stated in a paper published in the Journal of Environmental Quality in 1994 titled “Managing Agricultural Phosphorus for Protection of Surface Waters: Issues and Options” that “It may also be necessary to periodically plow no-till soils to redistribute surface P accumulations throughout the root zone”.

As a result of the lack of local (within South Dakota) research, South Dakota State University in partnership with the South Dakota Association of Conservation Districts has submitted a proposal to the South Dakota Department of Environment and Natural Resources for determining best management practices in land application of manure to reduce phosphorus loading to water resources in South Dakota.