9-30-1988

Reduced Tillage Economics Research

Donald C. Taylor
South Dakota State University

Thomas L. Dobbs
South Dakota State University, thomas.dobbs@sdstate.edu

No.263 September 30, 1988

REDUCED TILLAGE ECONOMICS RESEARCH

by
Donald C. Taylor
and
Thomas L. Dobbs
Agricultural Economists

This issue of the Economics Newsletter is devoted to (1) providing an overview of selected findings from the Economics Department's research during the past 5-6 years on reduced tillage crop practices and costs and (2) informing readers of the availability of a research report on reduced tillage which has just been published. While in some definitions of "reduced tillage", greater emphasis is given to coverage of soil surface by crop residue, the primary emphasis in this research has been on the absence of the moldboard plow in preparing fields for planting.

Three-phased research program

Research in the Economics Department on reduced tillage was planned and carried out by Dr. Herbert Allen until his retirement in mid-1987. Subsequently, the authors, assisted by Graduate Assistant James Shriver, carried the work to completion.

Phase I of the research involved the development of "synthesized" budgets for four crops grown under three tillage systems. Phase II involved a mail survey of nearly 1,000 reduced tillage farmers in South Dakota. The main purpose of this survey was to determine the nature of reduced tillage practices being followed by farmers in the state and the farmers' perceived benefits of and problems with reduced tillage.

Phase III involved intensive personal interviews with 23 of the mail survey respondents. A primary product of the Phase III research is a set of detailed crop enterprise budgets for selected crops grown by the 23 respondents. The enterprise budgets cover spring wheat, winter wheat, corn for grain, and soybeans grown in several different parts of the state.

Reduced tillage farmers

The 23 Phase III reduced tillage farmers reported operated acreages and proportions of rented land which exceed the average for all farms in the state. About 87% of the total land operated by them was under reduced tillage, using the criterion of no moldboard plow. Surveyed farmers with small acreages tended to have somewhat higher percentages of cropland under reduced tillage. Only two of the respondents had less land under reduced tillage in 1986 than in 1983. Friends and neighbors were reported to be the most important influence on farmers adopting reduced tillage practices.

Reduced tillage practices highly variable among farmers

Results from Phases II and III showed that farmers practicing reduced tillage in South Dakota vary greatly in their use of pre-harvest field operations. With one crop, some reduced till farmers commonly pass over their fields as few as 2 or 3 times prior to harvest and others as many as 6 or 7 times. Such differences in field operations arise from differences in producers' prior year crops (including possible summer fallowing), soils, weed populations, crop varieties, and managerial philosophies.

Reduced tillage production costs

In the Phase I budgeting analysis, the costs of production under reduced tillage were compared with corresponding costs under conventional tillage. For the row crops (corn and soybeans), herbicide and insecticide costs were from about 15% to 50% higher with reduced tillage. These costs are higher

because of greater weed and insect populations resulting from less cultivation of the soil and more plant residue being left on the soil surface with reduced tillage. Machine costs (e.g., fuel and lube, repair, depreciation), on the other hand, were about 30% less with reduced tillage. The differences in these costs between conventional and reduced tillage small grains (spring wheat and oats) were generally much less than for row crops, however.

Reduced tillage benefits and shortcomings

The Phase II and III research results show a strong consensus among South Dakota producers that reduced tillage practices result in lower crop labor requirements, greater conservation of soil moisture, and lower fuel costs--in comparison to conventional tillage practices. A solid majority also believe that reduced till production is more profitable and requires lower machine and overall direct costs of production than does conventional till production.

The study results show weed control to be the major problem associated with reduced tillage. Two dimensions of the weed control problem are knowing which chemicals and the amounts of chemicals to use and how future crop plans may be affected by chemical residues.

Reports of research findings

Phase III findings, covering the 23 detailed reduced till crop enterprise budgets, have just been published. Single copies of this report (about 45 pages) are available upon request. If you would like a copy, send us (SDSU Economics, Box 504A, Brookings, SD 57007) your name and address and indicate that you'd like a copy of the "Phase III research findings". If you'd also like copies of three earlier reports of findings (ranging from 4 to 7 pages each), simply ask for "other reduced tillage reports".