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**FARM MANAGEMENT INNOVATORS:
CHARACTERISTICS OF
EASTERN SOUTH DAKOTA FARM OPERATORS**



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Technical innovation is a practice perceived to be a new or different method from the existing practice. Regenerative farming and reduced or low tillage as a management tool are the technical and management innovations examined. Regenerative farming is a farming practice designed to reduce, preferably to eliminate, the inorganic fertilizers and chemical pesticides that are key elements of conventional farming by substituting crop rotation and cultivation for pest control and manure legumes, crop residue and other organic waste for plant nutrients.

Reduced tillage is a system of controlling weeds and managing crop residue throughout a crop rotation with minimum use of tillage so as to reduce production costs and soil erosion, while increasing crop yields, water infiltration, weed control, and moisture conservation.

The decision to adopt any innovation is usually made by the farm operator. Thus, the operator characteristics of age, education, income, farm size and tenure influence the decision to adopt farm management innovations. The uncertainty associated with the use of a new method will depend on the operator characteristics of income and size of operation. Farm income and size should have greater impacts on the decision because if gross income is already small the operator may not be willing to take any additional risk. Therefore, innovation adoption should be relatively low in low income categories. Farm size should have the same effect. The larger operator can test and gradually add the new technology (Continued on page 2)

USDA's June 10 U.S. and World supply-demand projections indicate continued tight U.S. grain stocks but larger world supplies. U.S. winter wheat production was lowered from 1.618 to 1.537 billion bushels. Spring wheat and durum production was left unchanged at 650 million bushels based on trend yield and prospective plantings. The season price projection was raised by 10 cents per bushel to a range of \$3.25-3.65.

The question in the U.S. is whether these production levels can be obtained. Wet weather in the southern plains has slowed harvest progress and quality deterioration is expected to reduce yields for hard red winter wheat. Harvest progress as of June 14 was 16% behind last year with more rain in the forecast. The USDA Crop Conditions report supports a reduction in production of around 100 million bushels.

Spring wheat crop conditions are very poor for this early in the year. The amount rated by USDA as poor to very poor is 22% compared to only 2% last year. Ratings of good to excellent appear on only 43% of acreage compared to 86% in 1991. Timely rainfall in the northern plains will improve these conditions but the poor start will hold yields to less than trend levels. Production of spring wheat and durum could fall 100 to 150 million short of the current 650 million bushel USDA projection. If this reduction in spring wheat production and the 100 million reduction in winter wheat production both materialize, the U.S. projected wheat price will increase 20 cents per bushel to \$3.45-3.85 per bushel. The most likely scenario is for harvest pressure to pick up and rain to fall in the northern plains pushing wheat prices (Continued on page 3)

(Farm Management ... continued)

whereas the small size operator is forced into an all or nothing adoption decision due to capital purchases. The small size operator can not afford the risk associated with the adoption, while a large size operator can absorb the risk associated with the trial adoption. However, it is recognized that a large size operator with a heavy debt load would be at just as great of risk as a small size operator. This implies that size alone is not the determining factor in technology adoption.

RESEARCH DESIGN

A random, stratified survey of 304 farmers in southeastern South Dakota was conducted in August 1990. The intent of the survey was to investigate the different management practices on eastern South Dakota farms. The survey covered six counties: Brookings, Deuel, Hamlin, Lake, McCook and Moody. The response rate was approximately 15.5 percent. The survey asked specific questions on the use of reduced tillage practices and regenerative farming and general questions about the activities of the farm.

The general questions asked about the operator and farm characteristics. The focus of this section was major crops, livestock or poultry inventory, irrigation methods, farm size, gross farm income, age of operator and the educational level of operator.

Survey Respondents

The total survey respondents were 47 of which 6 were unusable due to either the respondents were no longer farming, in horticulture, or the land was rented out to others. The 41 usable surveys came from the counties in the following percentage breakdown: 29% were from Deuel, 27% from McCook, 17% each from Brookings and Moody, 7% from Hamlin and only 2% from Lake.

Characteristics Of Respondents

The 41 usable respondents had the following characteristics shown in column 2 of Table 1. The estimated average age was 52.5 which was higher than the state average age of 49.7 and the six county average age of 48.4 (USDC, 1989). The estimated average gross farm income was

\$166,554, which was higher than the state average of \$74,761 and the six county average farm income of \$94,073. The estimated average farm size was 736 acres, which was lower than the state average of 1,214 acres but higher than the six county average farm size of 587 acres.

Twenty seven percent of the respondents practicing conventional farming method only (column 3, Table 1). Thirty-six percent had gross farm income of less than \$25,000 and none of the respondents had gross farm income of \$250,000 or more. The estimated annual gross farm income, \$78,525, was smaller than the non-conventional farming practices.

Column 4 of Table 1 shows the 24.2% of the respondents practicing both reduced tillage and regenerative farming at the same time. Ten percent of the producers operated more than 1,600 acres but none had more than 2,000 acres.

There were 73.2% of the respondents practicing either reduced tillage or regenerative farming or both as shown in column 5 of Table 1. Three percent had income of one million or more and also operated more than 1600 acres.

IMPLICATIONS

The factors of gross income and farm size show a positive relationship with adoption. As income and farm size increase the probability of adopting farm management innovation increases. The small size, low income operator cannot take the risk of losing a greater portion of income while an operator with larger gross farm income and larger farming acreage can more easily absorb the loss and is able to use the innovation.

The personal attributes of education and age of operator were found to play a major role in the adoption of new farming practices. Previous studies have found that adopters of new farming practices tend to be younger and better educated than non-adopters. The younger and better educated operators are more knowledgeable about new farming practices, more receptive to risk taking and have more incentive to adopt innovation because of longer remaining payoff period.

The farmers in the 45 to 64 age group

may be more receptive to risk taking. These operators have seen more changes occur associated with crop rotations as a pest control measure and crop residue and animal waste were a major source of fertilizer before the introduction of chemicals. Thus, the age of operators was inconclusive with respect to the relationship with using farm management innovations.

The years of education increased the probability of using the farming practices. The hypothesis was the more education the operator has, the better equipped the operator is for the changing trends in farm practices to reduce excessive chemical use and avoid soil erosion.

Land tenure plays a role in the decision to adopt farm management innovation. Individual operators with similar land characteristics can reach different decisions on new practices depending on land tenure. Full owners are more likely to plan for long term investment, thus, have a greater probability of adopting farm management innovations.

The percent of land the operator rents comes into the decision to adopt innovations. The more land rented, the less likely adoption takes place. Thus, as the percentage of rented land increased the probability of adopting farm management innovation decreased. This agrees with the fact that the more land rented the less the equity of the operator involved in the farming process, therefore, decreasing the inclination of the operator to be a better steward of the farm land and less likely to use reduced tillage or regenerative farming practices.

CONCLUSIONS

The operators who tend to adopt the change are considered innovators. Those operators having higher educational level, higher income, owning greater percentage of their cropping land and operating larger farms had the anticipated traits of innovators.

REFERENCE CITED:

USDA. 1989. "1987 Census of Agriculture: South Dakota." U.S. Dept. of Commerce, Washington, D.C.

Table 1. Characteristics of Respondents

Characteristic	All Percent	Conventional	Regenerative	Regenerative
		Tillage Only Percent	AND Low Till Percent	OR Low Till OR Both Percent
Age:				
less than 44	36	46	20	30
45 to 64	56	45	70	57
65 and older	8	9	10	13
Average age (years)	52.5	53.5	53.5	51.5
Income:				
less than \$99,999	41	67	40	38
\$100,00 to \$499,999	54	33	60	59
\$500,000 or more	5	0	0	3
Average income	\$166,554	\$78,525	\$179,999	\$178,499
Education:				
less than 12th grade	20	82	60	54
12th grade/post HS	66	18	30	33
bachelors degree	15	0	10	13
Acres Farmed:				
less than 400	22	55	20	19
400 to 799	37	27	40	39
800 or more	41	18	40	42
Average acres farmed	736	634	800	826

(Shane ... cont'd from p.1)

down from mid-June levels with a good post harvest rally.

In order for the post harvest rally to be significant, the CIS must remain an active buyer of U.S. wheat. Current indications are that further U.S. credit to the CIS may not be requested. Should this occur U.S. price will remain flat after harvest.

Major exporting nations will raise production 2% compared to 1991 (see table) but world stocks will remain fairly constant. Competition to sell this supply to major importing nations will shift as CIS production will increase and North African and Eastern European production will decline. The EC-12 will be very competitive in Eastern Europe and Northern Africa and force the U.S. to increase Export Enhance-ment Program (EEP) efforts in order to export more to these areas. U.S. exports to CIS will probably decline if their projected increase in production of 11.8 million metric tons is harvested. EEP initiatives after harvest will be necessary to sustain a post harvest rally in U.S. wheat price.



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Address Correction Requested

World Wheat Production -- 1992

	<u>1992</u>	<u>1991</u>
Major Exporters	(million metric tons)	
United States	59.5	53.9
EC-12	90.1	90.0
Canada	30.0	32.8
Australia	15.5	10.6
Argentina	10.0	9.0
Major Importers		
China	95.0	96.0
Eastern Europe	31.0	38.3
North Africa	9.1	13.1
CIS	85.0	73.2
Other Foreign	118.6	121.5
World	547.8	542.2

producers should continue to pre-harvest price wheat using whichever methods they are comfortable with, cash contracts, hedges, options or some combination of these marketing alternatives. Weather rallies may push wheat futures back to around \$3.80 to \$4.00 per bushel. At these prices farmers should consider adding to new crop sales.

**ECONOMICS
 COMMENTATOR**

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U.S. supply conditions lend favorable support for higher prices but demand is not shaping up as well and may pressure prices. Pressure for the USDA to increase EEP will be significant. Given this scenario for supply and demand, wheat

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