Conservation on Rented Farmland: A Focus on U.S. Corn Production

Does land tenure (ownership vs. leasing) affect a farm operator's adoption of conservation practices? Analysis by USDA's Economic Research Service (ERS) suggests that at least for corn production—which accounted for about one-fifth of all cropland in 1996—the answer is yes. Recent data from the 1996 Agricultural Resources Management Survey (ARMS) indicate that owner-operators are more likely than renters to adopt certain conservation practices for corn production.

With over 40 percent of U.S. farmland leased in 1992 (the most recent year for which national farmland tenure data are available from the Census of Agriculture), including about half of all farmland in Corn Belt states and California, conservation decisions by operators who rent farmland have implications for overall adoption of conservation practices in the U.S. And if a trend toward increased leasing of farmland continues—farmland leasing grew in the U.S. by more than 2 million acres per year between 1982 and 1992—those implications may become even more significant in the future. USDA's Natural Resources Conservation Service (NRCS) estimates that over 200 million acres, or about half of all U.S. cropland, needs additional conservation treatment in order to maintain productivity.

Noneconomic factors—sensitivity to local water quality problems, for example, or a general attitude toward the environment—play a role in farmers' decisions on whether to adopt conservation practices. Economic factors—such as short-term profitability and long-term asset value—also play a significant role. Renters are likely to be more concerned about short-term profitability of land they rent than about its long-term value, while owner-operators are likely to be concerned with both. So differences between renters and owner-operators in the adoption of conservation practices are probably not surprising.

Differences in farmland leasing arrangements will also likely affect adoption of conservation practices. Farmland leasing in the U.S. commonly takes one of two forms. Cash-renters usually pay all operating expenses, including a fixed cash rental payment to the landlord, and own the crop. Share-renters typically share some operating expenses and the final crop with the landlord. According to the 1988 Agricultural Economics and Land Ownership Survey (AELOS, a follow-on survey to the 1987 Census of Agriculture and the most recent national data available on use of different leases types), share leases represented 30 percent of all farmland lease contracts in 1988 in the U.S. and about 40 percent of lease contracts in the Corn Belt. AELOS reports that landlords participate more frequently in farm management decisions under share leases than they do under cash leases. The landlord's participation may make share-renters more likely to adopt conservation practices than cash-renters.

Although the analysis in this article focuses on the adoption of selected conservation practices by U.S. corn producers, and although current data limitations constrain the ability to generalize from these results to other commodities and practices, new ARMS data over the next 2 years will permit similar analyses of U.S. wheat and soybean producers. However, analysis of other conservation practices—particularly permanent conservation structures such as terraces—will continue to be limited by incomplete data on such questions as lease duration, landlord participation in conservation decisions, and the establishment date of conservation practices.

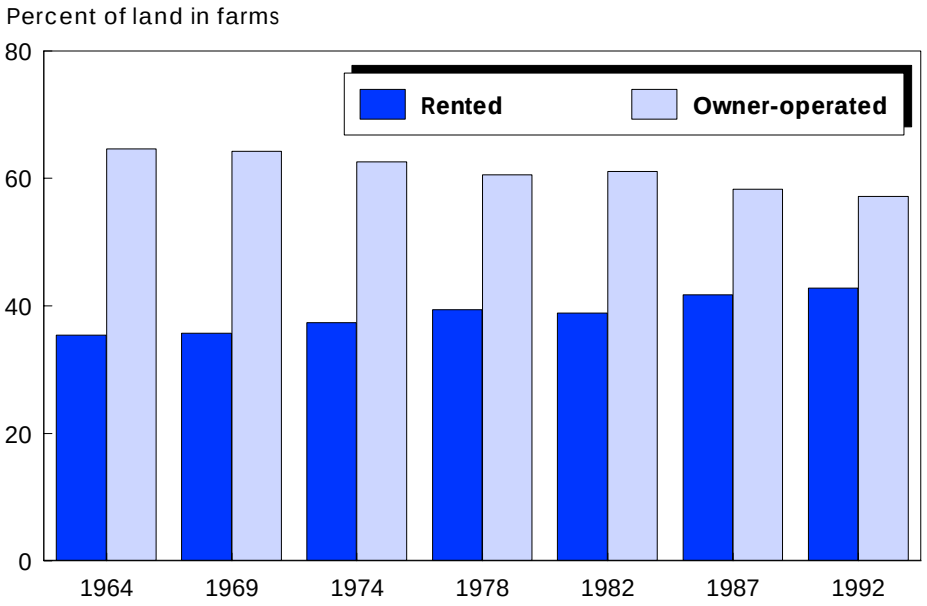
Land Tenure & Conservation—Is There a Link?

A wide variety of activities may be considered conservation practices, given their role in providing on-farm or off-farm conservation benefits, including maintaining or improving soil fertility, reducing soil erosion, and reducing runoff of nutrients and pesticides. Among the conservation practices common in corn production are conservation tillage, grassed waterways, contour farming, and strip cropping.

Conservation tillage includes any tillage and planting system that leaves 30 percent or more of the soil surface covered with crop residue to reduce soil erosion by water or, for control of wind erosion, maintains at least 1,000 pounds per acre of flat, small-grain-residue equivalent on the surface throughout the critical wind erosion period.

Grassed waterways are natural or constructed channels covered in suitable vegetation that control erosion and spread the flow of water from the field.

A Growing Share of U.S. Farmland Is Rented



Source: U.S. Census of Agriculture.
Economic Research Service, USDA

Contour farming involves preparing land, planting, and cultivating a crop along the contours of a field to reduce erosion, increase water infiltration, and control runoff water.

Strip cropping involves growing different crops in a systematic arrangement of strips across or along the contour of a field to retain runoff for moisture conservation and to reduce soil erosion, increase water infiltration, and thus protect water quality.

Each of these practices provides on-site and off-site benefits over the long term. In addition, conservation tillage may result in short-term profit increases to the farmer because of reduced labor and machinery costs.

For the purposes of studying tenure effects on adoption of conservation practices, USDA's Economic Research Service (ERS) examined 1996 ARMS data on use of conservation practices by U.S. corn producers. The study divided these practices into two categories: those that may provide short-term profits in addition to conservation benefits (conservation tillage) and those that provide benefits only over a longer time period (contour farming, strip cropping, and grassed waterways).

The rates of use of conservation practices that provide short-term profits as well as conservation benefits were expected to be similar among renters and owner-operators, while the rates for practices providing only longer term benefits were expected to be higher for owner-operators. Share-renters, whose landlords were likely to be more involved in management decisions, were considered more likely than cash-renters to adopt practices with long-term benefits.

Summary statistics from ARMS data indicated that essentially the same proportion—31 percent of owner-operators, 28 percent of cash-renters, and 33 percent of share-renters—used conservation tillage. For contour farming, strip cropping, and grassed waterways, 43 percent of owner-operators, 37 percent of cash-renters, and 23 percent of share-renters adopted at least one of those practices.

These statistics, however, are potentially misleading if considered in isolation from other factors that may influence the adoption of conservation practices. Farmers' ages, for example, might affect their inclination to adopt conservation practices, and if one age group is more heavily represented within a tenure type, the effect of age on practice adoption could be confused with the effect of tenure. To isolate the impact of tenure, the effects of land conditions and of socioeconomic, demographic, and climatic characteristics on the adoption of conservation practices were measured using ARMS data, as well as data on temperature and precipitation.

This analysis indicated younger operators, more highly educated operators, those with a larger percentage of total area in corn and soybeans, and those with larger farms were more likely than other farmers to use conservation tillage, as were farmers with land designated as highly erodible. The potential for significant time savings and lower machinery costs encourages adoption by larger farms; time savings may not be as critical for smaller operations. Farmers with improved drainage on their land were less likely to use conservation tillage—fields benefiting from drainage improvements would most likely have soils and topographic characteristics that are less well suited to the use of conservation tillage.

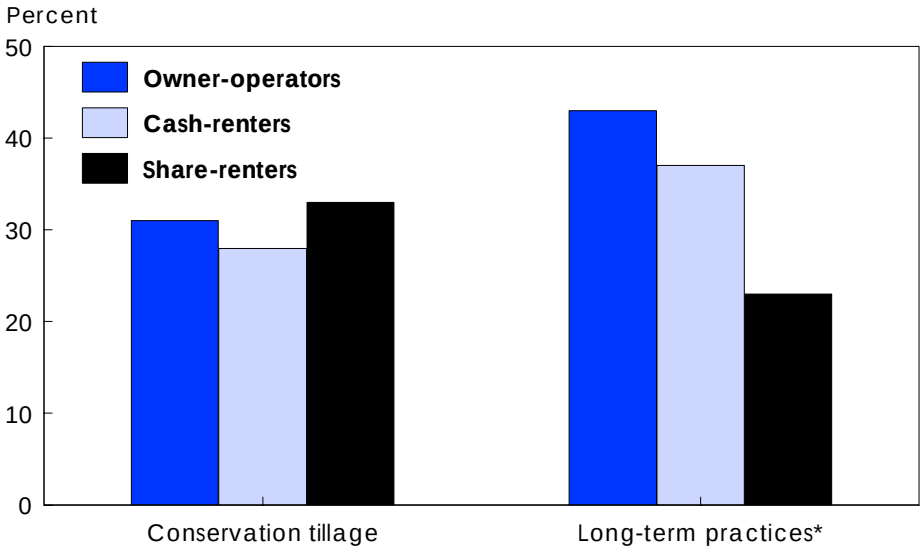
Younger farmers, those with less acreage, and those with a smaller percentage of farm area in corn or soybeans were more likely to use at least one of the conservation practices with longer term benefits (contour farming, strip cropping, and grassed waterways). A highly erodible land (HEL) designation as well as high levels of precipitation and cool temperatures also tended to encourage use of these three practices. Small farm operators who had an occupation other than farming, were retired, or had gross sales under $100,000 and total farm assets under $150,000 were less likely to use any of the conservation practices analyzed.

Controlling for these non-tenure factors allowed isolation of tenure's effect on adoption of conservation practices. The analysis found that cash-renters were significantly less likely than owner-operators to use conservation tillage, while share-renters behaved much like owner-operators in conservation tillage practices. Both share-renters and cash-renters were significantly less likely than owner-operators to adopt at least one of the practices with longer term benefits.

Farmers' participation in government programs was also considered as a possible factor affecting the use of conservation practices. Under the conservation compliance provision established in the 1985 Farm Act, farmers with HEL are required to implement approved soil conservation practices in order to receive some USDA program benefits. This requirement provides policy makers some leverage to encourage farmers to adopt conservation practices.

However, it is difficult to statistically disentangle the interaction of program participation and farming of HEL—most farmers in the ARMS sample who cultivated HEL also received payments through USDA programs and were thus subject to conservation compliance. This made it impossible to distinguish the effect of program participation (i.e., the compliance requirement) on adoption of conservation practices from the effect of HEL designation alone.

More Than 40 Percent of Owner-Operators Adopt Longer Term Conservation Practices



*Includes contour farming, strip cropping, and grassed waterways.
Source: 1996 Agricultural Resource Management Survey. Based on a subsample of 941 corn producers.
Economic Research Service, USDA

Implications for the Future

These findings on the effects of tenure on conservation practices may have implications for resource use and environmental quality in U.S. agriculture, since NRCS estimates that half of U.S. cropland still needs additional conservation treatment in order to maintain productivity and more than half of U.S. farmland in key agricultural regions is now leased. Moreover, the Census of Agriculture indicates that a large and increasing proportion of farm landlords are neither engaged in nor retired from any agricultural activity, and that disengagement from farming tends to increase the use of cash leases—the percentage of farmland rented under cash leases has risen in recent decades.

As the current farm population ages, historic increases in leasing and in farmland ownership by nonfarmers will likely continue, while factors such as provisions of the 1996 Farm Act could also be changing leasing patterns. The 1997 Census of Agriculture, for which data are expected in 1999, and a follow-on survey of agricultural landowners being considered for 2000, will be helpful in determining whether historic farmland tenure patterns are continuing. If they are, this analysis suggests that adoption of conservation practices may be lower in the future than otherwise expected, if renters continue to adopt such practices at lower rates.

While this research has analyzed adoption of conservation practices as a private choice based on farmers' maximization of private net returns, the adoption of these practices also provides public benefits in the form of moderation of downstream water flows, provision of wildlife habitat, and improved water and air quality. But public leverage to encourage adoption of conservation practices through conservation compliance requirements may diminish as the incentive to participate in farm programs declines with the level of program payments under the 1996 Farm Act. With such changes, identifying the effects of land tenure on adoption of different conservation practices may become increasingly important.

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