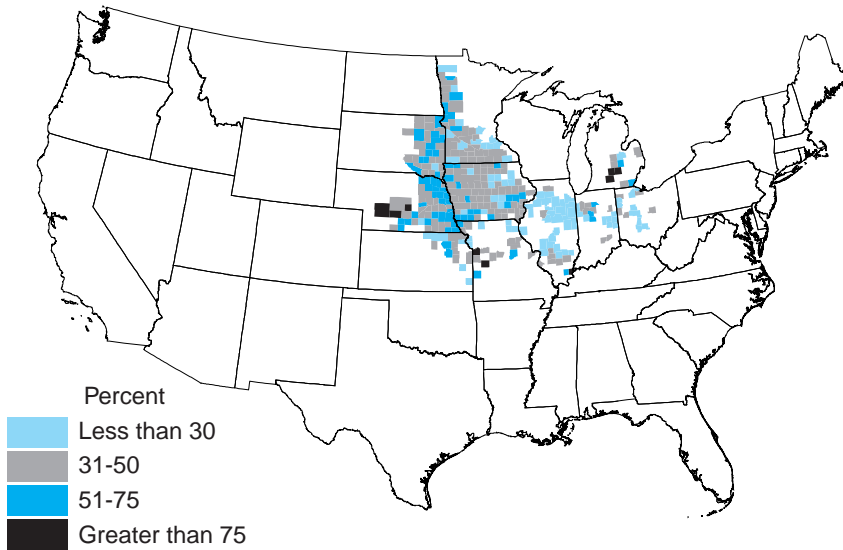


Figure 10

Proportion of soybean Crop Revenue Coverage (CRC) acres to all buy-up insured soybean acres, 1997



Note: Shaded areas include counties with at least 500 acres planted to soybeans.
Source: Estimated by ERS from USDA, Risk Management Agency, electronic experience and yield record database, 1996 and 1997.

erable time and effort in promotional activities (such as agent and commodity group meetings) in Iowa and Nebraska (Cleaveland).

Off-Farm Employment and Other Types of Off-Farm Income

Earning off-farm income is another strategy that farmers may use to mitigate the effects of agricultural risk on farm family household income. Not only can off-farm income supplement household income, it may also provide a more reliable stream of income than farm returns. In essence, off-farm income can offer a form of diversification. The incentives for diversifying income sources depend on the level and variability of returns when considering a risk-averse producer. If farm households are risk averse, then they will be willing to supply relatively more labor to stable off-farm occupations than they would otherwise (Mishra and Goodwin, 1997). Or, they may seek out other types of off-farm income (such as interest and dividends) to counter negative fluctuations in farm income.

According to USDA's ARMS data, a large percentage of farm families earn off-farm income, and the levels of off-farm income relative to farm income can be significant. ARMS data for 1996, for example, indicate that 82 percent of all farm households had off-farm income that exceeded their farm income (Hoppe). For each farm type category (including very large farms), at least 28 percent of the households within the category had off-farm income exceeding farm income.

Farm household income can be categorized as earned off-farm income (wages and salaries), unearned off-farm income (social security, pensions, and investments), and farm net cash income (fig. 11). As illustrated in the figure, reliance on off-farm income is related to farm size. About 10 percent of farm households were classified as primarily engaged in farming and having sales between \$100,000 and \$249,999 in 1996. These farms relied on off-farm sources for about 57 percent of their total household income. In contrast, households operating very large farms (those

Off-farm income can offer a form of diversification.

Evidence suggests that the riskiness of farm income is positively related to working off the farm.

with sales of \$500,000 or more) accounted for 3 percent of all farms and relied on off-farm sources for a relatively small percentage of their average income (Hoppe).²²

Several studies have modeled factors, such as off-farm work, that affect inequality in the distribution of income among farmers. Gardner (1969) found that off-farm work reduced both shortrun and longrun income inequality, and postulated that off-farm work may enable poor farmers to add to their own capital stock. A study focusing on New York farmers reached similar conclusions, finding that if incomes are improved by increasing income from nonfarm sources, inequality among farm families would likely be reduced (Boisvert and Ranney). Using 1991 ARMS data, another study found that the distribution of income in the North Central region was most equal among U.S. regions, and most unequal in the West (El-Osta, Bernat, and Ahearn). In addition,

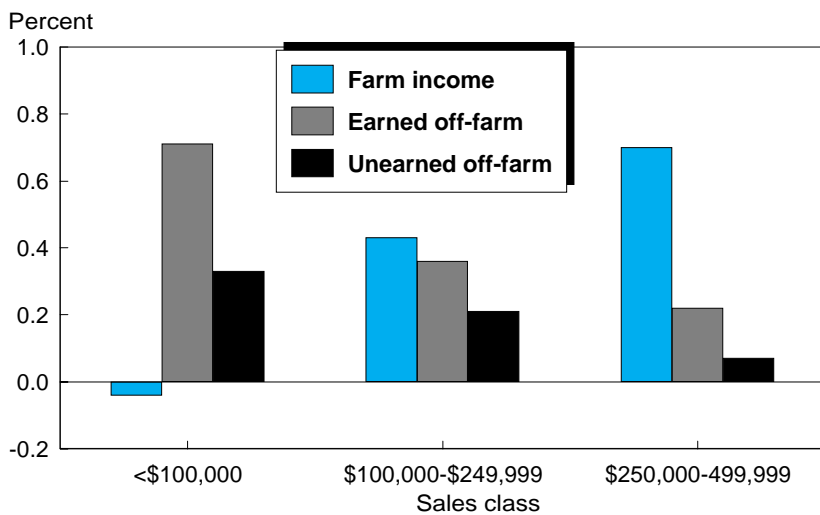
²²For more information on historical off-farm earnings, see Hoppe and others; Hamrick; Kassel and Gibbs.

results indicated that farm operator households that did not participate in off-farm employment experienced higher income inequality as a group than did their participating counterparts.

Research has also addressed the decision to engage in off-farm work and the hours of off-farm work supplied by farmers. One study, focusing on off-farm labor supply in Illinois, found that off-farm work was quite sensitive to economic incentives, and that a 10-percent increase in the off-farm wage entailed an 11-percent increase in hours of off-farm work, holding other factors constant (Sumner). A study focusing on Massachusetts farmers in 1986/87 concluded that the hours of work supplied by the farm operator depended on the participation decision of the spouse. In addition, family and farm characteristics were important to both the participation decision and hours worked by the farm operator (Lass, Findeis, and Hallberg).

Various empirical studies have examined the relationship between

Figure 11
Farm household income by sales class, 1996¹



Note: For sales classes less than \$250,000, the operator's principal occupation is farming.
¹Farm operator households are associated with farms organized as individual operations, partnerships, or family corporations, and are generally closely held by the operator household. Household income includes income from farming activities and earnings from nonfarm sources by all household members in the reporting year.

Source: USDA, ERS, 1996 Agricultural Resource Management Study, special analysis.

off-farm employment and farm income variability. In one study, a times series analysis of aggregate data indicated that the fraction of total farm family income earned from off-farm sources was higher in the 1980's than in the early 1970's, and suggested that the riskiness of farm income is positively related to working off the farm (Kyle). A study focusing on producer responses to a survey in Dodge County, Georgia, in the 1980's indicated that risk and low incomes were major disadvantages associated with full-time farming (Bartlett). In another study, farm household total income was found to be significantly less variable if producers and their spouses worked off the farm (Sander).

More recent research has more explicitly linked the decision to work off the farm with farm income variability and other factors (Mishra and Goodwin, 1997). Mishra and Goodwin's analysis, using a simultaneous-equation Tobit model, confirmed that the off-farm labor supply of farmers is positively correlated with the riskiness of farm income among Kansas farmers. Their results also indicated that off-farm work (for both the farmer and spouse) is positively correlated with off-farm experience and with the degree of leverage associated with the farm. Further, operators of larger farms and those receiving government supports were less likely to work off the farm. In a followup study, Mishra and Goodwin (1998) also found a positive and significant correlation between farm income variability and the decision by farm operators in North Carolina to work off the farm.

Although the focus of this section has been on off-farm employment, off-farm income may be derived from other sources as well (such as interest and dividends). Indeed, several studies have concluded that the low correlation between

financial assets (stocks, bonds, certificates of deposit) and farm assets suggests that diversifying into financial assets may yield important gains in risk efficiency for farm households. A quadratic programming analysis of a representative Illinois grain farm, for example, indicated that various levels of diversification could reduce the relative variability of the farm's rates of return on assets by 15-25 percent compared with holding farm assets alone (Young and Barry). Conversely, other research has focused on nonfarm equity investment in agriculture, generally concluding that investors can gain from inclusion of farm assets in their investment portfolios (Crisostomo and Featherstone; Moss, Featherstone, and Baker).

Other Ways of Managing Risk

The strategies and tools just discussed in detail are by no means all inclusive. Many other diverse strategies for farm risk management are commonly used by producers on their operations. Some of these additional strategies include the following:

- *Adjusting inputs and outputs*—Producers can respond to risk by altering output levels, input use, or some combination of the two. Research indicates that greater output price risk results in lower levels of both input use and final output. Given that preferences toward risk and circumstances can vary greatly across producers, the final input and output levels chosen by producers can, accordingly, vary considerably for individuals in similar situations. (See Sandmo; Hawawini; Ishii; Robison and Barry; and Just and Pope for more detail.)
- *Cultural practices*—Cultural practices can be used to reduce yield and, hence, income risk. One such practice involves planting short-season varieties

Farm household total income has been found to be significantly less variable if producers and their spouses work off the farm.
