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U.S. Wheat Production Practices, Costs, and Yields: Variations Across Regions

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What Is the Issue?

Wheat, produced in nearly every part of the United States, is the third largest U.S. crop in terms of both value and acreage, behind corn and soybeans. Unlike most other crops, however, wheat has distinct varieties that are produced in different regions or over different seasons. The result is wide variation in the costs of wheat production across growing areas, inherent in the diversity of inputs and production practices. These costs can affect the competitiveness of wheat with other crops in each region and the profitability of planting wheat. This study explores the variation in wheat production costs across U.S. regions, based on data from the 2009 Agricultural Resource Management Survey (ARMS).

What Did the Study Find?

The wide variation of wheat production costs across the country reflected differences in yields, cropping practices, and costs of land, labor, and capital assets. Regional climatic differences across the United States accounted for much of the variation in the class of wheat grown, each with its own production practices and associated costs. Northern wheat producers, for example, chose spring wheat varieties that were harvested in the fall because winter wheat—planted in the fall for summer harvest—would be killed by the cold during its winter dormancy. Growers in areas with abundant rainfall were able to boost their yield potential by applying high rates of fertilizer. At the other extreme, some regions had areas so dry that costly irrigation was needed to produce a wheat crop.

Wheat Yields and Production Costs: Expected Versus Actual

National Overview

In 2009, the expected national average of combined operating and ownership costs was \$4.00 per bushel of wheat versus an actual average of \$4.75. The expected average U.S. yield was 47.7 bushels per acre, while the actual average yield was 40.2 bushels. The 2009 season average price (SAP, estimated annually by the USDA National Agricultural Statistics Service) was \$4.87 per bushel.

An analysis using **expected yields** (based on survey responses) and the 2009 SAP finds that 97 percent of U.S. farms would have covered their operating costs if they had met their expected yields and received the SAP of \$4.87 per bushel, 77 percent would have covered both operating and ownership costs, and 34 percent would have covered their total costs.

Fewer U.S. farmers covered their operating costs when the analysis considers **actual or realized yields**. If farmers, on average, had received the \$4.87 SAP for the bushels they harvested in 2009, 79 percent of them would have covered their operating costs, 53 percent would have covered their

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operating and ownership costs, and 18 percent would have covered their total costs. Actual yields and costs are typically lower than expected ones, but this may have been especially evident in 2009 because of adverse weather. In particular, an April freeze and severe drought in the Southern Plains region led to the abandonment of many wheat fields and sharply reduced output, resulting in high production costs per bushel for the region. Local statistics such as these are reflected, in turn, in national average yields and costs.

Regional Comparisons

In all five regions analyzed, the average yield of bushels per acre was fewer than expected and average production costs were higher. The discrepancies and the factors underlying them varied by region.

North Central – Although the region’s actual yield of 59.8 bushels per acre was well above the national average and the highest among the regions, it fell short of the expected 69.2 bushels. North Central had the lowest overall production costs among regions but the highest operating costs, driven by large input expenditures. Farmers in the region applied the most fertilizer, which acted in combination with the region’s generous rainfall to promote high yields. Overall production costs were low because the high yields spread ownership costs over many harvested bushels of wheat.

Southern Plains – The region had the largest discrepancies between expected and actual production costs (\$3.80 versus \$8.76) and yields per acre (37.5 bushels expected versus 16.3 realized). As noted, the Southern Plains were hit by a double weather disaster in 2009, an April freeze and severe drought, which sharply reduced the wheat harvest.

Central Plains – The actual yield of the Central Plains—43.2 bushels per acre—was close to the expected yield of 47.6 bushels and to the national average, although actual production costs of \$4.39 per bushel exceeded the \$3.98 expectation. In 2009, the region’s yield was almost three times higher than in the neighboring Southern Plains because of the freeze and drought in the south. Central Plains wheat yields are higher than Southern Plains yields even in a year of more normal weather because temperatures are not as high on the Central Plains and the risk of drought is less.

Northern Plains – The Northern Plains had the highest expected production cost per bushel among the regions. Three-fourths of producers grew lower yielding spring wheat varieties. The region had relatively high expenses for fertilizer, as well as for herbicides and fungicides. The harvested yield (43.7 bushels) came close to the projected yield (45.5 bushels).

Northwest – Although the Northwest region’s actual yield of 59.5 bushels per acre fell short of its 67.0-bushel expectation, it was nearly tied with North Central for the highest yield, despite having lower rainfall. The Northwest’s expected yields are high, in part, because it has the most irrigation, covering more than 20 percent of wheat acreage. With its relatively high yields, its actual production costs of \$4.42 per bushel were below the national average despite the irrigation expense. About half the crop is soft wheat, which is given only low applications of nitrogen fertilizer to ensure the low protein levels for which it is grown.

How Was the Study Conducted?

The farm-level data for this paper were derived from USDA’s annual Agricultural Resource Management Survey (ARMS) for 2009. The ARMS, based on a representative sampling of all U.S. farms, provides information on a broad range of issues about agricultural resource use, production practices, farm costs, and financial conditions and economic well-being of America’s farm households. The ARMS collects data every 4-8 years for each commodity. The authors based their annual production cost estimates on data from the 2009 survey of the U.S. wheat sector. They arranged these estimates from the lowest production costs to the highest to form cumulative distributions. Two sets of cumulative farm distributions were calculated, one using expected yields and the other using actual yields. To provide some explanation for the discrepancies between expected and realized output and prices, the authors supplemented their regional data analyses with expert knowledge of regional conditions and wheat production practices.