

International Benchmarks for Corn Production

Michael Langemeier, Associate Director, Center for Commercial Agriculture

Examining the competitiveness of corn production in different regions of the world is often difficult due to lack of comparable data and agreement regarding what needs to be measured. To be useful, international data needs to be expressed in common production units and converted to a common currency. Also, production and cost measures need to be consistently defined across production regions or farms.

This paper examines the competitiveness of corn production for important international corn regions using 2013 to 2015 data from the agri benchmark network. An earlier paper examined international benchmarks for the 2012 to 2014 period ([here](#)). The agri benchmark network collects data on beef, cash crops, dairy, pigs and poultry, horticulture, and organic products. There are 36 countries represented in the cash crop network. The agri benchmark concept of typical farms was developed to understand and compare current farm production systems around the world. Participant countries follow a standard procedure to create typical farms that are representative of national farm output shares, and categorized by production system or combination of enterprises and structural features.

Data from five typical farms with corn enterprise data from Argentina, Brazil, Ukraine, and United States were used in this paper. It is important to note that corn enterprise data is collected from other countries. These four countries were selected to simplify the illustration of costs and discussion.

The farm and country abbreviations used in this paper are listed in table 1. While the farms may produce a variety of crops, this paper only considers corn production. Typical farms used in the agri benchmark network are defined using country initials and hectares on the farm. There are five U.S. farms with corn in the network. The two farms used to illustrate corn production in this paper are the west central Indiana (US1215C) typical farm and the southern Indiana (US1215S) typical farm.

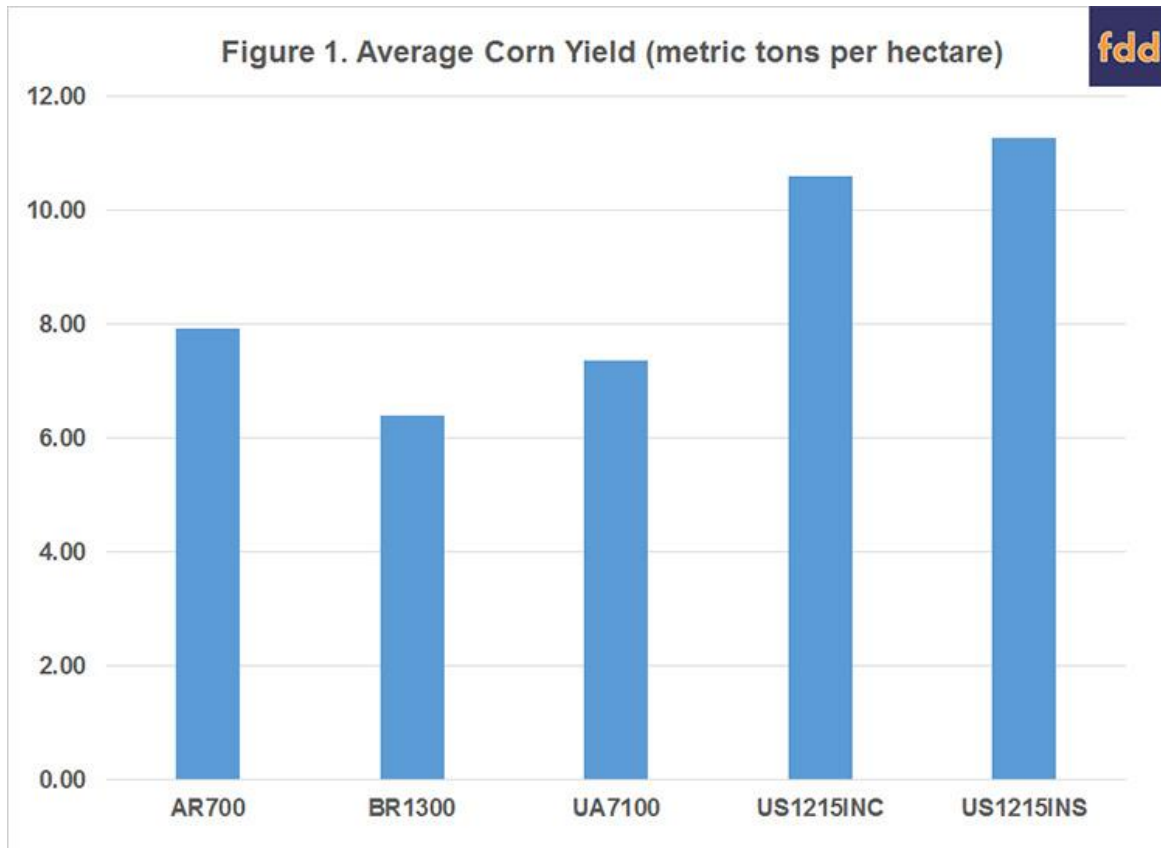
Table 1. Abbreviations of Typical Farms

Farm	Country	Hectares
AR700	Argentina	700
BR1300	Brazil	1300
UA7100	Ukraine	7100
US1215C	United States (west central Indiana)	1215
US1215S	United States (southern Indiana)	1215

Corn Yields

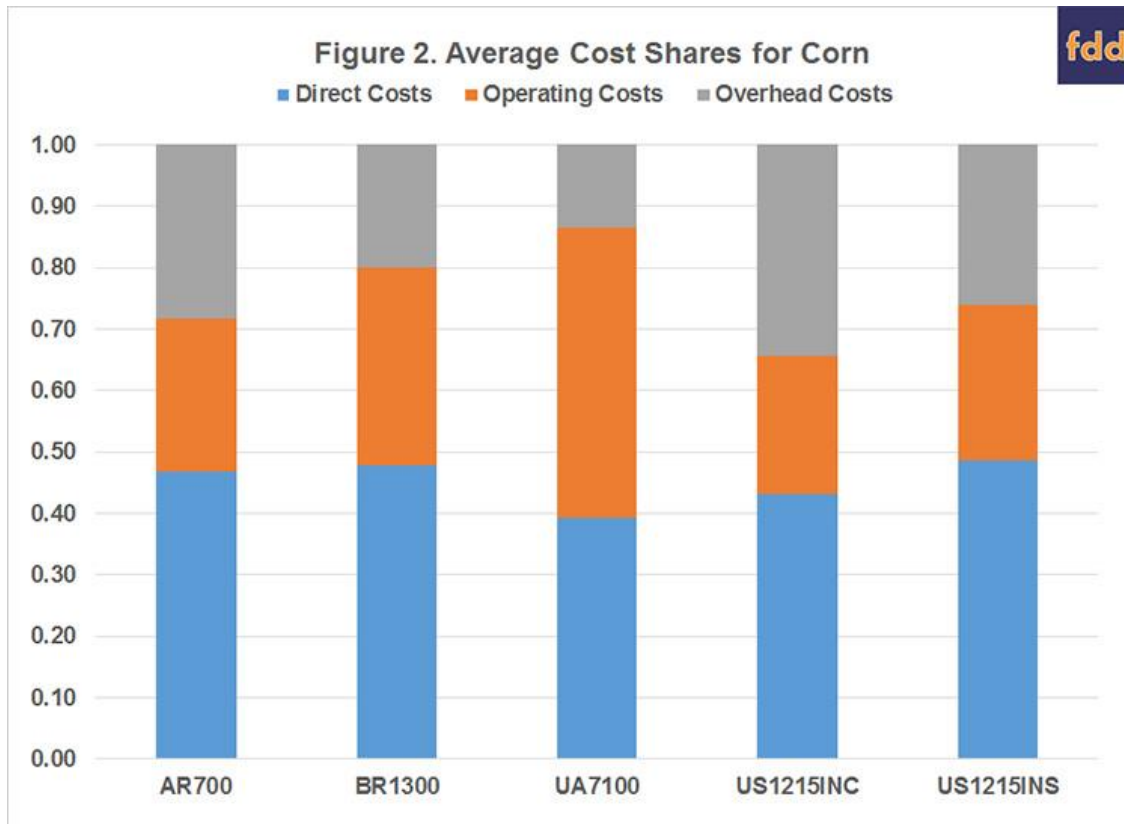
Although yield is only a partial gauge of performance, it reflects the available production technology across farms. Average corn yield for the farms in 2013 to 2015 was 8.71 metric tons per hectare (139 bushels per acre). Average farm yields ranged from approximately 6.40 metric tons per hectare for the Brazilian farm (102 bushels per acre) to 11.28 metric tons per hectare for the southern Indiana farm (180

bushels per acre). Figure 1 illustrates average corn yield for each typical farm. Both of the U.S. farms had average corn yields above 10 metric tons per hectare (159 bushels per acre). It is important to note that corn is the second crop of the year for the typical farms in Argentina and Brazil.



Input Cost Shares

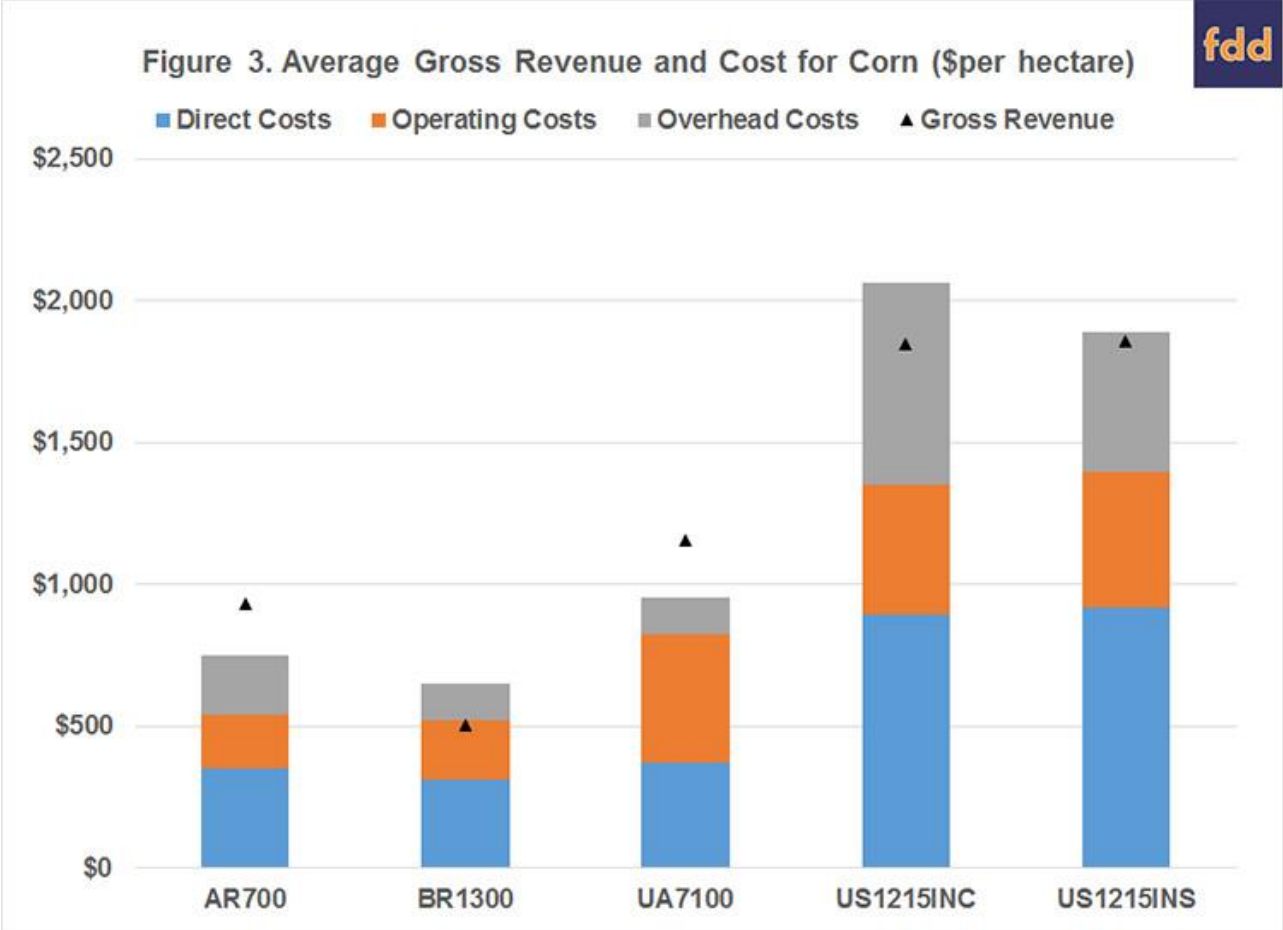
Due to differences in technology adoption, input prices, fertility levels, efficiency of farm operators, trade policy restrictions, exchange rate effects, and labor and capital market constraints, input use varies across corn farms. Figure 2 presents the average input cost shares for each farm. Cost shares were broken down into three major categories: direct costs, operating costs, and overhead costs. Direct costs included seed, fertilizer, crop protection, crop insurance, and interest on these cost items. Operating cost included labor, machinery depreciation and interest, fuel, and repairs. Overhead cost included land, building depreciation and interest, property taxes, general insurance, and miscellaneous cost.



The average input cost shares were 45.2 percent for direct cost, 30.4 percent for operating cost, and 24.4 percent for overhead cost. The typical farms from the Ukraine farm and southern Indiana had below average cost shares for direct cost. The typical farms from Argentina and Indiana had below average cost shares for operating cost, and the typical farms from Brazil and Ukraine had below average cost shares for overhead cost. The relatively large cost share for overhead cost in the U.S. reflects our relatively high land cost.

Revenue and Cost

Figure 3 presents average gross revenue and cost for each typical farm. Gross revenue and cost are reported as U.S. dollars per hectare. It is obvious from figure 3 that gross revenue per hectare is substantially higher for the two Indiana farms. However, cost is also substantially higher for these two farms. The typical farms from Argentina and Ukraine exhibited economic profits during the three-year period. Average losses for the typical farms from Brazil, west central Indiana, and southern Indiana were \$144, \$219, and \$31 per hectare, respectively, during the three-year period. The lowest economic profit for each farm was 2013 for the typical farm from Brazil, 2014 for the typical farms from Ukraine and southern Indiana, and 2015 for the typical farms from Argentina and west central Indiana. It is important to note that the west central Indiana farm suffered from a very wet June in 2015, which resulted in a yield that was 3.0 metric tons below trend (48 bushels per acre).



Conclusions

This paper examined yield, gross revenue, and cost for farms in the agri benchmark network from Argentina, Brazil, and the Ukraine, and the United States with corn enterprise data. Yield, gross revenue, and cost were substantially higher for the U.S. farms. The typical farms in Argentina and the Ukraine exhibited a positive average economic profit during the 2013 to 2015 period.