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Economics of Specialty Corn Production in Missouri

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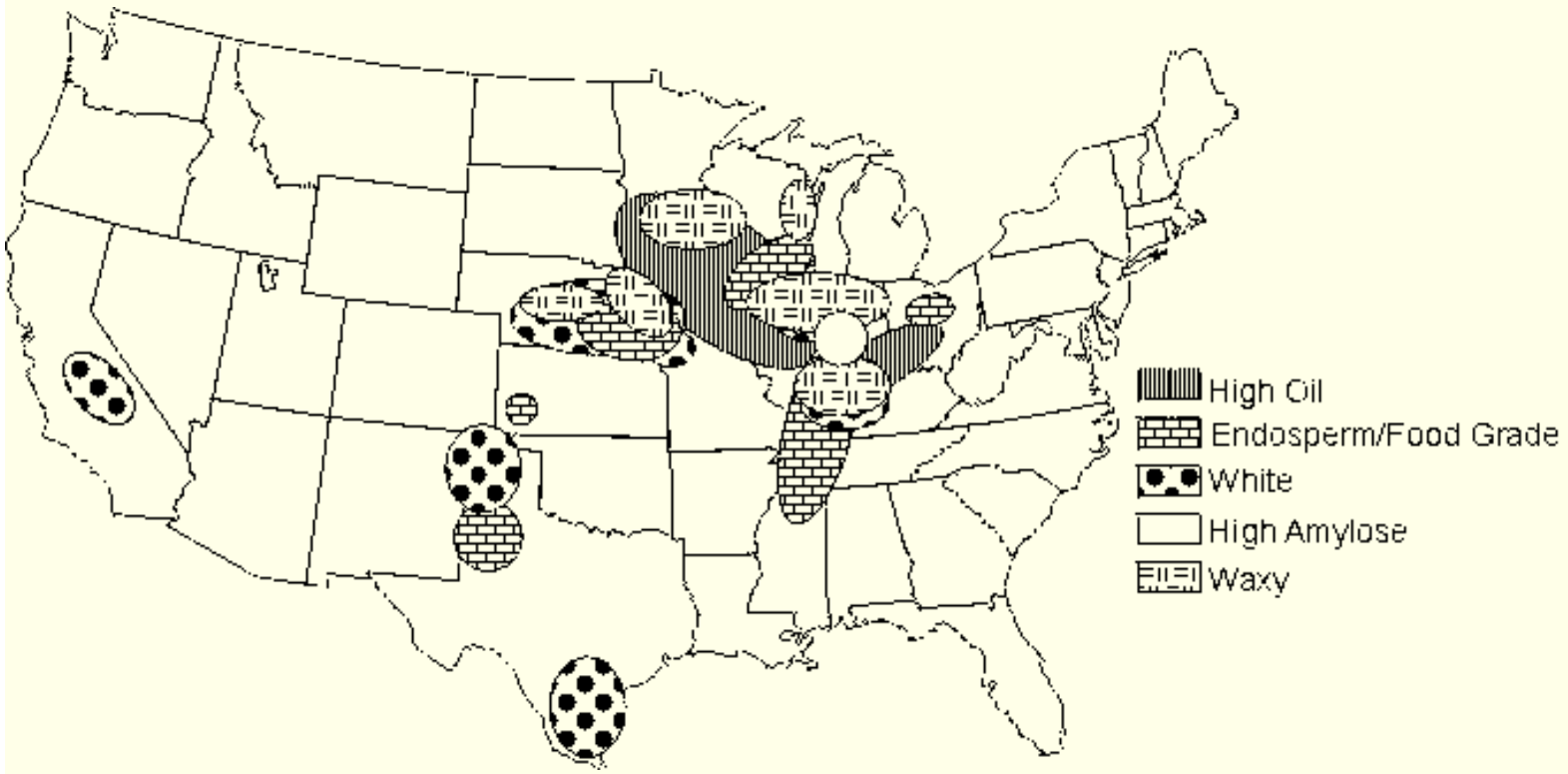
Overview of U.S. Specialty Corn Production

The grain/oilseed industry is undergoing change. These changes are driven by more discriminating consumers and by competitive processors. Advances in plant genetics and processing technologies work together to produce and process grains and oilseeds that have specific food-, feed-, and industrial-use properties. While the current market for specialty food-, feed-, and industrial-use grain and oilseed products is relatively small, interest in growing these crops is increasing. Processors who want specialty crops offer incentives, in the form of premiums, to producers to grow them. Missouri producers have shown particular interest in growing value-enhanced corn varieties.

The map below indicates the primary growing regions in the United States for five types of value-enhanced corn varieties. North and extreme southeast Missouri are included in these regions.

Specialty Corn Growing Regions in the U.S., 1998
(Source: U.S. Grains Council)



Planted acres of these hybrid corn varieties in the U.S. have been increasing over time. Planted acres of white, waxy, and

high oil corn increased 35%, 31%, and 213%, respectively, between 1996 and 1999 (Table 1).

Table 1. U.S. Cropped Acres Planted to Value-Enhanced Corn Varieties

	1996	1997	1998	1999
White	575,000	550,000	725,000	775,000
Waxy	400,000	420,000	500,000	525,000
Yellow Food Grade	800,000	800,000	1,000,000	1,000,000
High-oil	400,000	700,000	900,000	1,250,000
Nutritionally Dense	140,000	140,000	140,000	240,000
High Amylose	35,000	35,000	35,000	45,000

Source: U.S. Grains Council

Specialty Corn Hybrids Produced in Missouri

In North Missouri, the state's largest corn growing area, producers have shown interest in raising three value-added corn hybrids:

White - which is primarily used for food such as corn chips and tortillas.
Waxy - its name reflects its appearance. It is high in amylopectin starch and is used as a thickening ingredient for foods and bonding in paper.
High Oil - which has a higher oil content than base genetics varieties. Its primary use is as an ingredient in feed because of its high energy and protein content.

In Southeast Missouri some producers are raising the yellow food grade hybrid.

The location of processors and feed mills which handle these hybrids is an important factor in farmers' decisions to raise these crops. Farmers in North and Southeast Missouri are involved in the production of these hybrids because processors and feed mills in these regions are demanding these specialty corn hybrids. Central Missouri is not a major producing area for value-enhanced corn because processors and feed mills in this area of the state are not yet demanding those genetics.

Demand and Supply

Because the market for value-enhanced corn varieties is relatively new, demand is difficult to calculate. The best indication of the demand for a specialty corn hybrid is the amount of premium offered. Premiums have been declining over time as domestic production (supply) has increased to meet demand.

One indication of supply rising to meet demand is the Missouri white corn market. Year 2000 January forward pricing opportunities for #2 yellow and white corn during late November indicated about a $0.05/bushel premium for white corn. *The white corn premium is below that offered in 1997 and corresponds to an increase in planted acres.* Unless demand increases more rapidly than the increase in domestic production of value-enhanced corn varieties, the marketing

premiums will continue to decrease.

The price of #2 yellow corn also impacts the demand for specialty corn. As the average price of #2 yellow corn has declined, the premium for feed quality enhancing varieties such as high oil corn has declined. The value of a trait such as energy in high oil corn declines when the cost of feeding livestock with #2 yellow corn is low.

Producer Perceptions of Value-Enhanced Corn Production

In 1998, two researchers at the University of Illinois (Norvell and Lattz) surveyed Illinois grain farmers concerning the production of value-enhanced corn varieties. They received nearly 700 responses. In general, the survey results indicated larger farms were more active in contracting to raise value-enhanced corn varieties; however, smaller operations tended to allocate a larger portion of acreage to raising these varieties. Nearly 17% of respondents indicated they made new investments in storage facilities to produce value-enhanced corn varieties; 12% made changes in harvesting equipment. Only 7% of producers required new investment in planting equipment. For those indicating a new investment was made, the average investment in storage facilities and equipment was $22,500 and $44,000, respectively. The top three reasons respondents gave for producing value-enhanced corn varieties were to increase profit, to earn a premium, and to diversify risk. The three most important pieces of information for producers involved in value-enhanced corn production were average premiums paid, typical contract terms, and availability of contract types.

In summary, Illinois survey results indicated producers of value-enhanced corn varieties:

- Required some additional capital investments.
- Produced value-enhanced corn varieties to increase profits, capture premiums, and diversify risk.
- Required premium and contract specification information.

Budget Analysis

A budget can be used to provide a detailed estimate of the costs and returns per unit for a particular good. A budget lists the variable costs, fixed costs, and value of production. This helps the producer in assessing the costs and returns of producing a particular good or comparing the costs and returns of similar goods.

Table 2 is a budget showing per acre cost and return projections for producing specialty corn hybrids in northwest Missouri in the year 2000. The information used to generate this budget was provided by Ray Massey and Kevin Dhuyvetter. The budget uses averages in calculating costs and revenues. Thus, producers may financially do better or worse than indicated.

Table 2. Estimated Costs and Returns for Production of Specialty Corn Hybrids in the Year 2000 in Northwest Missouri

	Base Genetics	White	High Oil	Waxy
VARIABLE COSTS PER ACRE				
Labor and management[a]	$20.00	$22.00	$22.00	$22.00
Seed[b]	29.70	29.70	44.92	32.67

Pesticide and herbicide	22.00	22.00	22.00	22.00
Fertility program	56.00	56.00	56.00	56.00
Fuel and oil	7.50	7.50	7.50	7.50
Machinery and equipment upkeep	15.00	15.00	15.00	15.00
Drying @ $0.07 per bushel	8.40	8.40	7.98	7.98
Storage[c]	16.80	17.64	18.48	18.48
Miscellaneous	10.00	10.00	10.00	10.00
Interest @ 9% on 1/2 of variable costs	8.34	8.47	9.17	8.62
A. Total Variable Costs/Acre	**$193.74**	**$196.71**	**$213.06**	**$200.25**
FIXED COSTS PER ACRE				
Machinery depreciation, insurance, interest[e]	$37.00	$37.00	$37.00	$37.00
Real estate taxes, depreciation and interest	95.00	95.00	95.00	95.00
B. Total Fixed Costs/Acre	**$132.00**	**$132.00**	**$132.00**	**$132.00**
C. Total Costs/Acre (A + B)	**$325.74**	**$328.71**	**$345.06**	**$332.25**
RETURNS PER ACRE				
D. Yield per acre (bushels)	120	120	114	114
E. Base price per bushel	$2.50	$2.50	$2.50	$2.50
E1. Premium per bushel[d]	$0.00	$0.05	$0.14	$0.15
F. Net government AMPTA payment/acre	$8.50	$8.50	$8.50	$8.50
G. Total Returns/Acre ([E+E1] D + F)	**$308.50**	**$314.50**	**$309.46**	**$310.60**
H. Returns over variable costs (G - A)	$114.76	$117.79	$96.40	$110.35
I. Returns over total costs (G - C)	- $17.24	- $14.21	- $35.60	- $21.65
J. Variable costs/bushel (A divided by D)	$1.61	$1.64	$1.87	$1.76
K. Fixed costs per bushel (B divided by D)	$1.10	$1.10	$1.16	$1.16
L. Total costs per bushel (C divided by D)	$2.71	$2.74	$3.03	$2.91

[a] 10% higher labor costs for specialty corn as a result of increased handling.

[b] Conventional, white, and waxy seed cost is $88/bag; high oil seed cost is $121/bag. Conventional and white seed planted at 27,000 seeds/acre; high oil and waxy at 29,700 seeds/acre.

[c] 10% higher storage costs for white, high oil, and waxy corn to account for inefficient bin use from yield drag or acreage peculiarities.

[d] White corn premium is flat per-bushel; high oil premium is 6.9% of oil content; waxy is flat per bushel.

[e] 5% higher machinery cost for specialty corn is based on the Illinois survey of farmers producing value-enhanced corn.

Three items in the variable and fixed cost sections need further explanation. First, a 10% higher labor and management cost is used for the specialty corn hybrids than the base genetics corn due to the increased handling costs of segregating production. This includes cleaning out equipment and storage facilities and extra time spent during planting. Second, a higher storage cost is assumed for the different specialty hybrids because of the potential yield drag/lag with these varieties. Specialty corn hybrid marketing contracts often specify delivery for the first quarter of the next year after harvest. Also, it is unlikely that specialty corn production will exactly match storage size; therefore, a portion of the bin may be unused. Third, a 5% higher fixed machinery cost was used based on information gained from the University of Illinois survey. The yield for high oil and waxy corn was reduced by 5% from levels recorded for base genetics and white corn. Premiums for white, waxy, and high oil corn reflect premiums offered in contracts in early 2000.

Line I shows the net return per acre of base genetics and value-enhanced corn varieties. The added net return to producing white corn over the base genetics variety is estimated to be $3.03 per acre. Comparing high oil and waxy corn varieties to the base genetics shows $18.35 per acre and $4.41 per acre additional loss, respectively. High oil corn production yields the largest losses in this analysis.

Uncertainty of yields and premiums can impact the results. Table 3 shows the effect on returns per acre from doubling the premium or obtaining similar yields for the different varieties. Doubling premiums and obtaining similar yields substantially increased the profitability of high oil, white, and waxy corn hybrids. High oil corn returns were closer to the base genetics returns and white and waxy corn returns were greater than base genetics production under these assumptions.

Table 3. Effect on Bottom Line from Doubling Premium or All Varieties Having Same Yield

	Base Genetics	White	High Oil	Waxy
	($/acre)			
Line I from Table 2, returns over all costs	- $17.24	- $14.21	- $35.60	- $21.65
Double premiums listed on line E1	- $17.24	- $ 8.21	- $19.64	- $4.55
All yields the same, original premium	- $17.24	- $14.21	- $19.76	- $5.75

Management Considerations

The economic analysis of value-enhanced corn production indicates that it is not a guaranteed way for farmers to increase profit. However, the cost and return projection makes assumptions that can be modified by farmers raising specialty hybrids.

While labor costs for raising specialty varieties will undoubtedly rise because of the additional care needed to segregate grain and maintain its quality, some farmers will experience either larger or smaller penalties than shown in Table 2. As farmers purchase planters and combines that are easier to clean (part of the additional investment mentioned in the Illinois

study), they should be able to change more quickly from one hybrid to another while maintaining purity.

Storage costs could be much higher than estimated in Table 2 or more like the storage cost for the base genetics. Most contracts specify that the farmer delivers all of the production from the contracted acres. Producers should be sure to contract enough acres so that expected yield will fill entire bins and not plant an acreage that is likely to use part of a bin. If harvest is greater than expected, rather than use an additional bin for specialty corn, it may be advantageous to harvest the edges of the field as traditional corn and not deliver it on the contract. This increases the purity of the identity-preserved corn while also managing bin space. Another method of managing bin space is to have one or two small bins for storage of excess grain.

The example in Table 2 does not include transportation costs. Contract production requires delivery to specific locations. If these locations are farther than normal delivery locations, this should be considered before entering into a contract.

Table 3 assumes that a producer might be able to double premiums. Most contracts are uniform so the opportunity to do this under contract production is slim. However, a grower utilizing specialty corn for feeding his own animals will capture the full value of the grain without having to share that value with other grain handlers. Therefore, what may be unprofitable to produce under contract may be profitable to raise and use as feed.

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