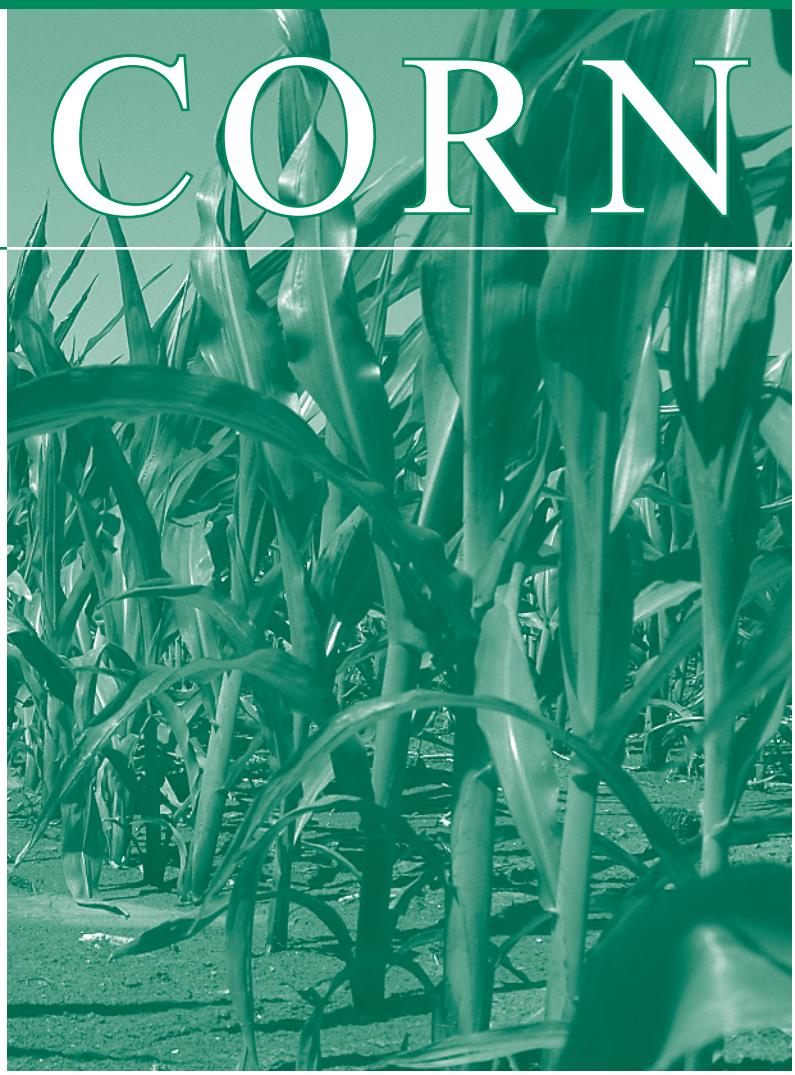
NSRL National Soybean Research Laboratory May 2008

Iowa 2006 Specialty Soybean and Corn Survey



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Acknowledgments

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Special thanks also to the soybean farmers of Iowa who financed this study. Surprisingly there is no current or longitudinal study of value added grain practices and markets. By funding this research the Iowa Soybean Association has helped to fill an important knowledge gap, and in doing so will help farmers, managers, and policymakers make better decisions.

Project Overview

Over the years there has been significant research about how to create and capture more value from grain/oilseed differentiation. One early finding of the research was that creating and capturing value by differentiating grains/oilseeds is difficult. Premiums decline over time and capturing the demand for market identity-preserved grains/oilseeds is not straightforward.

A better understanding of the details of contracting is increasingly important as a greater amount of commerce in agriculture is now governed by contracts. The approximately 1.8 million acres of specialty soybeans and corn in Iowa are an integral part of a new farm business environment where buyers and sellers increasingly depart from the spot market and add greater specificity to their commercial activities through contracting.

Introduction

In 2007, the National Soybean Research Laboratory in collaboration with the Iowa Agricultural Statistical Service conducted a survey of the specialty soybean and corn activities in the State for the 2006 crop year. Out of 55,879 corn and soybean farmers in Iowa, 5,000 farmers were randomly selected and 2,369 farmers, responded, for a response rate of 47.4%. A key objective of the survey was to better understand, and then assess the state of differentiated or enhanced soybean and corn production in Iowa. The goal is to help farmers capture more value.

The 2006 Specialty Soybean and Corn Survey Questionnaire can be viewed and downloaded at: http://www.nsrl.uiuc.edu/news/nsrl_pubs/

This brochure is chiefly about corn specialty crops, but a few points of comparison with soybean specialty crops will be of interest. There is a companion report chiefly about soybeans that can be downloaded at the above website.

What the Survey Means

Two findings can be emphasized. First, on the one hand specialty soybean and corn programs are significant. Approximately 1.8 million acres were devoted to specialty production, and farmers collected $22.9 million and $11.1 in soybean and corn premiums, respectively. Surveys like this are not conducted every year, so historical trends are not well understood. It appears, though, from this and other research, that specialty soybean and corn production in Iowa had leveled off over the last few years prior to 2006 at around 10% of acres. A recent survey, for example, in Illinois (2004 crop year) found 9.9% of corn acres and 10.7% of soybean acres were in specialty programs[1]. It should also be noted that location in terms of growing region and market access is an important component of participation in specialty grain opportunities.

On the other hand, overall agricultural value creation and capture from specialty corn and soybean programs is small. The Iowa soybean and corn crop was marketed in 2006 for $9.6 billion, so specialty premiums accounted for only .35% of gross revenue. Moreover, when the additional costs of participation in specialty programs are included, value capture is even less than the contribution to gross revenue suggests. So while certainly beneficial to the farmers of the State, specialty grain/oilseed production remains a minor activity. Commodity procurement, as opposed to specialty procurement is overwhelmingly preferred by Iowa's soybean and corn customers. For example, basis improvement from increased local demand for commodity corn by the ethanol industry added significantly more to the gross agricultural product than did specialty programs in 2006.

The second finding has to do with the nature of the specialty grain/oilseed activities. With the advent of biotechnology in the 1980s and '90s there were great expectations for, and significant research investments in, creating and capturing value via output traits. Genetically modified organisms (GMO) output traits seemed to be the wave of the future. Significant investments were made in specialty grain/oilseeds (also called value-added crops) by life science companies, universities, producers, handlers, and some primary processors. There are currently about 24 specialty soybean and corn programs offered in the State. But in the end the most commercially active programs are seed and Non-GMO production, not output trait innovations that resulted from the industry's research and development activities. Low Linolenic soybeans are the only output trait program that has broken the 100,000 acre level, and now has broken the 500,000 barrier in Iowa. We need to ask why demand is not stronger for our current slate of enhanced soybean and corn offerings, and what must be done differently to increase their demand.

> Growing region and market access impact participation in specialty grain opportunities

In conclusion, the survey results serve as a touchstone. Value added grain/oilseeds are not contributing as much as producers might want. The capacity of specialty crops to help Iowa farmers and their communities create and capture more value is yet unfulfilled. So the survey results help to raise important strategic questions for commodity groups as they look to invest in order to better serve their ethanol, biodiesel, livestock, and food manufacturing customers.

Overview of Value Added Agriculture

Over the last several years there have been significant efforts to help Iowa soybean and corn farmers create and capture more value. There are four general strategic thrusts for making this goal a reality back on the farm:

1) Increase aggregate demand. This is an "all ships rise" approach that leads to increasing margins through higher commodity prices. The strategic orientation is to supply markets by producing a commodity. Examples:
   - new uses for corn and soybeans
   - growing demand for bio-fuel
   - increased use of soy protein in food aid
2) Decrease costs and improve competitiveness. This strategy increases margins by lowering costs or raising revenue per unit. Research consistent with such a strategic thrust would focus on technologies and practices that lower farmers' cost of pro-

[1] http://www.nsrl.uiuc.edu/news/nsrl_pubs/

duction or increase yields. Many farmers benefit unless the technology is proprietary (controlled by a narrow group of farmers). Here, too, the strategic orientation is to supply markets by producing a commodity.

Examples:
- precision agriculture
- yield and disease resistance research
- nutrient economizing

3) Vertical integration. This strategy involves direct investment in the next stage(s) of the marketing channel to access potentially higher returns. The strategy also attempts to directly improve local prices by increasing local demand. Examples:
- farmer investments in bio-energy production
- farmer investments in food processing
- farmer investments in meat packing.

Local farmers benefit the most from a change in basis, though investor-farmer benefits may be offset by greater risks associated with such vertical investments. The strategic orientation can be two-fold. The vertical business can produce a commodity, e.g., ethanol, so the farmers would continue to serve commodity markets. Or, the vertical business can produce a product, i.e. specialty meats, and the business will serve customers who will also require service, not just a product. Either way, farmers can benefit from a local basis change and investment appreciation and income.

4) Differentiated grain production. Farmers employing this strategy focus efforts on obtaining higher prices (premiums) for the grains and oilseeds they produce by differentiating their products in order to receive premiums. Yet if premiums are widely accessible, the market will be commoditized, premiums will decline over time, and the price received will approach commodity levels. As a result, large numbers of farmers would each earn small premiums. Alternatively, if production and customer relationships are more tightly controlled, premiums would be more narrowly accessible, costs of production would be higher, premiums would be more stable, and small number of farmers would receive relatively higher premiums. The strategic thrust is to produce a differentiated product and serve specific customers, not broad markets, with a product-service bundle.

This fourth strategy is the subject of this series of reports.

Creating and Capturing Value through Differentiated Grain/ Oilseed Production

Underlying Strategy 4 is the proposition that valuable corn (and soybean) attributes could be the foundation for new identity preserved grain/oilseed delivery models. Upstream farmers and their seed suppliers would create and capture value by delivering an enhanced non-commodity offering to downstream customers.

Coincident with product differentiation has been some movement in the grain/oilseed sector toward more coordinated marketing channels. These new channels have a variety of names: value-added markets, specialty grain/oilseeds, identity-preserved grain/oilseeds, and attribute-enhanced products. The first three are similar because they differ from the spot market exchange that involves selling commodities. In value added/specialty/IP markets grain and oilseeds sell for premiums, and buyers and sellers interact contractually. The fourth, attribute-enhanced, not only receives a premium and employs a contract, but involves a product enhancement as well. For example, seed, organic, and Non-GMO production of corn often involve contracts and premiums, and are considered value-added or specialty programs. They are not attribute-enhanced though. High oil or Nutri-Dense® corn or Low Linolenic soybeans involve contracts and premiums, and are attribute-enhanced.

The distinction is very important because a central objective of shifting to differentiated grain/oilseed production from commodity grain production is for producers to create and capture more value. Grain enhancement attempts to provide new value either substituting for a current down chain activity or creating a new application. Value is created and premiums are paid because the grain is doing more for someone along the value chain. Agriculture's share of the value created along the chain increases under such conditions.

But producing seed and Non-GMO crops does little to expand agriculture's share of end-user value. Seed production is an activity that is not new, and Non-GMO varieties of seed reflect the absence, not the addition, of an attribute. Non-GMO varieties also embody how agriculture is valued for its old practices, not its new capabilities. No additional value is created within the value chain, and agriculture's share of value does not increase, even though premiums are paid over the commodity price.

For example biotechnology has had significant impacts with widespread adoption among the leading agricultural countries. Yet biotechnology is still mostly relegated to input trait applications and has yet to break through with output traits. Input traits create and capture value *intra-sectorally* by lowering costs and improving sector (producer) efficiency. Output traits, on the other hand, create and capture value *inter-sectorally* by better servicing the needs of customers. The problem is that only by inter-sectoral value creation can one sector achieve greater influence within a value chain, power over pricing, and a greater share of the channel's total created value.

One recent success story of inter-sectoral value creation is Low Linolenic soybeans. These soybeans are enhanced to improve health profile of foods in a significant way for consumers. Low linolenic soybeans are a new program accounting for over 500,000 acres, or 5.5% of the soybean acres in Iowa. Iowa farmers who produce Low Linolenic soybeans provide the value chain with a product for which there are few alternatives. They command a premium and capture more value as a result.

We now turn to the general results of the survey.

General Results: Corn Specialty Programs

In Iowa in 2006 there were 0.45 million acres of specialty corn grown (Figure 1), or 3.6% of all corn grown in the State. The leading specialty program was Seed corn with 150,000 or 33.1% of all specialty corn grown. Waxy was the second leading program with 62,000 acres or 13.6% of specialty corn, and third was Non-GMO production with 51,000 acres or 11% specialty corn production.

In the previous section we drew a distinction between enhanced and non-enhanced specialty grains/oilseeds. There were over 205,000 acres of enhanced corn planted in the state, or about 46% of all specialty corn (Figure 2). This level of enhanced production was significantly larger than occurred with specialty soybeans, where 33% were enhanced.

Enhanced grains/oilseeds are "next generation" products that provide value for end users. They compete directly against industrial or commodity sources of an attribute. For example, high oil corn suppliers offer oil in a bundle, which may be superior to alternative oil sources for livestock feeders.

Land Use

The ratio of corn to soybeans planted in Iowa has averaged 1.24:1[2] since 2000. In any given year, relative costs and prices can shift the ratio (Figure 3). In 2006, our study period, the ratio was 1.20:1. Iowa farmers allocated 55% of their soybean and corn acres to corn. Servicing increasing ethanol demand in the state has since shifted the ratio of corn to soybean acres to 1.60:1 in 2007.

According to the 2006 survey 85% of farmers grew no specialty soybeans or

Figure 1. Specialty Corn Acres Harvested Iowa, 2006

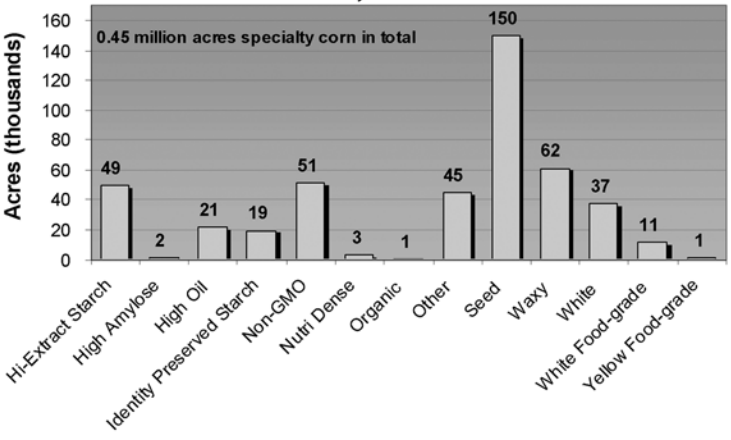


Figure 2. Enhanced Corn as a Percentage of Corn Specialty Acres (Iowa 2006)

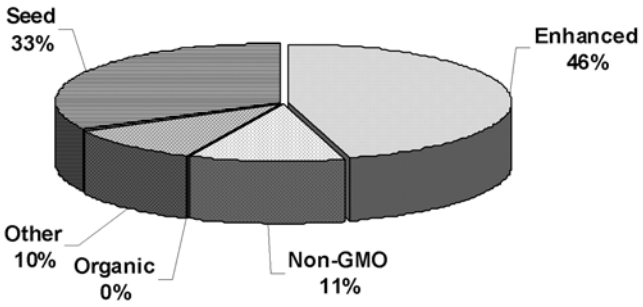
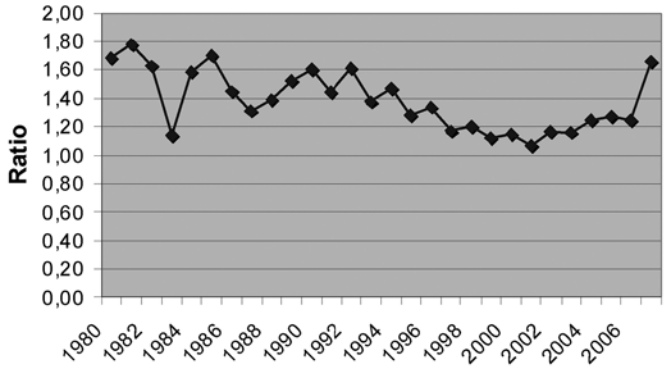


Figure 3. Iowa Corn:Soybean Acres Ratio 1980-2007



[2]National Agricultural Statistics Service and Authors' calculations.

corn (Figure 4). Of the 15% who did grow specialty soybeans and/or corn, 11% grew only specialty soybeans, 3% only specialty corn, and 1% both specialty soybeans and specialty corn.

In terms of Iowa land use, not producers, only 5% of the land contained specialty acres in 2006. Though research data is limited, the quantity specialty corn acres had been stable over the last five years[3], until 2006.

There were four types of farmers in our survey: Those who that raise no specialty crops, those who raise specialty soybeans and not specialty corn, those who raise specialty corn and not specialty soybeans, and those who raise both. The average farm producing both specialty soybeans and specialty corn contained 2,526 acres and was more than twice as large as the average farm producing neither specialty (957 acres) (Figure 5). The average farm producing both specialty soybeans and corn would have 16% of its land in specialty soybeans, 10% in commodity soybeans, 14% in specialty corn, 15% in commodity corn, and 46% in something else. Interestingly the average farm producing specialty soybeans and specialty corn operates 62% more specialty soybean acres than commodity soybean acres.

Farms that produce specialty corn have half their corn in specialty corn and half in commodity corn. One explanation why the specialty to commodity ratio is greater for soybean producers than corn producers is that soybeans' lower yields requires a greater commitment to specialty soybean acres, given the typical grain/oilseed storage configuration. It is easier to fill a bin with corn than with soybeans, so relatively more soybeans need to be planted when engaging specialty production.

Figure 4. Specialty Crop Production (% of producers) Iowa, 2006

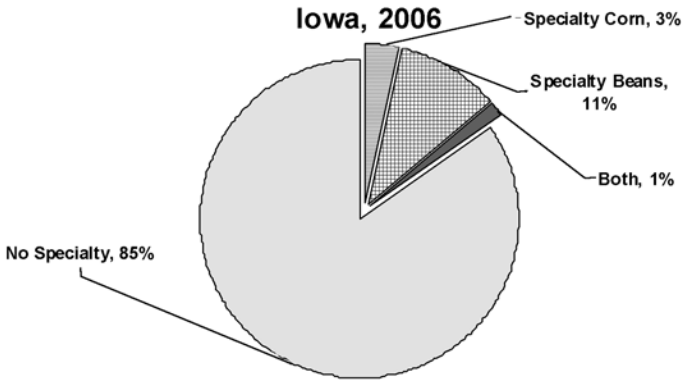
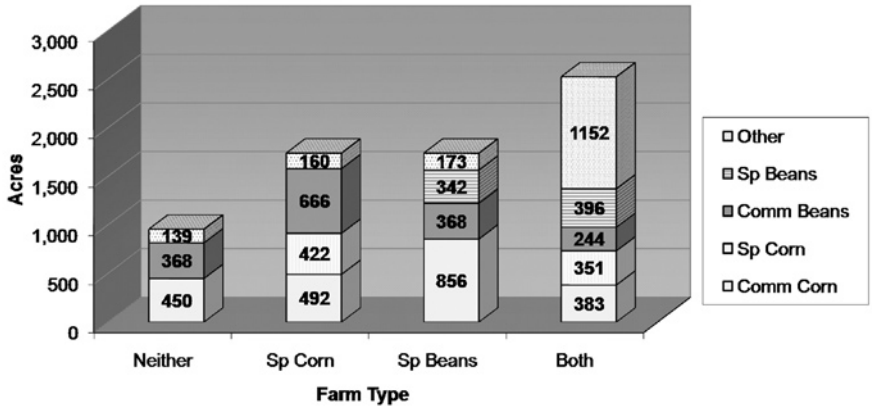


Figure 5. Land Allocation on Corn and Soybean Farms Iowa, 2006



[3]For a further discussion see:

Swanson, B., A. Sofranko, M. Samy, E. Nafziger, D.L. Good. "Value-Enhanced Corn and Soybean Production in Illinois." AE-4744. University of Illinois Department of Agricultural and Consumer Economics October 2001.

Pritchett J. J. Fulton, J. Beyers, R. Pederson, L., and L. Lawson. "Specialty Corn and Soybeans: Production and Marketing in Indiana." EC-714 Purdue University Cooperative Extension Service.2002: pp. 12.

Elberhi, A. "The Changing Face of the U.S. Grain System: Economic and Structural Implications of Differentiation and Identity Preservation Trends." Working Paper. USDA-ERS, 2005.

Goldsmith, P.D. and C. Silva. 2006. "NSRL Specialty Grain Survey: Corn." A special report of the National Soybean Research Laboratory, Urbana, Illinois. August: pp. 37.

Goldsmith, P.D. and C. Silva. 2006. "NSRL Specialty Grain Survey: Soybeans." A special report of the National Soybean Research Laboratory, Urbana, Illinois. August: pp. 31.

Corn Premiums

More than $11.1 million dollars in corn premiums were paid to Iowa farmers in 2006 (Figure 6). Three programs received 57% of the premiums; 23% to white corn, 19% to waxy corn, and 15% to Non-GMO corn.

Specialty premiums ranged on average from $0.13 per bushel for High Extractable starch corn to $3.00 dollars per bushel for Organic corn (Figure 7). Average reported yields ranged from a low of 97 bushels per acre for High Amylose corn to 210 bushels per acre for Identity Preserved Starch corn (Figure 8).

Combining yield and premiums, the top three revenue programs were not the three main specialties, but instead were High Amylose, Organic, and White Food Grade, averaging $146, $127, and $99 per acre, respectively (Figure 9). Not reflected are the costs associated with participating in specialty programs. These costs can range from being inconsequential to be being very significant, thus may affect overall profitability from program participation.

Drivers of Premiums

A central objective for specialty markets is to pay efficiently for specialty attributes. For example, high oil corn premiums should generally be greater for corn that contains higher levels of oil. So theoretically, producers of specialty crops would be paid differentially on a per bushel basis. The hypothesis we test is: that differences in premiums paid to farmers is a function either directly or indirectly of the added value being delivered to the customer.

(Differential pricing as a function of quality is not the case in commodity markets where farmers are paid "the same price" for soybeans. Commodity price differentials do arise, but those price differences are the result of locational basis or differing marketing tactics.)

Premium payments will normally reflect the underlying supply of an attribute in industrial supply chains. A short supply of an attribute will command a higher premium. The more unique or difficult to produce the attribute, the more sustainable is the premium. As a specialty program is commoditized because of greater supply, the differentiation, by definition, decreases. Correspondingly, differentiation of premiums within a program should decrease. That is, farmers should tend to receive the same premium, albeit a lower one.

Though we hypothesize that there should be a correlation between quality and premium level, Farmers are currently not paid per ton of attribute delivered. Instead they are paid per bushel of grain or oilseed that contains the attribute. This creates inefficiency in a system of attribute delivery. Some farmers may be better at delivering higher levels of an attribute per bushel, thus would warrant a higher premium, but don't receive it.

Figure 6. Total Premiums by Specialty Corn Program Iowa, 2006

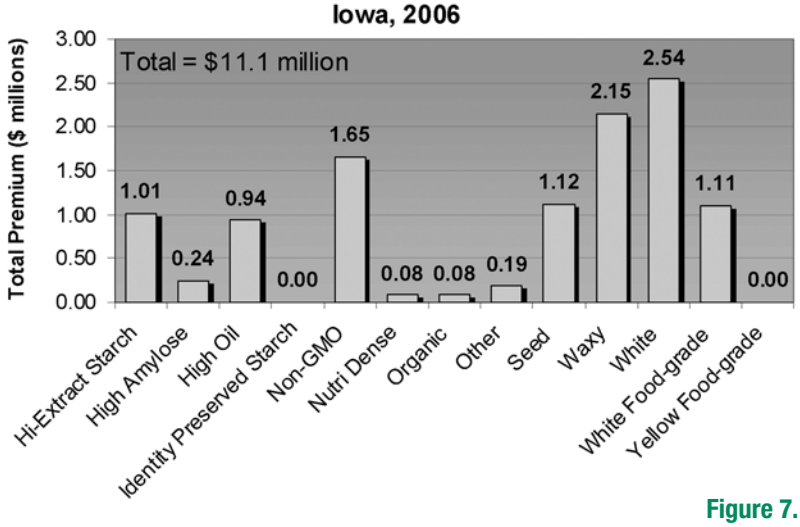
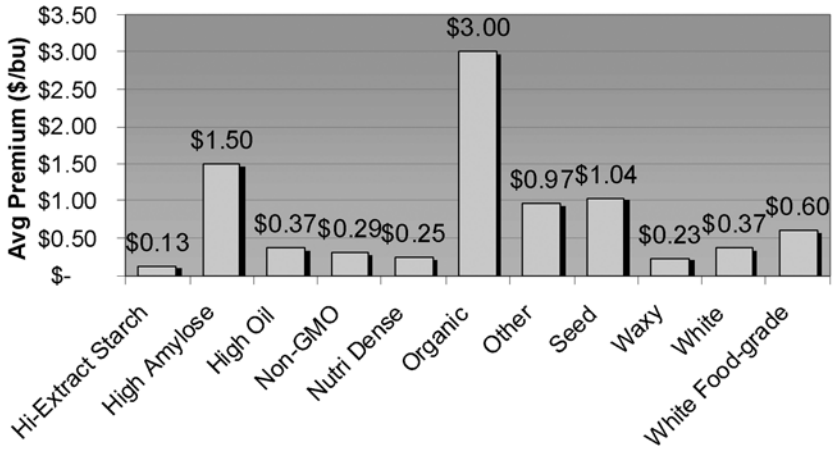


Figure 7. Specialty Corn Premiums Iowa, 2006



A second problem is that farmers do not currently measure the attributes they are selling, say protein or oil, while buyers do[4]. Very few loads of corn and soybeans delivered by the farmer to the first handler are tested for positive attributes such as protein and oil. Often times any test results that are received cannot be traced back to the field or variety. Measurement of the attributes by sellers (producers) is important because it allows sellers to bargain for higher premiums and helps sellers learn how production practices affect attribute levels. The lack of measurement makes it difficult for farmers to improve the efficiency of their attribute delivery because on-farm quality control is not possible.

One might expect as a result of the lack of measurement and the use of bushel-based contracts that not only do premiums vary across producers for the same specialty program, but that this variability is uncorrelated. So while it may be hypothesized that there should be a correlation between premium and quality, in practice there may be none. Regression analysis is helpful to better understand the factors, and their variability, that explain premium levels. Of particular interest are levels of specialty yield, total corn and soybean acres farmed, and total specialty acres farmed as predictors of premium levels. The following relationships are tested.

Specialty yield is assumed to be a proxy for soil quality, rainfall, fertilizer applied or overall management, and that such factors may explain premium levels. So premiums might be higher where there are higher specialty yields because buyers would expect higher and more consistent attribute levels.

Farm size, as measured by total corn and soybean acres farmed, is assumed to proxy for an economy of scale in attribute production. Larger farms might be able to employ more specialized equipment or be able to deliver larger volumes of a specialty grain/oilseed under tighter quality specifications. Thus farm size and premium levels are expected to be positively related.

The number of specialty acres farmed may reflect greater experience, thus may command higher premiums. Such farmers may be better suppliers because of their larger volume, or they may have more experience and are thereby able to better specialize. Or they may have a longer tenure growing the crop and have a longer relationship with the buyer.

Note: The following figures also nicely show the distribution of premiums. This is important because it helps show if there is differentiation among prices received by farmers. As opposed to the pricing homogeneity found in commodity markets, one would expect to see differentiation, not only between a specialty product and the commodity, but across specialty suppliers (farmers). Pricing differences theoretically would reflect buyers' willingness to pay differentially (ideally, more) because the product they receive contains a real difference.

Figure 8. Yield by Specialty Corn Program
Iowa, 2006

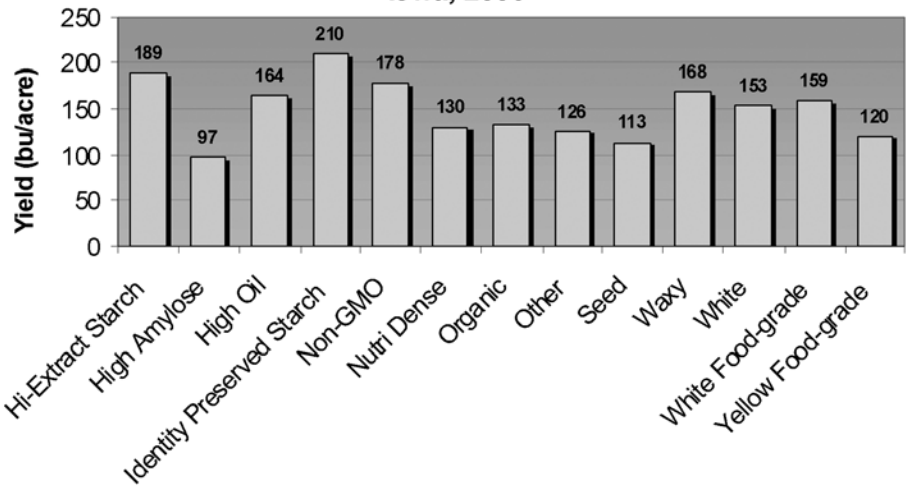
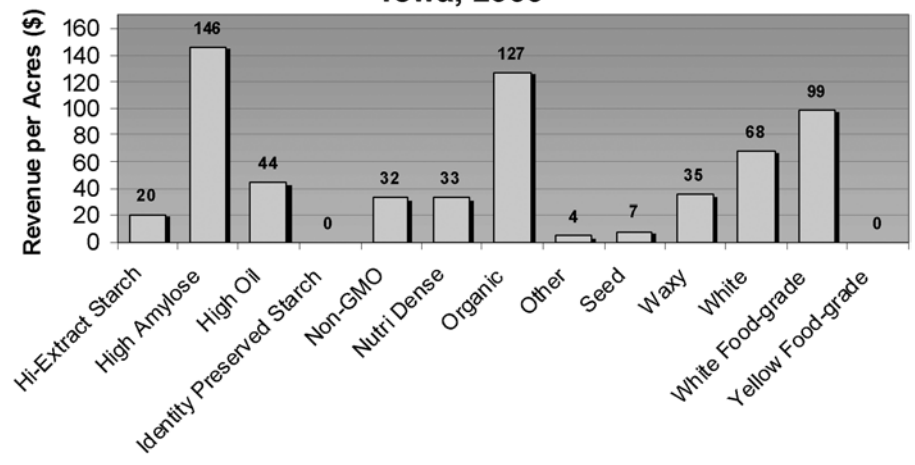


Figure 9. Specialty Corn Premium Revenue per Acre
Iowa, 2006



[4]See: http://www.grainqualitytechnology.org/
and http://www.ars.usda.gov/research/projects/projects.htm?accn_no=412371

There were only three programs that provided a sufficient number (seven or more) of premium observations, and they are discussed below. The rest of the corn specialty programs contained data that were too thin to analyze because of low participation levels or no premium data were reported.

Non-GMO Corn

Non-GMO corn growers in Iowa received $1.65 million in premiums in 2006. There was a negative and significant relationship (Pvalue = .06) between corn yield and Non-GMO premium levels (Figure 10). So producers who achieved lower yields, or farms that were less productive, received higher premiums (Table 1). There was one outlier that distorted the results. There was no statistical relationship when the low yield outlier was removed.

There was no relationship between premium level and farm size or level of specialization. The implication is the above three proxies are unable to explain any of the 300% range in premiums, $.08 to $.25 per bushel (excluding the outlier). Certainly imperfect proxies (specialty yield, farm size, and specialty acres) as explanatory variables may have caused the failure to explain the 300% premium range.

Waxy Corn

Waxy corn is the second largest specialty corn program in Iowa and amounts to 62,000 acres and $2.15 million in premiums. There was a range in premiums received by farmers of over 400%, $.08 to $.35 per bushel (Figure 11). There was no statistical relationship between premium levels and farm size, farm yields, or level of specialization. The proxy variables were unsuccessful explaining the differences in premiums across producers.

High-Extractable Starch

The 49,000 acres of High Extractable Starch corn produced brought Iowa farmers $1.01 million in premiums. Premium levels ranged 400% from $.05 to $.20 per bushel (Figure 12). There was no statistical relationship between premium levels and farm size, farm yields, or level of specialization. The proxies again were unsuccessful explaining the differences in pre-

Figure 10. **Yield and Premiums: Non-GMO Corn Iowa, 2006**

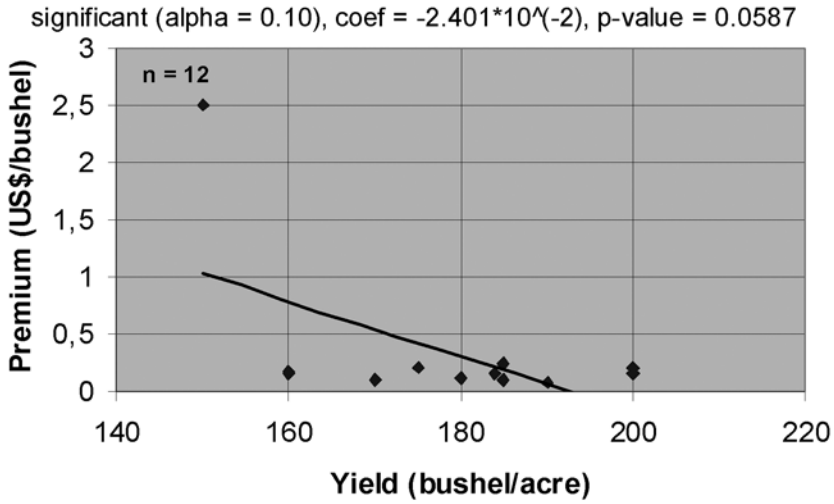


Table 1 Regression Results for Potential Specialty Corn Premium Drivers (Iowa, 2006)

Dependent Variables	Explanatory Variables					
Premium (US$/bushel)	**Yield (bushels/acre)**		**Total Acres**		**Specialty Acres**	
	Relationship	**P-value**	**Relationship**	**P-value**	**Relationship**	**P-value**
Non-GMO	**Negative** *	**0.06**	Negative	0.62		
# of observations	12		12		12	
Waxy	Positive	0.86	Positive	0.52		
# of observations	11		11		11	
Hi-Extractable Starch	Negative	0.73	Negative	0.85		
# of observations	8		8		8	

Notes.
Single (*), double (**), and triple (***) asterisk denote significance at 0.10, 0.05, and 0.01 levels, respectively.

miums across producers.

Among these three programs there is considerable variability in premium levels. The regression analysis was unable to shed any light on why farmers receive different premiums. The survey instrument was designed to be very quick for producers to complete; hence the high response rate. Unfortunately in depth questions that might shed light on premium differences were omitted. Premium levels too are a sensitive subject. Some contracts prohibit disclosure of premium levels. This limited the number of responses containing premium information. As a result data were thin. Finally the population of producers engaged in specialty production is small. This too limits the quantity and quality of premium data available to researchers.

The results indicate, as do previous studies, that more work needs to be conducted to better understand why premiums vary. It should be noted that there was a statistical relationship between premiums and proxy variables in the soybean programs. The implications of a weak relationship between premiums and attribute quantity or quality are twofold. Certainly there may be a fairness question if some farmers are receiving higher premiums than others. Or it behooves farmers to shop around for premium bids, because they do vary.

Second, there is a question about market efficiency. If the wide range in premiums is not correlated to the unique value each farmer is supplying then attributes are being mispriced and there is a lot of uncertainty for both buyers and sellers. The failure of the market to price efficiently may result in fewer suppliers entering such markets because they may not be compensated for their efforts. Or fewer buyers may not enter the market because premium-based procurement model does not deliver the attributes they value in an efficient manner.

An unfortunate result of the uncertainty is that producers are challenged as to what practices result in higher premiums. An interesting question is how on-farm measurement of attributes might help farmers receive appropriate compensation for the attributes they deliver to customers.

Figure 11. Total Acres and Premiums: Waxy Corn Iowa, 2006

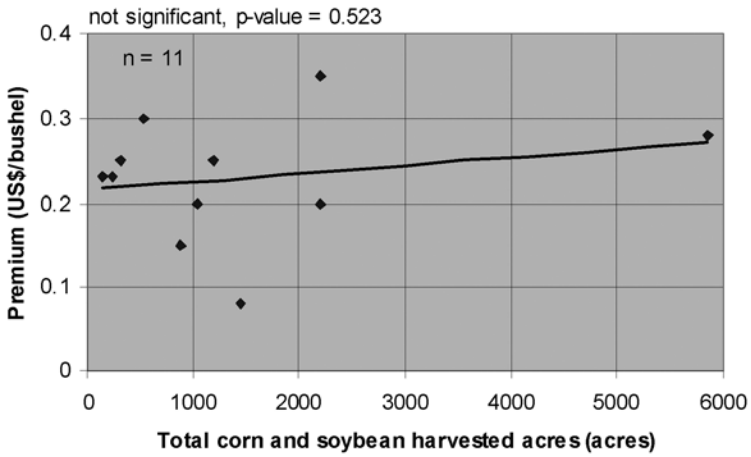
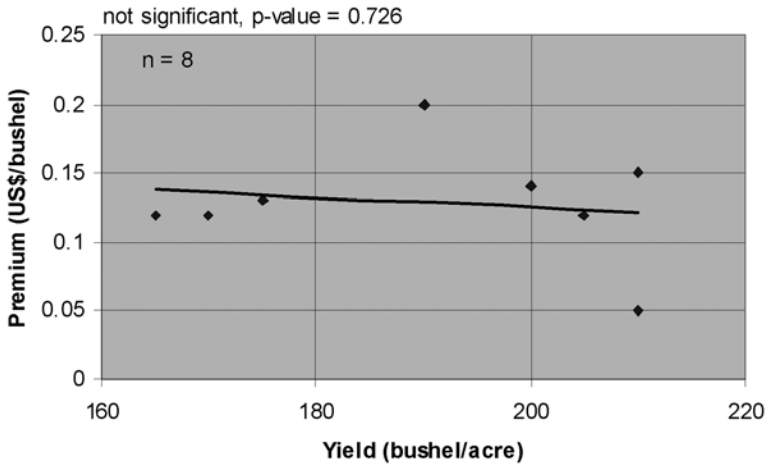


Figure 12. Yield and Premiums: Hi-Extract Starch Corn Iowa, 2006



Corn Contracting

About 86% of specialty corn acres involve a contractual price arrangement (Figure 13). (By comparison, 92% of soybeans are grown under contract.) The remaining are grown without a contract at planting as producers assume in such cases there will be a market harvest. The local cash market serves as the price basing point for 41% of specialty corn contracts, while 21% employ the futures price.

There are significant differences in contract type depending on the specialty corn produced. Discussed below are four of the corn specialty programs for which there were sufficient observations for analysis. (Note that not all specialty programs surveyed for contract features are included in this discussion due to the limitations of a small sample.)

Corn Contract Type and Pricing: High Oil Corn

All, or 100%, of high oil corn is produced under contract (Figure 14). Local cash pricing is utilized on 37% of these contracts, while 15% use the futures price. Contracts based on the futures price received the highest premiums, 40 cents per bushel, which was 14% higher (5 cents) than those using local cash or "something else". The highest average acreage per producer was 573 acres for high-oil corn priced off of "something else" and the lowest was 63 acres for local cash.

Corn Contract Type and Pricing: Seed Production

Seed production occurs under contract 95% of the time (Figure 15). As expected almost half of the seed contracts were priced using something other than the cash or futures market as a base because the output is not a grain but commercial seed. These contracts therefore involve production and harvest specifications, and unique cost sharing arrangements. Premiums were highest for local cash-based premiums at 38 cents per bushel, compared with 35 cents per bushel for something else. The highest average acreage per producer

Figure 13. Use of Contract Types - Specialty Corn Iowa, 2006

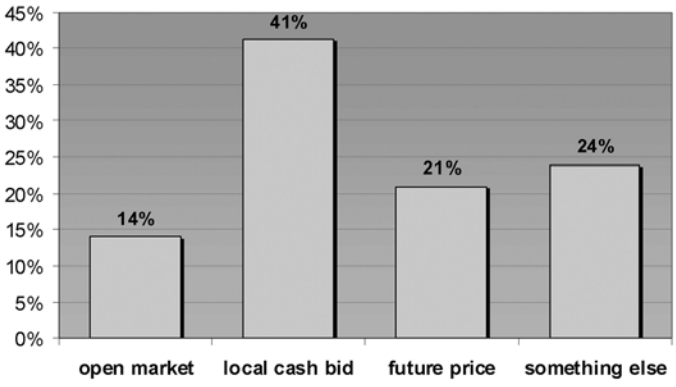


Figure 14. Use of Contract Types - High Oil Corn Iowa, 2006

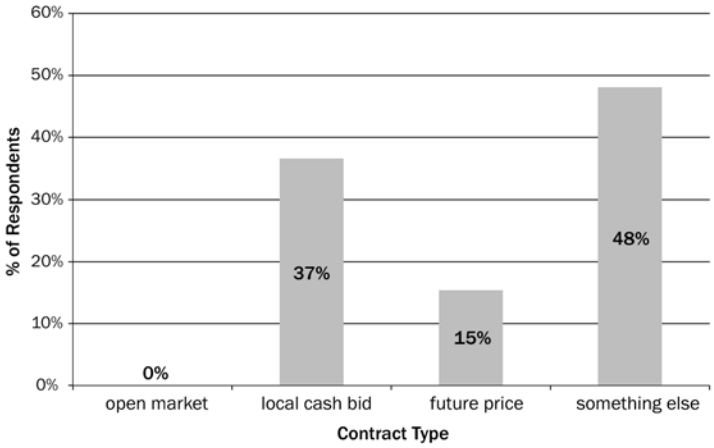
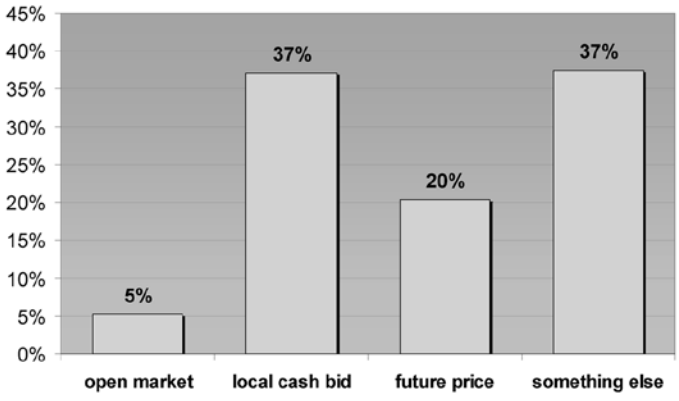


Figure 15. Use of Contract Types - Seed Corn Iowa, 2006



was 600 acres for seed priced off of open market and the lowest was 270 acres for the local cash bid premium.

Corn Contract Type and Pricing: Non-GMO

Most (76%) Non-GMO corn in Iowa was produced under contract (Figure 16). Over half the Non-GMO corn produced under contract use local cash as the price base, with The GMO corn that was grown under contract was priced using a local cash base (58%). There were no reports of the futures market being used, and 18% used some other base price. Non-GMO corn was sold on open market, which offered the highest premiums at 79 cents per bushel: more than 5 times higher than local cash bid (15 cents per bushel) or "something else" (15 cents per bushel) (Figure 17). The highest average acreage per producer was 397 acres for Non-GMO corn priced off of the local cash market and the lowest was 143 acres for futures market-priced corn.

Corn Contract Type and Pricing: High-Extractable Starch (HES) Corn

All HES production in the state was grown under contract (Figure 18). The majority of the contracted acres were priced using a local cash base (83%). Something other than the futures was employed on 17% of the contracted acres. Both the local cash

Figure 16. Use of Contract Types - Non-GMO Corn Iowa, 2006

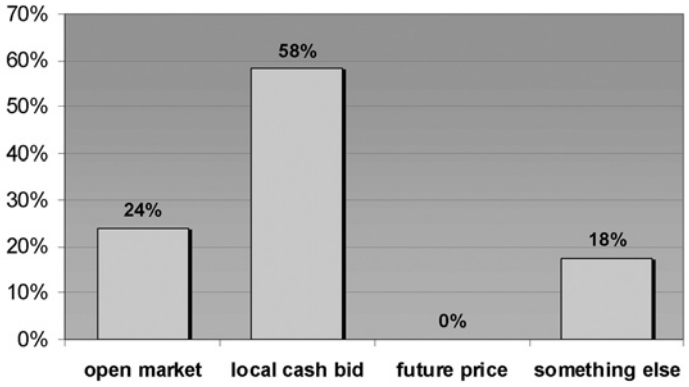


Figure 17. Premium for Non-GMO Corn by Contract Type Iowa 2006

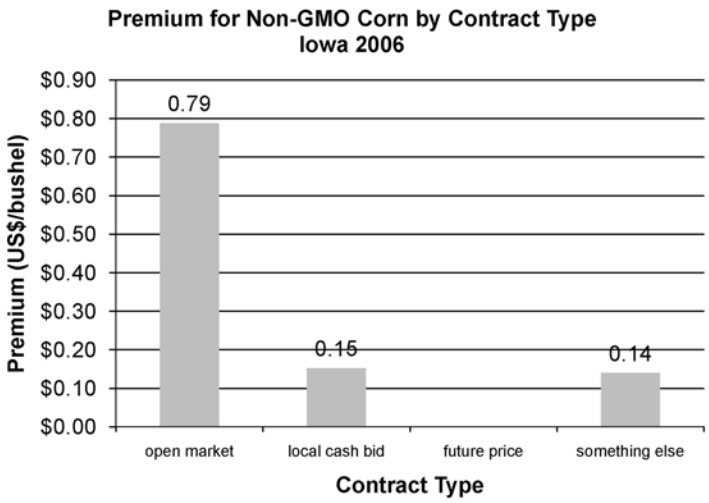
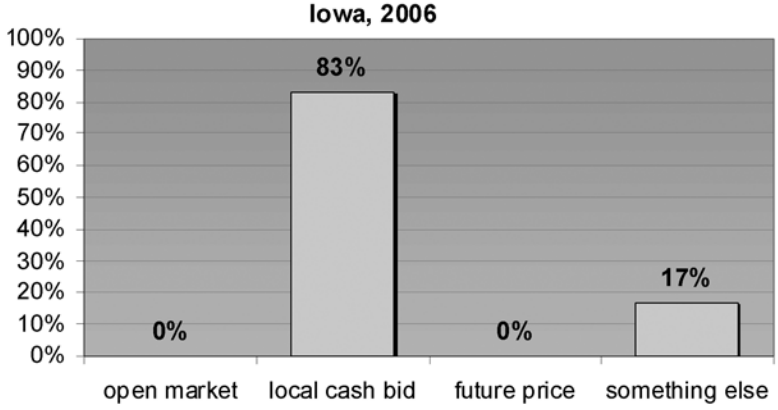


Figure 18. Use of Contract Types High Extractable Starch Corn Iowa, 2006



bid and something else offered the same premiums at 13 cents per bushel. The average acreage per producer was 1000 acres for HES corn priced off of something else and 328 acres for the local cash bid.

Corn Contract Features

Of those farmers responding who were engaged in specialty corn production, 47% used identity-preserved storage, 39% of producers had to deliver on a specific date, 22% of the corn producers were to be delivered on the buyer's call[5], and 2% involved container shipping (Table 2). Yield penalties were included in 9% of the contracts and 1% required bagged product.

- Use of contracts specifying on-farm identity preserved storage ranged from 100% for High-Extractable Starch, Identity Preserved Starch, and Nutria Dense corn to 2% for Seed, 0% for Organic and White Food-grade corn (Figure 19).
- Specification of a delivery date was common on the Identity Preserved Starch (100%), High-Extractable Starch (72%) and Waxy (72%) programs while being least frequent on the High Amylose, Nutri-Dense, or Organic programs (0%).
- Container shipping was not commonly used. It was only used for the

Table 2

Feature Program	Buyer's Call	Specific Date	Yield Penalties	IP Store	Container Ship	Bagged	Other
Hi-Extract Starch	35.6%	72.3%	0.0%	100.0%	0.0%	0.0%	35.6%
High Amylose	60.7%	0.0%	0.0%	60.7%	0.0%	0.0%	60.7%
High Oil	15.4%	63.5%	0.0%	78.8%	0.0%	0.0%	15.4%
Identity Preserved Starch	100.0%	100.0%	0.0%	100.0%	0.0%	0.0%	100.0%
Non-GMO	40.0%	57.6%	0.0%	76.0%	0.0%	0.0%	40.0%
Nutri-Dense	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
Organic	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	21.0%	21.0%	0.0%	42.0%	0.0%	0.0%	21.0%
Seed	4.3%	11.9%	13.7%	2.4%	0.0%	0.0%	4.3%
Waxy	9.3%	72.0%	19.5%	90.7%	0.0%	0.0%	9.3%
White	35.4%	22.9%	0.0%	35.4%	35.4%	0.0%	35.4%
White Food-grade	0.0%	52.4%	52.4%	0.0%	0.0%	26.2%	0.0%
Yellow Food-grade	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Specialty Corn Total	**21.8%**	**38.5%**	**9.4%**	**46.8%**	**1.8%**	**1.1%**	**21.8%**

[5]A buyer's call is when the supplier must deliver a product when contacted by the buyer. Terms may vary whereby suppliers may have a time window into which they must deliver or the delivery place and time may be very specific and immediate. The buyer's call feature entails the supplier holding and managing the inventory. All inventory risk (spoilage, quality and weight changes) and holding cost is born by supplier, unless explicitly compensated by the buyer

White corn program (35%).

- Baggage container was not commonly used. It was only used for the White Food-grade corn program (26%).
- Use of buyer's call ranged from 100% for Identity-Preserved Starch and Nutri -Dense to 0% for Organic and White Food-grade corn programs (Figure 20).

Figure 19. Use of On-Farm Identity Preserved Storage for Specialty Corn (Iowa, 2006)

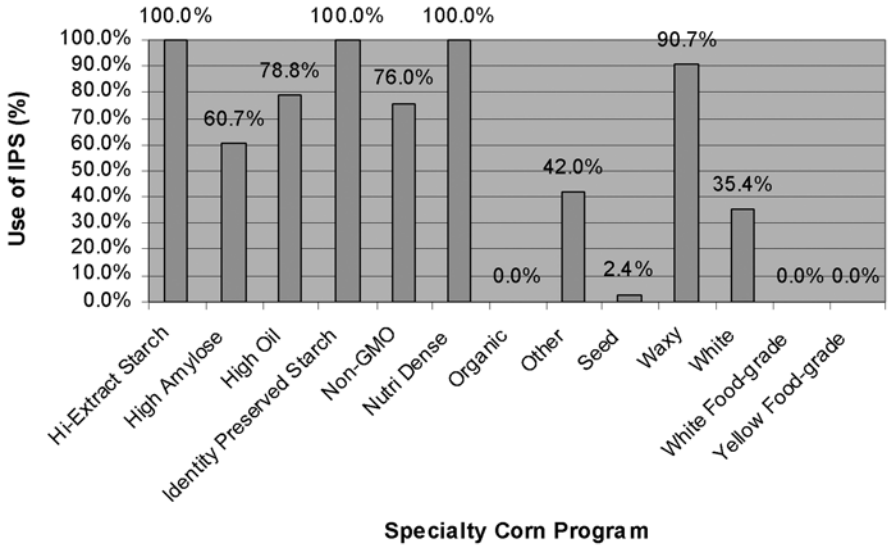
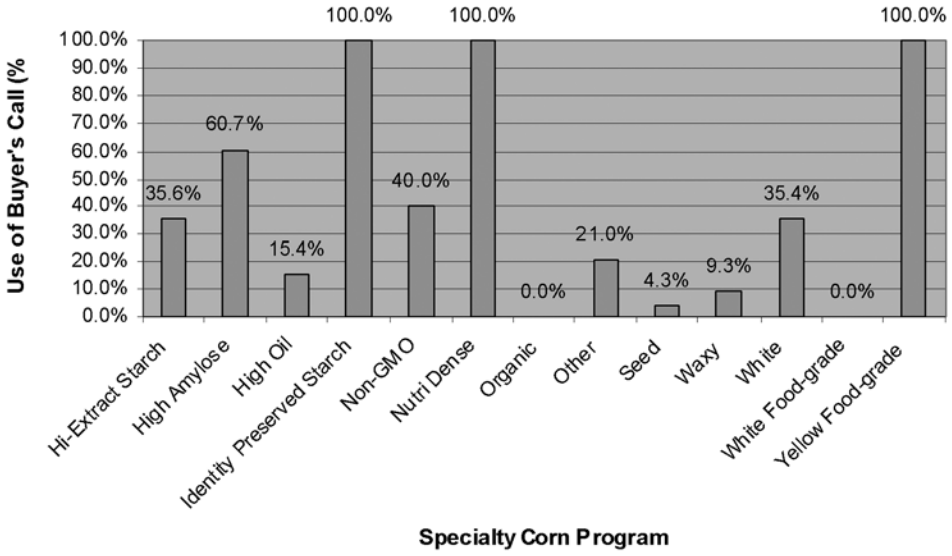


Figure 20. Use of Buyer's Call for Specialty Corn (Iowa, 2006)



Specialty Corn Production by Region

Varietal and hybrid selection vary by location or region as a result of many factors. The three main factors affecting specialty program selection in Iowa are agronomic zone, access to domestic agro-industrial processing facilities, and access to exported-oriented transportation channels. In a favorable agronomic zone, quality and yield are more reliable and thus are critical to both buyer and farmer-supplier profitability. Access to a local agro-industrial facility reduces transportation costs and allows buyers to work closely with farmer-suppliers.

The Iowa Agricultural Statistics Service divides Iowa into nine agricultural statistics districts for presenting statistical information on crops and livestock. The districts are designated as follows:

1. North West (NW)
2. North Central (NC)
3. North East (NE)
4. West Central (WC)
5. Central (C)
6. East Central (EC)
7. South West (SW)
8. South Central (SC)
9. South East (SE)

Specialty corn production in Iowa is less regionally concentrated than is the case for soybeans. Half of the activity is in the north central and eastern part of the State. The three leading corn specialty regions are: Central (23%), North East (17%), and East Central (14%) (Figure 21).

The leading specialty corn program is seed corn with an estimated 149,584 acres. Two thirds of these acres are located in two regions; the Central and West Central (Table 3). Waxy corn production is the second largest program. Most of its production is located in the East Central (43%) and North West (30%) regions of the State (Table 4). Finally the third largest program is Non-GMO production with 51,168 acres estimated. Over 80% of the production occurs in two regions, the South East (52%) and the North East (33%) (Table 5).

The other specialty corn programs reveal distinct regional features even though they were not produced in abundance (Appendix 2). Over 97% of the white corn production occurs in the South West. The IP starch production was identified in the North East Region. While almost a third of the high-oil production takes place in the South East. The High Amylose acres are in the North East, while the Nutri-Dense corn is located in the East Central Region. Over 80% of white food grade corn took place in the South West and East Central regions, while all yellow-food grade production took place in the South West. Organic production was estimated at less than 1,000 acres, and was split between the North East and the South East Regions.

Figure 21. Specialty Corn Production By Region: Iowa 2006

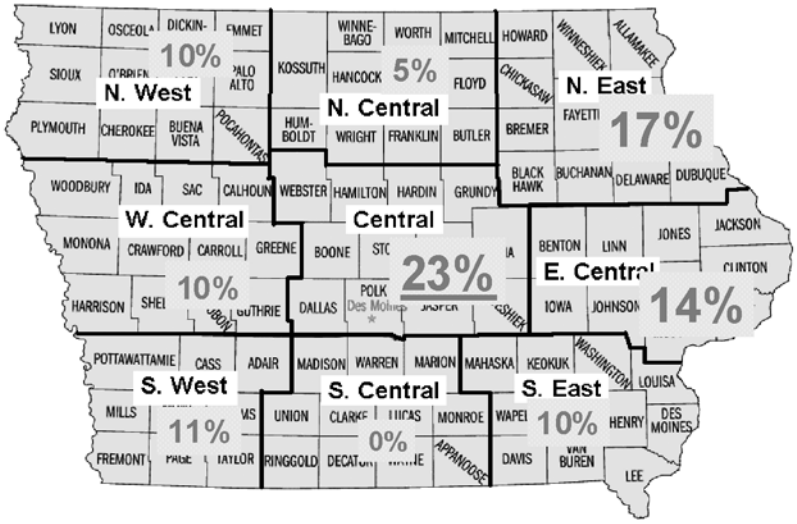


Table 3. Regional Corn Seed Production (Iowa 2006)

Region	% of Total	Total Acres
1. N. West (NW)	16.8%	25,102
2. N. Central (NC)	0.0%	
3. N. East (NE)	4.6%	6,899
4. W. Central (WC)	22.7%	33,936
5. Central (C)	43.3%	64,705
6. E. Central (EC)	10.2%	15,217
7. S. West (SW)	0.0%	
8. S. Central (SC)	0.0%	
9. S. East (SE)	2.5%	3,725
Iowa 2006 Total	**100.0%**	**149,584**

Table 4. Regional Waxy Corn Production (Iowa 2006)

Region	% of Total	Total Acres
1. N. West (NW)	29.9%	18,369
2. N. Central (NC)	7.2%	4,437
3. N. East (NE)	0.7%	403
4. W. Central (WC)	4.7%	2,863
5. Central (C)	14.2%	8,718
6. E. Central (EC)	43.4%	26,700
7. S. West (SW)	0.0%	
8. S. Central (SC)	0.0%	
9. S. East (SE)	0.0%	
Iowa 2006 Total	**100.0%**	**61,490**

Table 5. Regional Non-GMO Corn Production (Iowa 2006)

Region	% of Total	Total Acres
1. N. West (NW)	0.0%	
2. N. Central (NC)	0.0%	
3. N. East (NE)	32.5%	16,641
4. W. Central (WC)	0.0%	
5. Central (C)	0.0%	
6. E. Central (EC)	15.7%	8,029
7. S. West (SW)	0.0%	
8. S. Central (SC)	0.0%	
9. S. East (SE)	51.8%	26,497
Iowa 2006 Total	**100.0%**	**51,168**

Conclusion and Strategic Implications

The survey provides the industry and policymakers with a good assessment of the state of specialty soybean and corn markets. These markets have been under development for almost ten years, and activity has leveled off. Growing bioenergy markets have now cut into specialty corn production as commodity prices have risen, and by doing so have reduced the incentives for farmers to switch to cropping alternatives. Economists call this the wealth effect. When incomes rise, the marginal value of increasing income, and willingness to accept risk associated with that income, decreases. The second reason is that commodities, not specialties, are the current feedstock of choice for bioenergy. Specialty attributes targeting the bioenergy sector may emerge in the future, but as of now commodities are the preferred input.

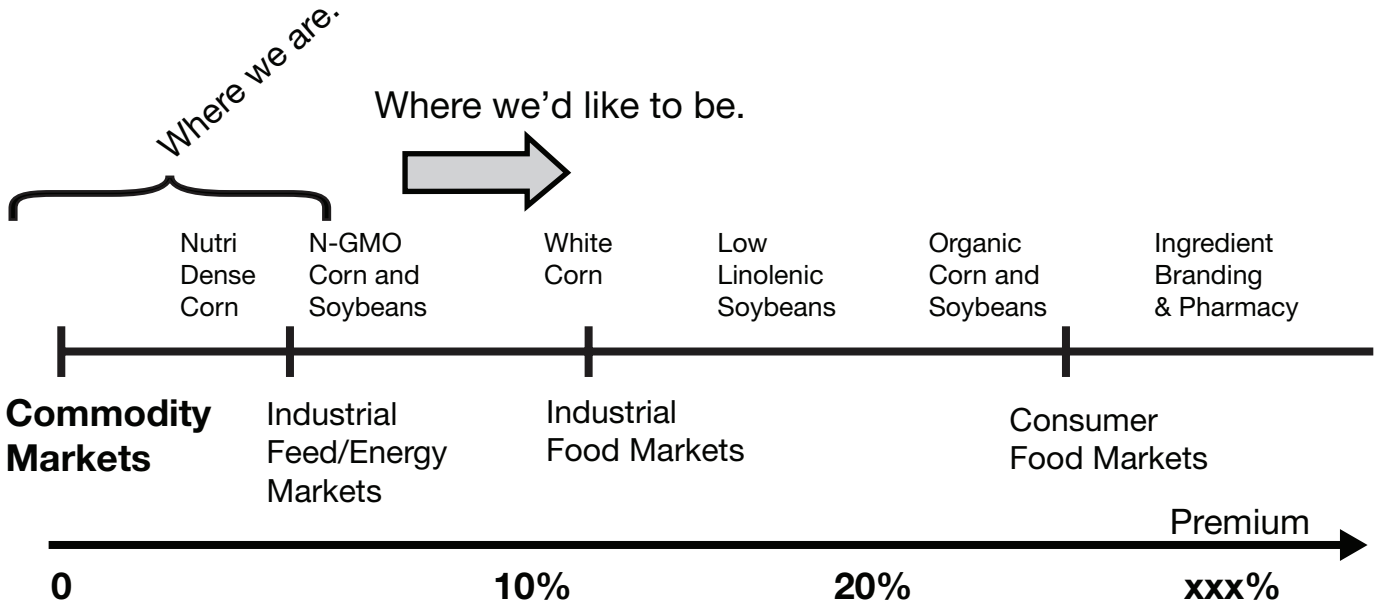
The goal for value-adding in the agriculture is to move toward higher value activities, such as those that command premiums. In 2006 the State of Iowa earned $34 million in corn and soybean premiums or .35% on top of a $9.6B crop. So by in large most buyers of Iowa corn and soybeans prefer commodity inputs compared with specialties. Buyers, who are primarily industrial buyers, still have not found sufficient value in greater supply coordination or more narrowed supply bases for which contracts are employed. The spot market continues to serve them satisfactorily.

Value-adding in industrial markets is different than in consumer markets (Figure 22). There are large commodity and synthetic suppliers that produce many of the same attributes found in specialty markets, e.g., oil, protein, and starch. Opportunities for differentiation in industrial grains and oilseeds are more difficult because of the existence of the competing attributes in the marketplace. Delivering single attribute products such as high oil corn or low saturated fat soybeans may be insufficient to attract many buyers away from the value proposition found in commodity or synthetic markets. Certainly as one moves more toward the food and consumer end of the continuum (left to right in Figure 22) there is greater potential for higher premiums and single attribute marketing models. Low Linolenic soybeans are a good example. Zero transfats have made it onto all consumer food product label and there are few competiting alternatives.

Unfortunately most soybeans and corn are utilized for industrial applications, such as fuel or feed, and thus are far distant from a consumer label. Industrial customers generally don't buy on one attribute. So in response, industrial suppliers orient their offer toward bundles and services as a way to provide solutions to their industrial buyers. For example, effectively supplying more fermentable starch to ethanol processors may be an important priority and an opportunity for corn producers. Is there a role for specialties? There might be if suppliers can bundle supply risk reduction and regular delivery throughout the year, along with a high starch specialty corn product. Because grains and oilseeds are generally a low-valued good, and industrial buyers will always be price sensitive. The challenge for the grain/oilseed industry is adding product and service value without adding (much) cost.

Finally, complicating the value creation process is that agricultural sellers, as opposed to most other industrial suppliers, generally don't measure the attributes they

Figure 22. Industrial Consumer Marketing Continuum



produce and buyers value; such as protein, oil, amino acids, fatty acids, and starch. The lack of measurement by suppliers contributes to the variability of attributes and uncertainty facing buyers. Variability of the inbound feedstock quality creates uncertainty for buyers, which in turn creates manufacturing systems that are not highly sensitive to quality.

There may thus be an opportunity for strategic investments in low cost per-unit and broadly applicable tools that help grain suppliers measure the attributes they are marketing. Investments in information and measurement technologies, which historically have been lacking, may be an important missing component for releasing the real value of specialty grain production.

The broad term for information and measurement technologies associated with grain attributes is called grain informatics. Grain informatics is a burgeoning new research and investment area that focuses on the collection (much of it automated), management, and analysis of grain quality data. Real-time protein maps of fields and amino acid, fatty acid, and starch profiles are some of the exciting new capabilities available to specialty grain producers and marketers. Such technologies and the resulting information help agricultural suppliers to:

1) better understand how their businesses affect grain attributes levels;
2) better market the attributes they produce and/or sell; and
3) better service the needs of their customers.

Appendix 1.

Iowa Specialty Soybean and Corn Survey

February 2007

A sample of 5,000 Iowa farm operations with soybean and/or corn acreage was chosen for the survey as follows:

Strata	Corn/Soybean Acres	Population	Acres	Sample Size
1	1-199	25,344	2,126,211	1,210
2	200-499	15,585	5,039,029	1,100
3	500-999	9,713	6,739,004	1,100
4	1,000-1,999	4,311	5,655,933	918
5	2,000-6,999	904	2,442,437	650
6	7,000 +	22	208,881	22
Total		**55,879**	**22,211,495**	**5,000**

Mid-February, a questionnaire and return envelope were mailed to each operation that was chosen for the survey. A follow-up mailing was sent three (3) weeks later to those not responding to the initial mailing. This was then supplemented by telephone data collection. The final data set had 2,369 reports (47.4% of the sample). This dataset does not include refusals or inaccessible operations.

Each questionnaire was manually reviewed prior to data entry. Following data entry, a machine edit checked for within questionnaire consistency.

Sampling weights were adjusted for non-response. Weights were created such that the sum of the weighted soybean and corn acres equal the NASS published harvested acre estimates for Iowa.

Appendix 2.

Regional Breakdown of Specialty Corn Production (Iowa 2006)

(% of Regional Total)

	NW	NC	NE	WC	C	EC	SE	SC	SE	Total
Hi-Extract Starch	0.0%	76.3%	18.8%	0.0%	0.0%	12.2%	7.9%	n/a	12.9%	11.0%
High Amylose	0.0%	0.0%	2.2%	0.0%	0.0%	0.0%	0.0%	n/a	0.0%	0.4%
High Oil	0.0%	3.8%	2.2%	0.0%	5.4%	0.0%	0.0%	n/a	26.1%	4.7%
Identity Preserved Starch	0.0%	0.0%	25.3%	0.0%	0.0%	0.0%	0.0%	n/a	0.0%	4.3%
Non-GMO	0.0%	0.0%	21.9%	0.0%	0.0%	12.5%	0.0%	n/a	52.1%	11.3%
Nutri Dense	0.0%	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%	n/a	0.0%	0.6%
Organic	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	n/a	0.9%	0.1%
Other	2.4%	0.0%	19.8%	15.6%	21.1%	0.0%	0.0%	n/a	0.0%	9.9%
Seed	56.3%	0.0%	9.1%	77.9%	63.1%	23.7%	0.0%	n/a	7.3%	33.1%
Waxy	41.3%	19.9%	0.5%	6.6%	8.5%	41.6%	0.0%	n/a	0.0%	13.6%
White	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	76.9%	n/a	0.0%	8.3%
White Food-grade	0.0%	0.0%	0.0%	0.0%	1.1%	5.9%	12.5%	n/a	0.7%	2.5%
Yellow Food-grade	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	n/a	0.0%	0.3%
Specialty Corn Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**n/a**	**100.0%**	**100.0%**

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