

**2000**  
**Precision Agricultural Services  
and Enhanced Seed  
Dealership Survey Results**

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## 2000 Precision Agricultural Services and Enhanced Seed Dealership Survey Results

### Introduction

The “Precision Revolution” has been underway for at least a decade now. And, over that decade, precision technologies have become more standardized, growers have become more knowledgeable about what they’re looking for from their dealers, and dealerships have been fine-tuning their strategies in the precision arena. The adoption of precision services has continued at a steady pace as both growers and dealerships determine where precision adds value. However, after several years of such steady growth, it appears that precision services took a bit of a ‘breather’ in 1999, with precision offerings and demand pegged at or slightly below year-earlier levels. Given a year racked with uncertainty over GMOs and a year marked by extremely low commodity prices, such a pause in the long-term growth of the use of precision products and services is not a major surprise.

This year marked the 5<sup>th</sup> annual Precision Agriculture and Enhanced Seed Dealership Survey sponsored by *Farm Chemicals* magazine and Purdue University’s Center for Agricultural Business. As in previous years, the survey was designed to gain a better understanding of who is adopting precision technologies and how quickly they’re adopting. In addition, the survey also polled the industry as to future prospects for precision – prospects that were clouded in 1999 by some difficult market conditions.

The survey was conducted in January and February 2000 and the questionnaire was sent to 2500 retail agronomy dealerships across the US. A second questionnaire was mailed to everyone approximately two weeks after the first one as a reminder to complete it and send it back. (See the Appendix I to this report for a copy of the questionnaire.) A total of 558 questionnaires were returned and usable, providing a 22 percent response rate. This response rate was considerably higher than the response rate in recent years. While the response rate was lower than that obtained in the first year, when precision agriculture was still a new concept (38 percent response in 1996), the 2000 response was higher than the 1997 and 1999 response rates of 16 percent and 19 percent, respectively. (Note that the survey in 1998 reflected a different sampling structure as specific “precision leaders” were surveyed and therefore 1998 results cannot be directly compared with those of other years.)

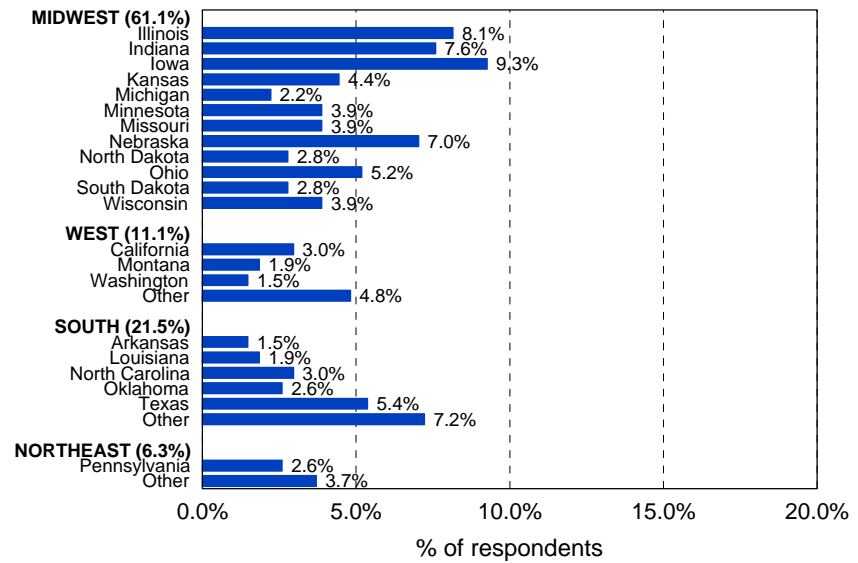
Survey participants were asked a wide range of questions. Some of these included: the types of precision services the dealerships were currently offering and their future plans for offering these services; the fees they were charging for the services they were offering; how quickly their customers were adopting precision agricultural practices; whether or not they were offering enhanced seed; and what impact they expected enhanced seed to have on their business in the future. Most of the questions were worded similarly to those questions asked in previous years.

## The Respondents

The Midwest was heavily represented in the distribution of respondents, with six out of ten of the respondents from the Midwest states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North and South Dakota, Ohio and Wisconsin (Figure 1). Just over 21 percent were from the South, 11 percent were from the West and 6 percent were from the Northeast. This reflects a higher proportion of respondents from the South and fewer from the Midwest than were represented in the 1999 survey.

Figure 1. States Represented

Figure 1. States Represented

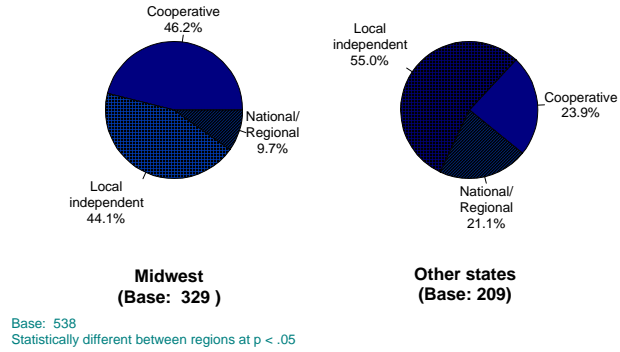


Base: 540

Responding dealerships represented a wide variety of organizational types with almost half local independents (49 percent), while 37 percent were cooperative dealerships, and the remaining 14 percent were part of a national or regional chain of dealerships. Compared to 1999, this represents significantly more local independents (45 percent in 1999) and fewer cooperatives (41 percent in 1999). As in previous years, cooperatives were more heavily represented in the Midwest than in the other states, with just under half of the Midwestern respondents from cooperative firms compared to only 24 percent outside the Midwest (Figure 2). Correspondingly, the proportion of local independent respondents was much higher outside the Midwest (55 percent) relative to the proportion of such dealerships in the Midwest (44 percent).

Figure 2. Organization Types by Region

Figure 2. Organization Types by Region



The size of the responding dealerships ranged from one outlet (46 percent of the respondents) to more than 25 outlets (15 percent of the respondents). Across regions, non-Midwest dealerships tended to have only one outlet (47 percent) or over 25 outlets (23 percent) while dealerships in the Midwest were a bit more evenly dispersed (Figure 3). As expected, the local independents were much smaller in terms of number of outlets than either cooperatives or national/regional dealerships. In the Midwest, 94 percent of the local independent dealerships had 5 or fewer outlets compared to 65 percent of the cooperatives and only 9 percent of the national/regional dealerships (Figure 4).

Figure 3. Number of Outlets Owned or Managed by Region

Figure 3. Number of Outlets Owned or Managed by Region

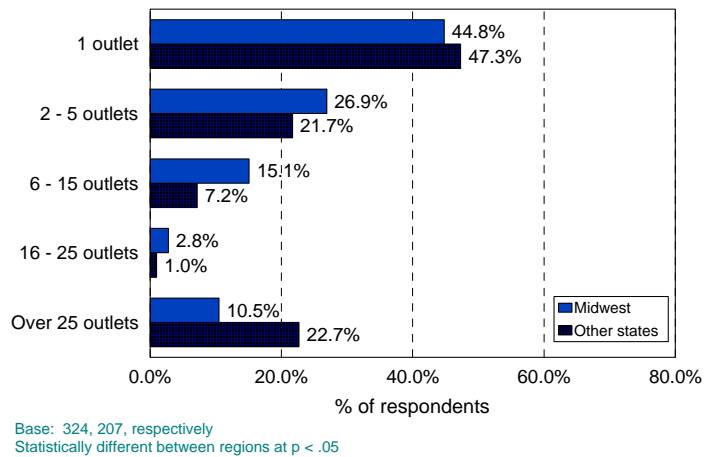


Figure 4. Number of Outlets Owned or Managed by Organization Type in the Midwest

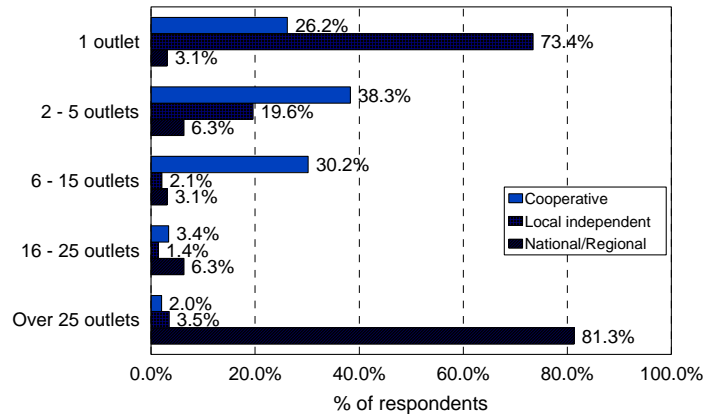


Figure 4. Number of Outlets Owned or Managed by Organization Type in the Midwest

Base: 149, 143, 32, respectively  
Statistically different between organizational types at  $p < .05$

There was also a range of individual location sizes represented by the respondents, though overall, the respondents were slightly smaller than they were in 1999. Of this year's respondents, 22 percent had 1999 annual agronomic sales of less than \$1 million at their location (compared to 18 percent of the 1999 respondents) while 19 percent had \$5 million or more in agronomic sales. Sales at individual locations varied by region, with those in the Midwest more heavily weighted to agronomic sales of \$1 to \$2 million, while outside the Midwest, respondents tended to be more heavily weighted to each end of the spectrum with just over a quarter having annual agronomic sales under \$1 million at their location and almost a quarter having over \$5 million in annual agronomic sales (Figure 5). Across organization types in the Midwest, local independents tended to be the smallest dealerships with only 20 percent having agronomic sales over \$3 million compared to over a third of the cooperatives. Again, these numbers reflect significantly smaller individual locations than respondents of the 1999 survey, especially for local independents.

Figure 5. Total 1999 Annual Agronomic Sales at Location by Region

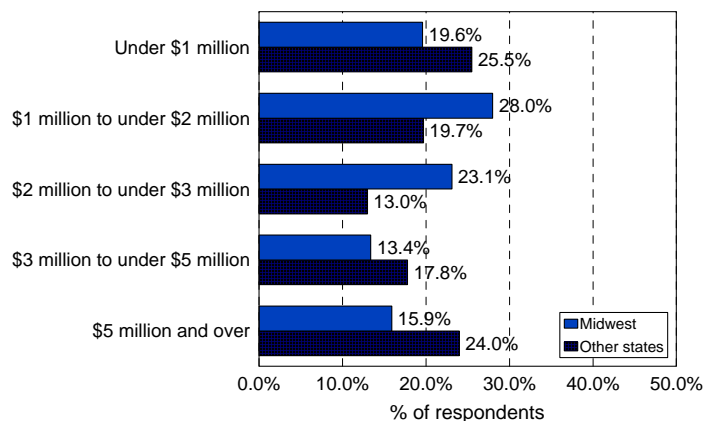


Figure 5. Total 1999 Annual Agronomic Sales at Location by Region

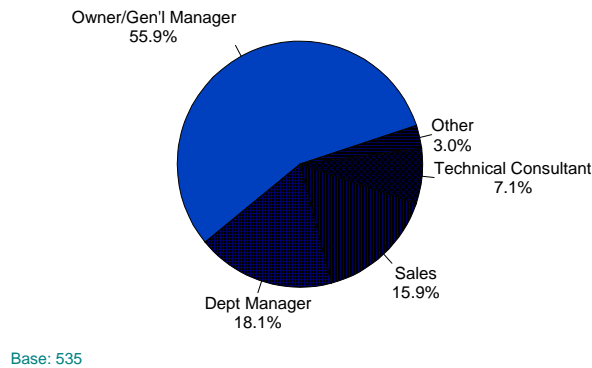
Base: 321, 208, respectively  
Statistically different between regions at  $p < .05$



The outlet's owner/manager completed the questionnaire over half of the time (56 percent), followed by departmental managers (18 percent), and sales personnel (16 percent) (Figure 6). The owner/manager was more likely to complete the questionnaire for the local independents and national/regional outlets, while departmental managers were more likely to complete the questionnaire for the cooperatives.

**Figure 6. Responsibility of Survey Respondent**

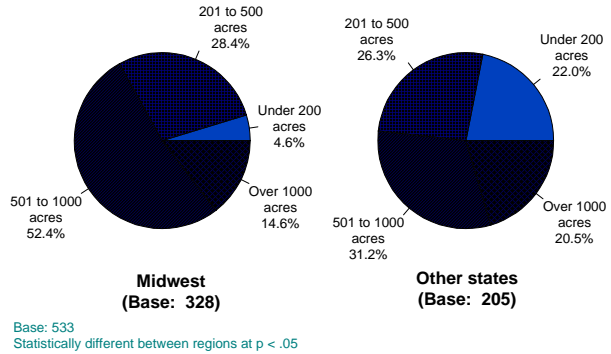
Figure 6. Responsibility of Survey Respondent



To better understand the size of growers in the dealerships' markets, respondents were asked for the average size (in acres) of their customers. Almost two-thirds of the respondents said their average customer farmed more than 500 acres (61 percent) with 17 percent indicating their average customer farmed more than 1000 acres. As expected, the average customer size varied greatly across the geographic regions. Over half of the respondents in the Midwest said their average customer farmed between 501 and 1000 acres (52 percent) whereas average customers for dealerships in other (non-Midwest) states were more evenly divided among the four size categories (Figure 7). In the Midwest, there were some statistical differences across organizational types, with national/regional outlets more likely than other types to serve customers with 501 to 1000 acres (75 percent of the national/regional outlets responding) while local independents were significantly more likely than the other respondents to say their customers farmed 500 acres or less (39 percent compared to 31 percent of the cooperatives and 13 percent of the national/regionals).

Figure 7. Average Customer Size by Region

Figure 7. Average Customer Size by Region



### *Statistically Weighting the Data*

Several factors combined to make the 2000 survey results not directly comparable to the 1999 survey results. First, due to the timing of when the questionnaire was mailed (2 weeks earlier in 2000) and a few modifications to the survey instrument, the response rate was considerably higher in 2000 relative to 1999. Also, the 2000 sample was more heavily weighted toward the South than in previous years, and there was also a greater proportion of smaller, local independents in the 2000 sample. Consequently, to make the 2000 results comparable with the 1999 results, the 2000 results were statistically weighted to reflect the same percentages of outlet sizes, organizational types, and geographic locations as the 1999 data. See Appendix II for the statistical weightings used to do this. All remaining statistics in this report reflect data that have been weighted back to the 1999 sample composition to make the results more directly comparable.

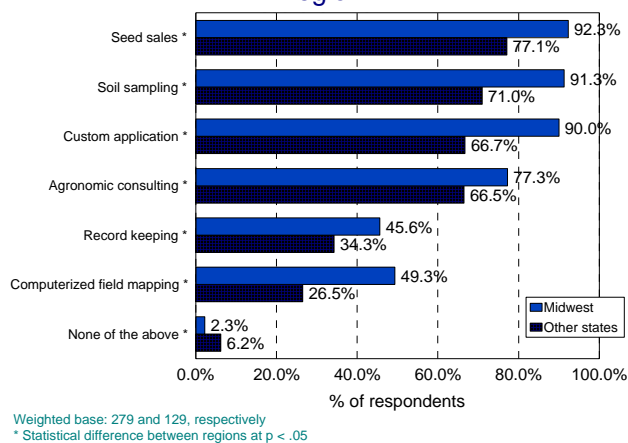
## Traditional Services Currently Offered by Respondents

The most common traditional agronomic services offered by the responding dealerships were seed sales and soil sampling (88 and 85 percent of the respondents, respectively). Custom application was also offered by 83 percent of the respondents while almost three-quarters of the respondents offered some form of agronomic consulting (74 percent). Only 4 percent of the respondents did not provide at least one of the traditional agronomic services listed on the questionnaire. All of these service offerings varied statistically by region and were most commonly offered in the Midwest where only 2 percent of the respondents did not offer at least one of the traditional services compared to 6 percent in the other non-Midwestern states (Figure 8). Both cooperatives and national/regional dealerships were more likely to offer traditional agronomic services than were local independents.

Compared to the 1999 results, the only traditional service to change significantly in offerings was record keeping, dropping from 48 percent of the respondents offering the service in 1999 to 42 percent in 2000.

Figure 8. Traditional Agronomic Services Offered by Region

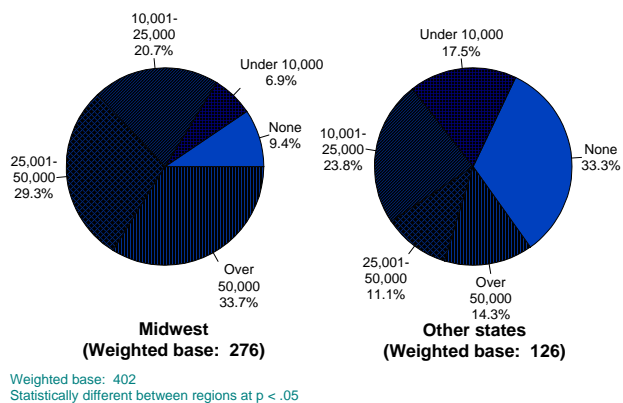
Figure 8. Traditional Agronomic Services Offered by Region



Looking at custom application in more detail, over half of the respondents custom applied more than 25,000 acres per year. (Custom application here is defined as dealership application of fertilizer, pesticides, and/or seed.) Across the US, however, custom application was most common in the Midwest where 91 percent of the respondents offered custom application services compared to 67 percent of the respondents from other states (Figure 9). Though custom application was offered by most of the responding dealerships, there were significant differences by organizational type in the Midwest. Ninety-six percent of the cooperatives and 90 percent of the national/regional dealerships offered custom application, compared to only 83 percent of the local independent dealerships.

Figure 9. Acres Custom Applied by Region

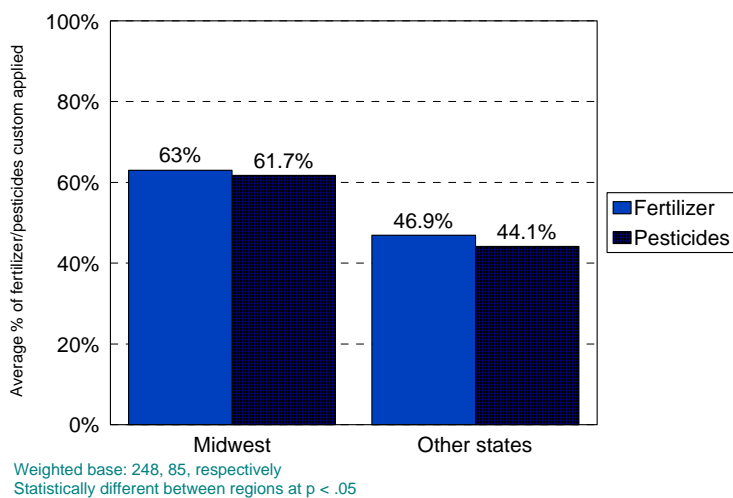
Figure 9. Acres Custom Applied by Region



When asked specifically about custom application of fertilizer versus pesticides, respondents custom applied a slightly greater proportion of fertilizer than pesticides. On average, respondents from the Midwest applied 63 percent of the fertilizer and 62 percent of the pesticides they sold (Figure 10). Those from non-Midwestern states applied just under half of the fertilizer they sold (47 percent) and 44 percent of the pesticides. This did not vary across organizational types in the Midwest.

Figure 10. Custom Application of Fertilizer and Pesticides by Region

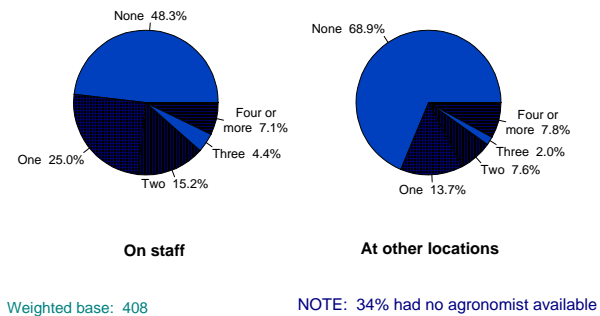
Figure 10. Custom Application of Fertilizer and Pesticides by Region



To support these services, many dealerships had agronomists available, either full-time on staff or shared with other locations. On average, the respondents had 1.2 full-time agronomists available on staff and shared an average of approximately one agronomist with other locations (1.0). Just over half of the responding dealerships had at least one full-time agronomist on staff at their location (52 percent) (Figure 11), however several of those with no full-time agronomist at their location did have one available for their use at another location. Only a third of the respondents had no full-time agronomist available to them at all. Company type had a major impact on sharing agronomists across locations. Midwestern cooperatives were more likely to have agronomists available on staff as well as being more likely to have agronomists available to share between locations than were national/regional dealerships or local independents (Figure 12).

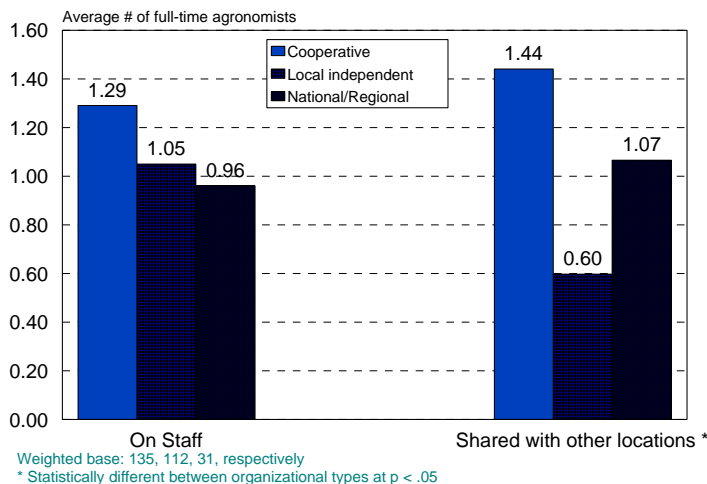
**Figure 11. Full-time Agronomists Available**

**Figure 11. Full-time Agronomists Available**



**Figure 12. Full-time Agronomists Available by Organization Type in the Midwest**

**Figure 12. Full-time Agronomists Available by Organization Type in the Midwest**



## Use of Precision Technologies and Offerings of Site-Specific Services

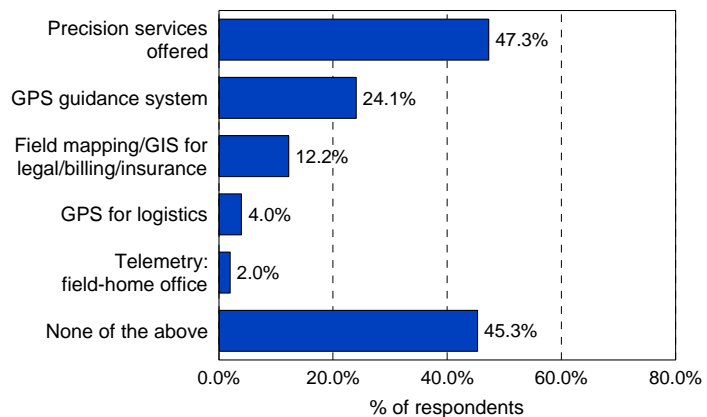
Respondents were asked several questions about their use of precision technologies, which site-specific services they were currently offering (or would be offering by the fall of 2000), which ones they were planning to add in 2001 or 2002, and which site-specific services they didn't know when, or if, they would add. The following figures compare the 2000 survey results for current and expected precision technology use and service offerings with results from the 1999 survey where possible.

### *Use of Precision Technologies*

For the first time, this year's questionnaire included a broader question about how dealerships were using precision technologies in their dealerships – from offering their customers precision/site-specific services to using precision technologies internally for guidance systems, billing/insurance/legal activities, logistics management, or field-to-home office communications (Figure 13). Over half of the respondents used precision technologies for some purpose (55 percent) with 47 percent offering their customers at least one precision service. Almost a quarter were using GPS (Geographical Positioning System) guidance systems while custom applying uniform rates of fertilizer and chemicals to reduce skips and overlaps. Twelve percent were using field mapping with GIS (Geographical Information Systems) to document work for billing/insurance/legal purposes. Only 4 percent said they were managing vehicle logistics with GPS and only 2 percent (all of them cooperatives and national/regional organizations) were using telemetry to send field information from the field to the home office.

Figure 13. Use of Precision Technology

Figure 13. Use of Precision Technology

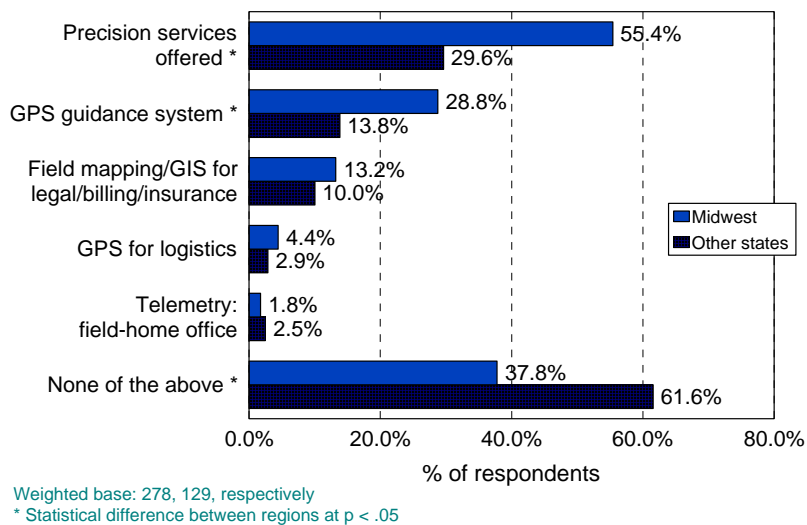


Weighted base: 407

Precision technologies were being used to offer precision services and for GPS guidance systems by significantly more dealerships in the Midwest than in non-Midwestern states (Figure 14). Well over half of the Midwestern respondents offered precision services (55 percent) compared to only 3 out of 10 of the non-Midwestern respondents. GPS was used as a guidance system by 29 percent of the Midwestern dealerships compared to only 14 percent of the non-Midwestern respondents. In the Midwest, there were few significant differences by organizational types – the proportion of dealerships offering precision services was the only area where there were significant differences. Almost three-quarters of the national/regional dealerships offered precision services (73 percent) compared to 58 percent of the cooperatives and less than half of the local independents (47 percent). There were no significant differences among the other uses of precision technologies across the organizational types.

**Figure 14. Use of Precision Technology by Region**

**Figure 14. Use of Precision Technology by Region**

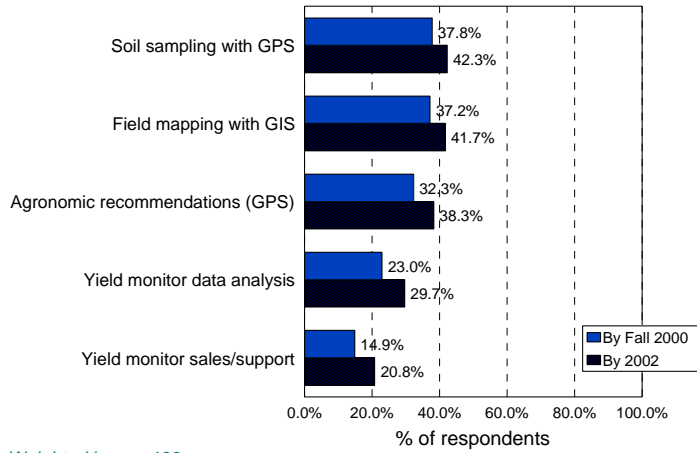


### ***Soil Sampling, Field Mapping and Yield Monitors***

The most common precision service offered by these dealerships in 2000 was soil sampling with GPS. By the end of 2000, 38 percent of the respondents said they would be offering soil sampling with GPS (Figure 15). By 2002, this was expected to grow to 42 percent of the respondents. The current and projected offerings of this service were actually down slightly from the 1999 survey results. Such a decline may be due to several reasons. A few dealerships may have actually dropped this service (more likely for those dealerships outsourcing this service to an outside contractor); the decline may reflect dealerships not rolling out this service as planned for the fall of 1999 due to the previously mentioned challenges in the market environment; or some of this difference may simply be due to differences in who responded to the survey in 2000. (Note that even statistical weighting cannot correct for differences in survey respondents from year to year.)

**Figure 15. Precision Ag Services/Technologies Offered: Soil Sampling, Field Mapping and Yield Monitors**

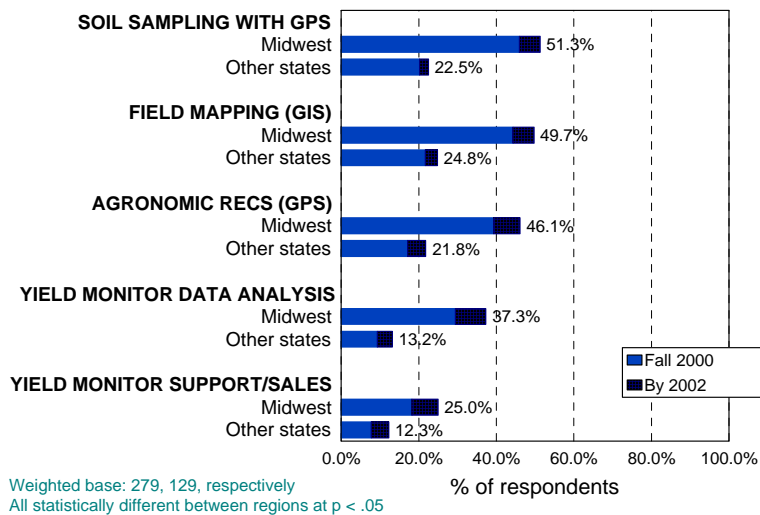
**Figure 15. Precision Ag Services/Technologies Offered  
Soil Sampling, Field Mapping and Yield Monitors**



Soil sampling with GPS was significantly more likely to be offered in the Midwest than in other states – by the fall 2000, 46 percent of the responding dealerships from the Midwest indicated they would be offering this service compared to 20 percent in the other states (Figure 16). In the Midwest, soil sampling with GPS was also far more likely to be offered by national/regional dealerships and cooperatives relative to local independents (Figure 17).

**Figure 16. Soil Sampling, Field Mapping and Yield Monitors Offered by Region**

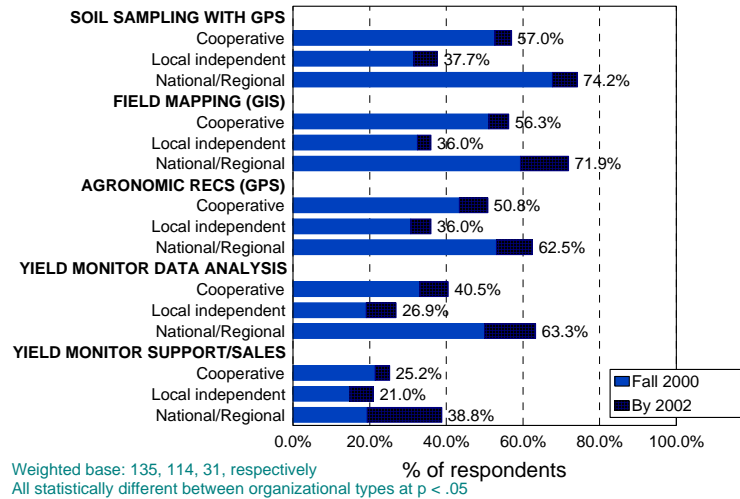
**Figure 16. Soil Sampling, Field Mapping and Yield Monitors Offered by Region**





**Figure 17. Soil Sampling, Field Mapping and Yield Monitors Offered by Organization Type in the Midwest**

**Figure 17. Soil Sampling, Field Mapping and Yield Monitors Offered by Organizational Type in the Midwest**

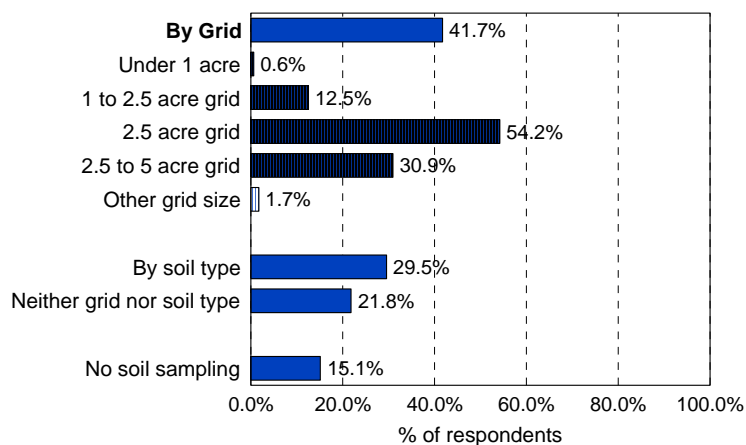


When asked what type of soil sampling they offered – by grid or by soil type – most of those offering soil sampling with GPS were sampling by grid, with over half using a 2.5 acre grid (Figure 18). Sampling by soil type was used by 30 percent of the respondents. Only 22 percent of the respondents offered soil sampling (with or without GPS) but did not offer it either by soil type or by grid. Some of those respondents did say they used other methods for determining where to sample soil – by field history, by satellite imagery, or by some other management technique – though this was less common than in previous years.

Those in the Midwest were more likely than other dealerships to sample by grid (50 percent versus 24 percent of the respondents in other states). Within the Midwest, national/regional organizations and cooperatives were more likely to sample by grid than the local independents (65 percent of the national/regional organizations and 56 percent of the cooperatives offered grid sampling versus 39 percent of the local independents). With respect to grid size, those outside the Midwest were more likely to use smaller grids than those in the Midwest, potentially because they were soil sampling for different crops.

Figure 18. Soil Sampling

Figure 18. Soil Sampling



Weighted base: 406

Another popular precision service offering was field mapping with GIS – to be offered by over a third of the respondents by fall of 2000 (37 percent). This is similar to the numbers offering the service in 1999, showing little growth over the previous year. By 2002, 42 percent of the respondents said they would be offering some type of field mapping (Figure 15). GIS field mapping was most common in the Midwest (44 percent versus 22 percent elsewhere, Figure 16) and for both cooperatives and national/regional organizations (Figure 17).

Yield monitors often represent the first step into the precision agricultural arena for farmers. Hence, dealerships often get involved in this area as well – either in the form of sales/rental/support of the units or else through the analysis of the resulting yield data. These areas also showed little growth from 1999 to 2000. By the end of 2000, just under a quarter of the respondents said they would offer yield monitor data analysis, with 42 percent planning to offer it by the end of 2002 (Figure 15). A smaller group offered yield monitor sales/rental/support services with only 15 percent saying they would be offering the service by the end of 2000, down from the 20 percent who said they would be offering this service by the end of 1999.

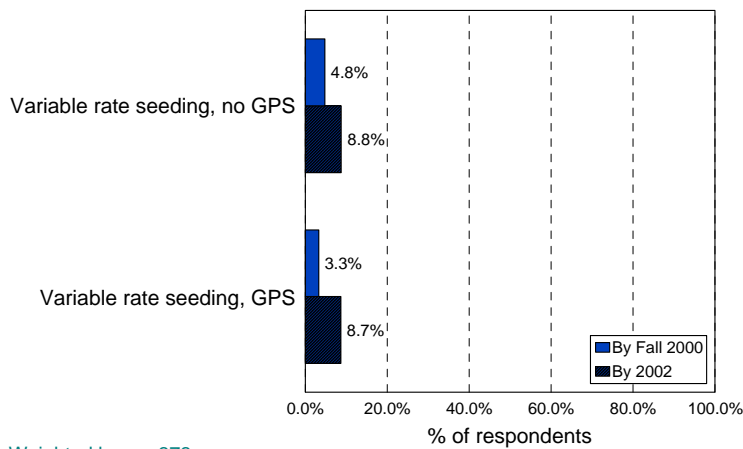
Yield monitor data analysis and yield monitor sales/support were again more common in the Midwest relative to the other states (Figure 16). Three out of ten of the responding dealerships in the Midwest offered yield monitor data analysis compared to 9 percent in non-Midwest states. Again, national/regional organizations were significantly more likely to offer both yield monitor data analysis and yield monitor sales/support/rental services than other organizations (Figure 17).

## Variable Rate Seeding

Variable rate seeding continues to be an area where dealerships show less interest compared to other precision technologies, although some dealerships expect to add the service in the future. Less than 10 percent of the responding dealerships offered variable seeding, either with or without GPS in 2000 (Figure 19). However, variable seeding without GPS was expected to almost double by 2002 and variable seeding with GPS was expected to almost triple by 2002 to 9 percent of the dealerships. These numbers were virtually identical to the expectations respondents had in 1999. Variable rate seeding was more common in the Midwest than in other states but there were no significant differences by organizational type (Figures 20 and 21).

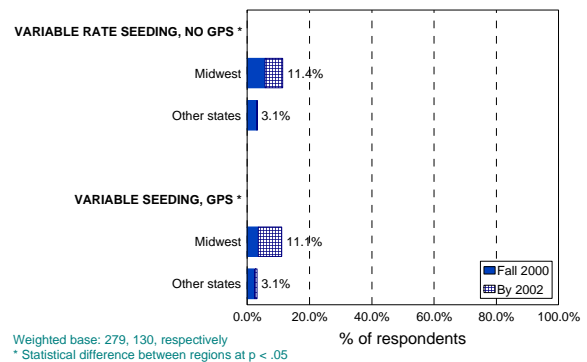
**Figure 19. Precision Ag Services/Technologies Offered: Variable Rate Seeding**

Figure 19. Precision Ag Services/Technologies Offered  
Variable Rate Seeding

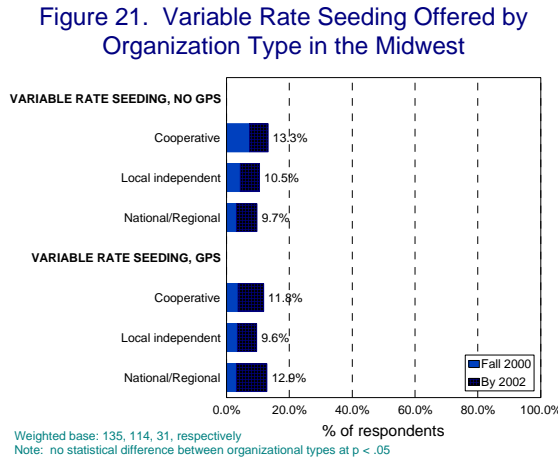


**Figure 20. Variable Rate Seeding Offered by Region**

Figure 20. Variable Rate Seeding Offered by Region



**Figure 21. Variable Rate Seeding Offered by Organization Type in the Midwest**



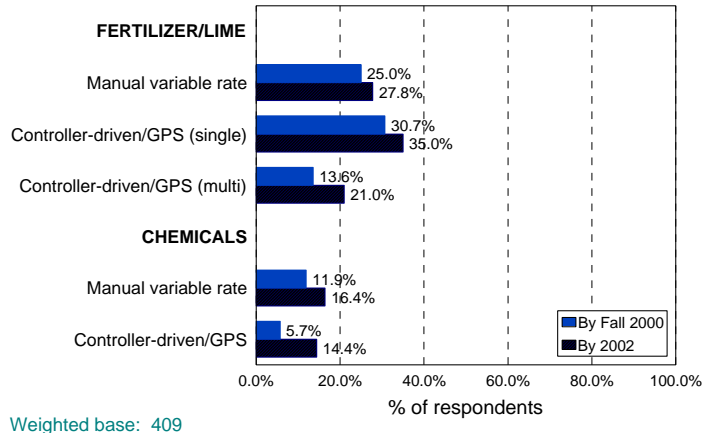
***Variable Rate Application***

Among this group of dealerships, variable rate custom application services were often provided along with traditional custom application. Of the 83 percent who offered any custom application, 48 percent of them expected to offer some type of variable rate application by the end of 2000 (including manual variable rate application), with over half planning to offer some type of variable rate application by the year 2002 (54 percent).

Unlike previous years, this year’s questionnaire specifically separated variable rate application of fertilizer/lime and chemicals. Figure 22 shows the use of variable rate application by the fall of 2000 and expected use by 2002. Three out of 10 of the respondents offered some form of controller-driven application of fertilizer/lime – either single nutrient or multi-nutrient application – and/or chemicals. Single nutrient controller-driven application of fertilizer/lime was the most common, with 31 percent of the respondents expecting to offer the service by the fall of 2000, growing to 35 percent by 2002 (Figure 22). Multi-nutrient controller-driven application of fertilizer/lime was also expected to continue to grow, from 14 percent of the respondents offering the service by the fall of 2000 to 21 percent expecting to offer it by 2002.

**Figure 22. Precision Ag Services/Technologies Offered:  
Variable Rate Application**

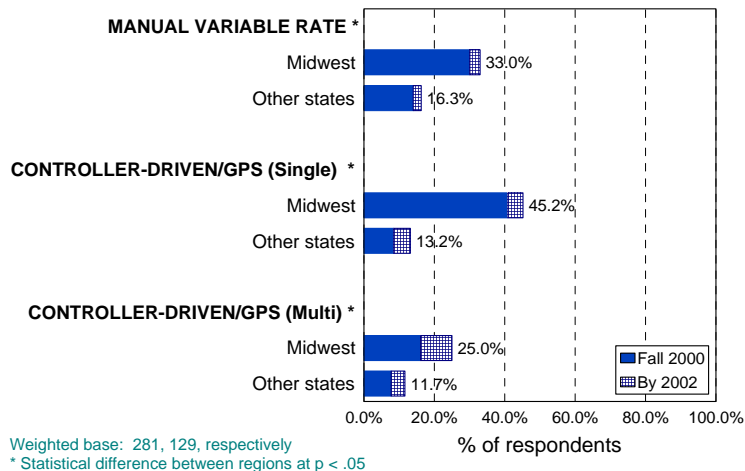
**Figure 22. Precision Ag Services/Technologies Offered  
Variable Rate Application**



Controller-driven variable rate application was more common in the Midwest relative to the other states (Figures 23 and 24). For fertilizer and lime, over forty percent of the respondents expected to offer single nutrient controller-driven application in the Midwest by the fall of 2000 compared to only 5 percent of the respondents from other states. In the Midwest, single nutrient controller-driven application of fertilizer and lime was expected to increase slightly to 45 percent of the respondents by 2002 while multi-nutrient controller-driven application was expected to increase 55 percent from 16 percent of the respondents offering the service in 2000 to 25 percent expecting to offer the service in 2002.

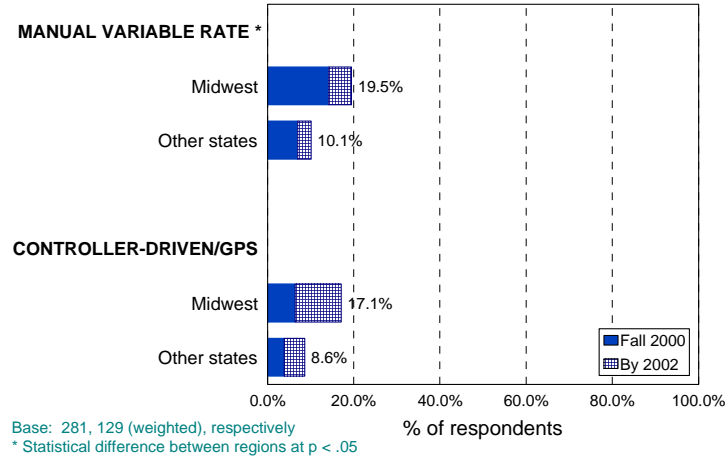
**Figure 23. Variable Rate Application for Fertilizer/Lime Offered by Region**

**Figure 23. Variable Rate Application For Fertilizer/Lime Offered by Region**



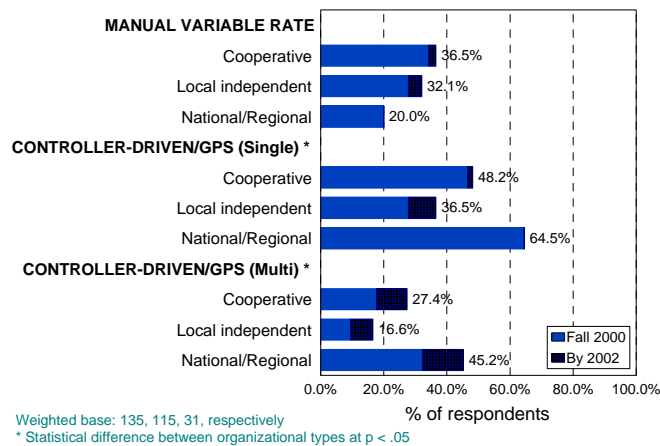
**Figure 24. Variable Rate Application for Chemicals Offered by Region**

**Figure 24. Variable Rate Application For *Chemicals* Offered by Region (Weighted)**



In the Midwest, there was also a significant difference between organizational types as to who was more likely to offer the different application services (Figures 25 and 26). National/regional outlets were most likely to offer controller-driven application of both fertilizer/lime and chemicals while cooperatives were most likely to offer manual variable rate application. Local independents were the least likely to offer any controller-driven application.

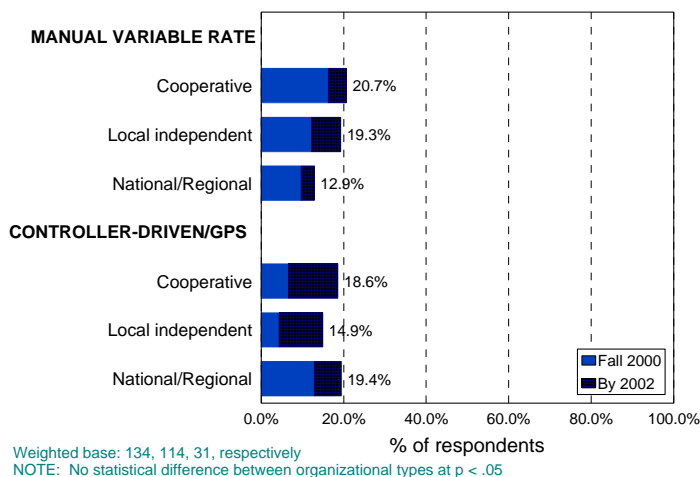
**Figure 25. Variable Rate Application for *Fertilizer/Lime* Offered by Organization Type in the Midwest**



**Figure 25. Variable Rate Application for Fertilizer/Lime Offered by Organization Type in the Midwest**

**Figure 26. Variable Rate Application for Chemicals Offered by Organization Type in the Midwest**

Figure 26. Variable Rate Application for *Chemicals* Offered by Organization Type in the Midwest



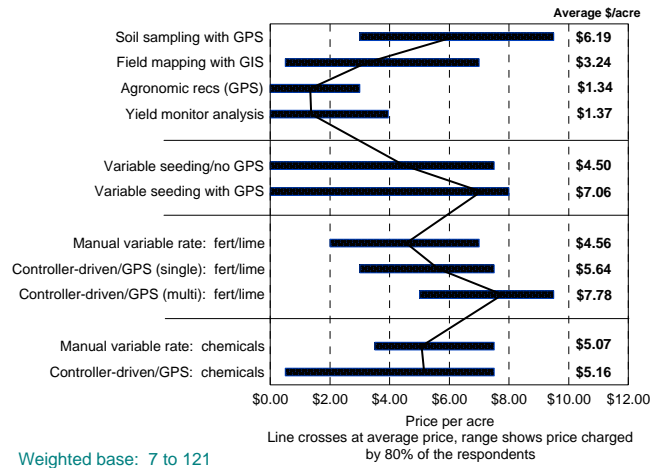
### ***Pricing Site-Specific Services***

As new services become established in a market, there may be considerable variation in price from supplier to supplier given uncertainty in key areas such as customer willingness to pay, competitive price response, and the actual cost of providing the service. As the services become more familiar to both dealerships and their customers, this variation may shrink and prices tend to stabilize in the marketplace. Though we see some evidence in 2000 that prices for specific precision services are beginning to converge relative to earlier years, there is still substantial variation in the market. To better understand what is going on with respect to pricing, we asked the responding dealerships to tell us the typical price they charge *per acre* for their precision services where they could. For those offering only packages or bundled pricing, it often wasn't possible to price out the specific components individually.

Figure 27 shows the average prices charged per acre for each of the precision services. The bar indicates what the middle 80 percent of the dealers were charging (we dropped the top 10 percent and bottom 10 percent to make the ranges a bit more consistent). As is evident by the figure, there is still a wide range of pricing strategies in place, depending on the competitive situation in the local market, the dealer's costs of providing the services, and the benefit local growers receive from precision services. Overall, prices did rise slightly in 2000 from those reported in 1999.

**Figure 27. Prices Charged for Precision Ag Services**

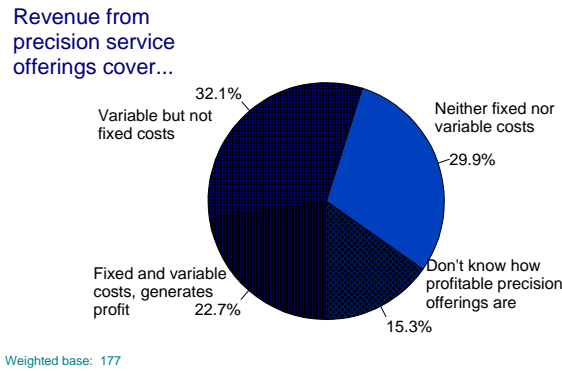
**Figure 27. Prices Charged for Precision Ag Services**



To get a better idea of how much profit these prices were generating, we also asked dealerships how profitable they felt their precision offerings were. Figure 28 shows that for one in three dealerships, revenues from precision service offerings were covering variable but not fixed costs. Another 30 percent said that precision revenues did not cover either fixed or variable costs. About a quarter of the respondents felt they were making a profit from their precision service offerings (23 percent). Compared to 1999, however, a significantly lower proportion said they didn't know the profitability of their precision services – 15 percent in 2000 compared to 23 percent last year. As precision technologies become more commonplace and established, this trend toward a better understanding of profitability is to be expected.

**Figure 28. Profitability of Precision Service Offerings**

**Figure 28. Profitability of Precision Service Offerings**





## Customer Use of Site-Specific Services

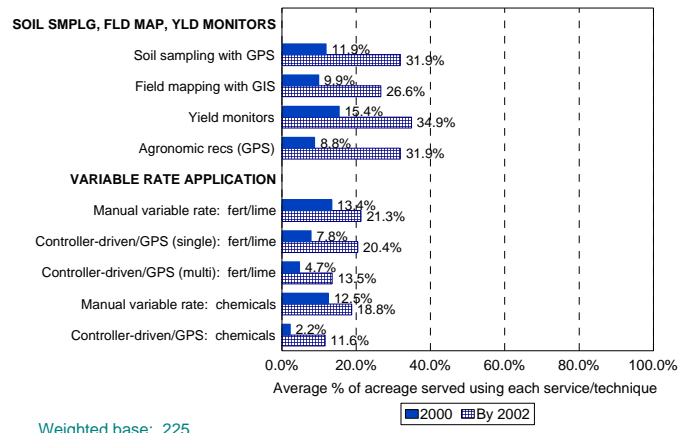
To get a better understanding of how quickly growers are adopting precision services, survey participants were asked what percentage of the total acreage they served in their market area (all growers, not just current customers) was under various site-specific management techniques currently, and, in their opinion, what proportion of the acres they serve will be using these techniques in 2002. Figure 29 shows the average percentage of the current acreage respondents serve that is under specific precision agriculture management techniques. (Note that the wording of this question was made more specific relative to previous years and the results cannot be directly compared across years.)

Currently, yield monitors are the most common precision technology used, with this technology used on an average of 15 percent of the acreage (Figure 29). This is expected to more than double by 2002, with yield monitors used on over a third of the acreage at that time. The second most common precision service was manual variable rate application – both fertilizer/lime and chemicals – with approximately 13 percent of the acreage estimated to be using each service currently. These were followed by soil sampling with GPS and field mapping with GIS (12 percent and 10 percent of the acreage, respectively).

Acreage using the precision services is expected to grow at a much more rapid rate from 2000 to 2002 than the expected growth rate of dealerships offering the services during that same period. This suggests that respondents expect service volumes to grow quickly among dealerships who already offer precision services.

**Figure 29. Estimated Market Area Using Precision Ag Products or Services**

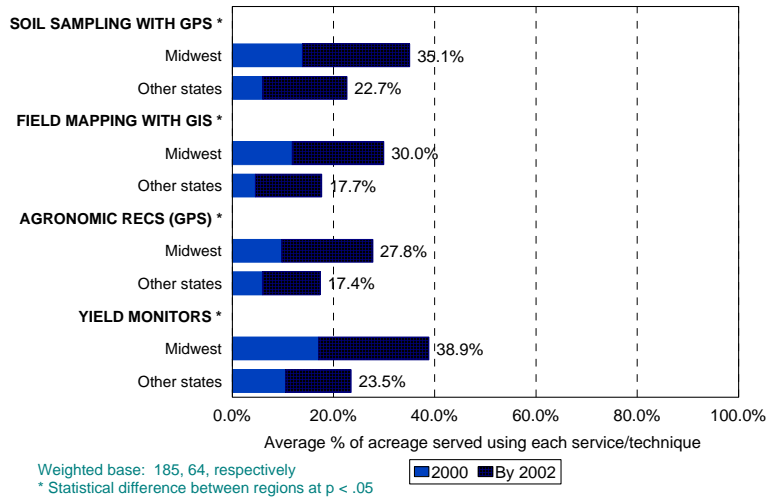
**Figure 29. Estimated Market Area Using Precision Ag Products or Services**



For all precision services, with the exception of manual variable rate application of fertilizer/lime and chemicals estimated market use of precision services was more intensive in the Midwest compared to other states. Figures 30 and 31 show the average percentage of customer acres using precision services in the Midwest compared to other states in 2000 and the expected proportion of acres under those same precision management techniques in 2002. All services were expected to grow rapidly over the next 3 years in both regions.

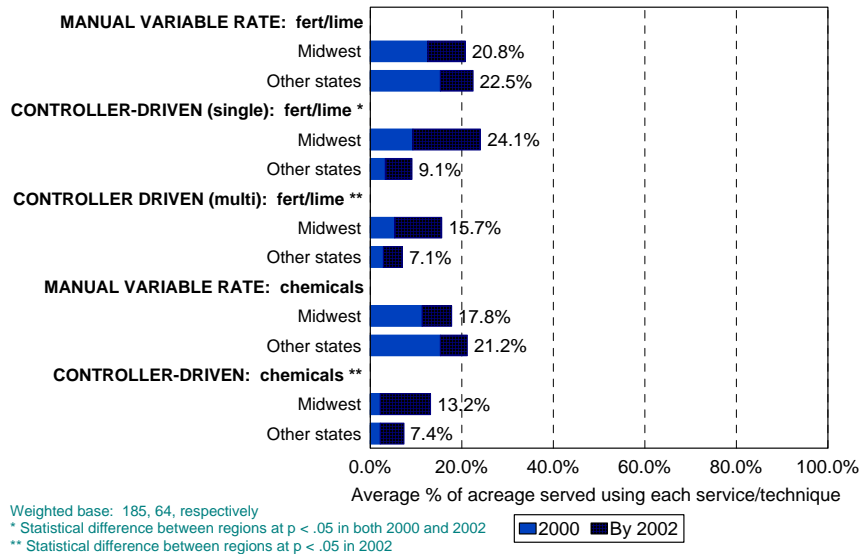
**Figure 30. Estimated Market Area Using Soil Sampling, Field Mapping, and Yield Monitors by Region**

**Figure 30. Estimated Market Area Using Soil Sampling, Field Mapping and Yield Monitors by Region**



**Figure 31. Estimated Market Area Using Variable Rate Application by Region**

**Figure 31. Estimated Market Area Using Variable Rate Application by Region**



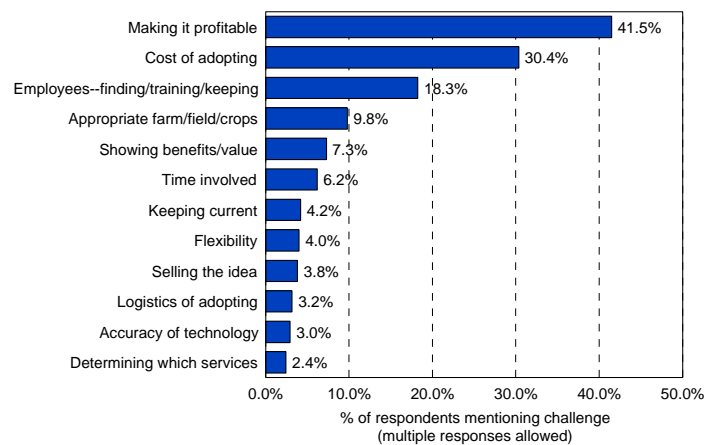
Interestingly, though there were significant differences in the provision of precision services across the three organizational types in the Midwest, there were no significant differences in the estimates of intensity of customer use across local independents, cooperatives, and national/regional organizations. This suggests that dealerships who do not offer precision services recognize that their customers are going to other sources for the precision technologies they are looking for.

### ***Internal Management Challenges in Implementing Precision Agriculture***

To get a better understanding of some of the problems dealerships are facing when offering precision products and services, respondents were asked about their biggest internal challenges in implementing these technologies. For the first year since starting this survey, cost was not the most-often mentioned internal challenge. Perhaps reflecting low commodity prices, respondents said their biggest challenge was in figuring out how to make the service profitable for both them and their customers (Figure 32). Responses here ranged from how to charge enough for the services, to generating enough profit at the farm level to be able to pay for the actual cost of the service. More than four out of ten dealerships who offered precision services said the challenge of making the services pay was their biggest challenge, compared to 30 percent who said the challenge was the cost of adopting the technology.

The third challenge mentioned was a day-to-day management challenge – how to find, train, and keep employees in order to offer the services (down from 27 percent last year to 18 percent this year). Other management challenges included having enough farm/fields/crops that fit well with precision technology, proving the benefits of the technology, and managing the time involved. Internal management challenges appear similar across regions and organizational types.

**Figure 32. Most Challenging Internal Management Problems in Implementing Precision Agriculture**



Weighted base: 181

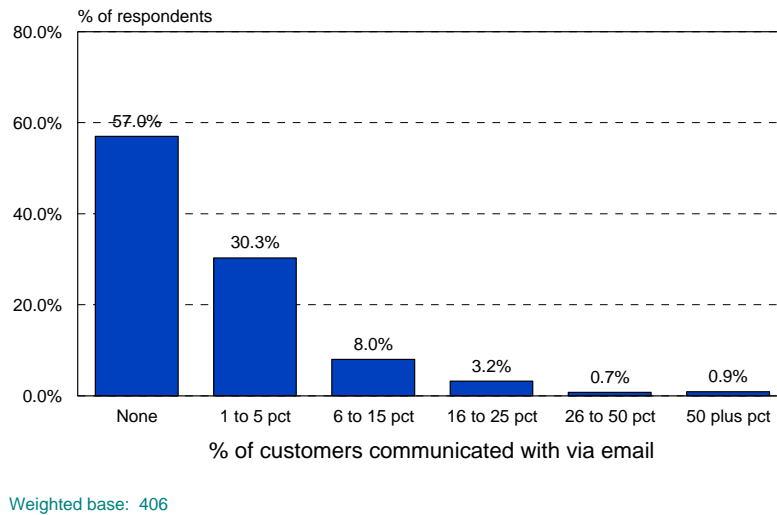
**Figure 32. Most Challenging Internal Management Problems in Implementing Precision Agriculture**

### Use of Email and Web Sites

Associated with the technologies of precision agriculture, dealerships were asked how many of their customers they were communicating with through email and whether or not they, or their parent company, had a web site available for their customers. Figure 33 shows that more than four out of ten respondents (43 percent) used email to communicate with at least some of their customers. Almost 5 percent communicated with over 15 percent of their customers within the past year. There were no differences by region or by organizational type.

Figure 33. Customers Communicated With Via Email

Figure 33. Customers Communicated With Via Email



When asked if either they or their parent company had a web site available, 46 percent of the dealerships said there was a web site (Figure 34). Though there were no differences by region, there were significant differences between organizational types in the Midwest. As might be expected, national/regional outlets were significantly more likely to have a web site available (84 percent) compared to either cooperatives or local independents (Figure 35). Local independents were least likely to have a web site available (only 30 percent).

Figure 34. Web Site Available

Figure 34. Web Site Available

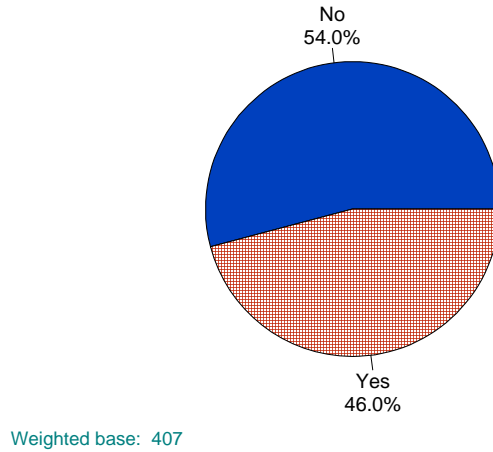
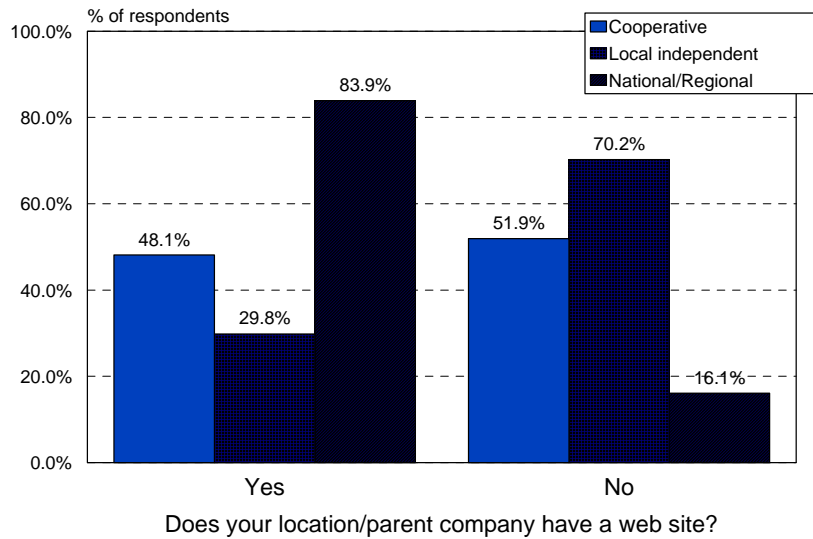


Figure 35. Availability of Web Site by Organization Type in the Midwest

Figure 35. Availability of Web Site by Organization Type in the Midwest



Weighted base: 135, 114, 31, respectively

\* Statistical difference between organization types at  $p < .05$

## Enhanced Seed

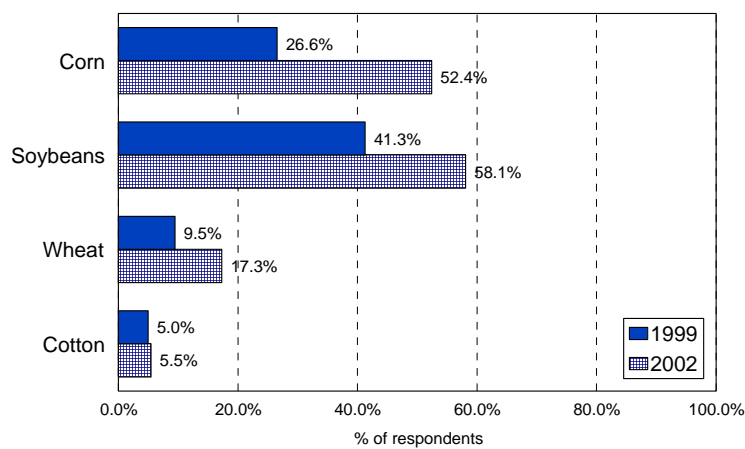
As technology continues to evolve and as dealerships continue to look for ways of enhancing customer service and profitability, seed is becoming an increasingly important part of the total product line for agronomic dealerships. Seed enhanced with some input or output trait (enhanced seed) is driving much of this growth, and, despite uncertainty in the GMO arena, respondents indicate they expect enhanced seed to have an even greater impact on their businesses in the future.

### Seed Sales

Some 88 percent of the survey respondents sold seed in 1999 – 92 percent in the Midwest and 77 percent in the non-Midwestern states. Despite 1999's prediction of rapid growth in seed sales, these numbers are virtually unchanged from last year. The type of seed respondents sold is shown in Figure 36 (including both enhanced and traditional seed). Given the heavy representation from the Midwest, it's not surprising that corn and soybeans were most common seed types sold among the four types specified in the survey. More than four out of ten of the dealers sold over 5000 acres of soybean seed in 1999 while over a quarter sold more than 5000 acres of corn seed. Like last year, respondents were very optimistic in their expectations for an increase in seed sales over the next three years. By 2002, the proportion of dealerships expecting to sell more than 5000 acres of hybrid seed corn doubles, and it almost doubles for wheat (Figure 36). Soybean seed sales are also expected to grow rapidly, while cotton seed sales show more modest growth.

Figure 36. Dealers Selling More Than 5000 Acres of Seed

Figure 36. Dealers Selling more than 5000 Acres of Seed

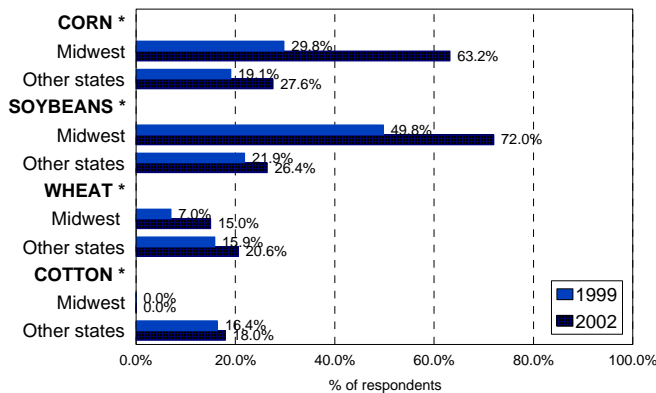


Weighted base: 360

As might be expected, there were regional differences in the type of seed sold. Dealers in the Midwest were more likely to sell soybean seed and hybrid seed corn, while those outside the Midwest were more likely to sell wheat and/or cotton seed (Figure 37). For both corn and soybeans, the growth in seed sales expected over the next 3 years was greater in the Midwest than in other states, with the percentage of dealers selling over 5000 acres of seed corn expected to more than double in that time.

In the Midwest, there were some differences by organizational type, reflecting traditional roles taken by the different organizations. Local independents were less likely to sell soybeans while cooperatives were more likely to sell all types of seed (Figure 38). In all cases, however, the growth expected in seed corn and soybean seed sales is tremendous.

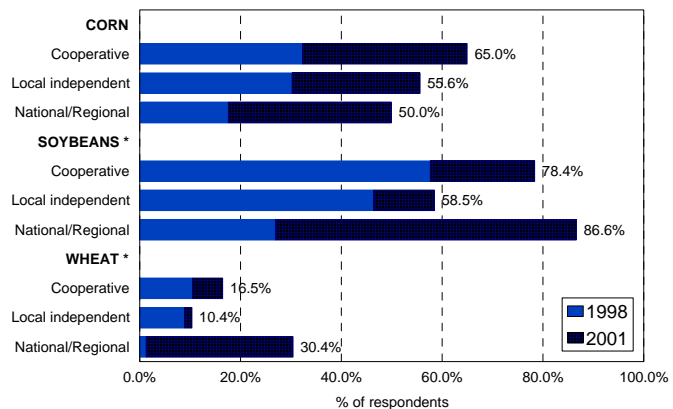
Figure 37. Dealers Selling more than 5000 Acres of Seed by Region



Weighted base: 251, 110, respectively  
 \* Statistical difference between regions at  $p < .05$

Figure 37. Dealers Selling More Than 5000 Acres of Seed by Region

Figure 38. Dealers Selling more than 5000 Acres of Seed by Organization Type in the Midwest



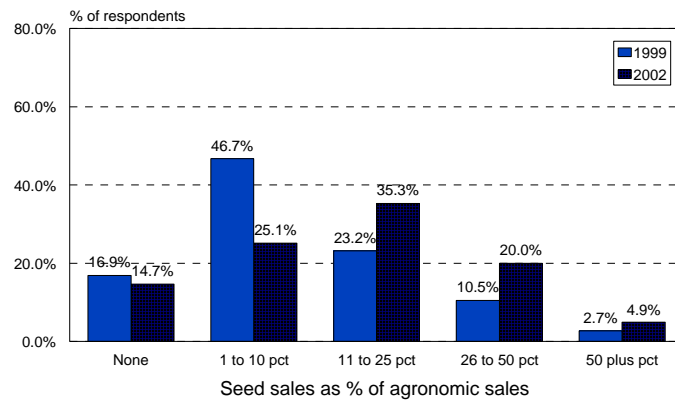
Weighted base: 127, 93, 30, respectively  
 \* Statistical difference between organizational types at  $p < .05$

Figure 38. Dealers Selling More Than 5000 Acres of Seed by Organization Type in the Midwest

Not surprisingly, dealerships see seed becoming a more important contributor to their total agronomic revenue (sales of fertilizer, chemicals, and seed plus agronomic service income). In 1999, respondents reported that seed sales accounted for an average of 13 percent of their agronomic revenue. This figure was expected to grow to 20 percent by 2002 (Figure 39). Only 13 percent of the responding dealerships currently have seed sales accounting for over a quarter of their agronomic revenue, but by 2002, this is expected to almost double to 25 percent of the dealerships.

**Figure 39. Seed Sales as a Percent of Agronomic Revenue**

**Figure 39. Seed Sales as a Percent of Agronomic Revenue**

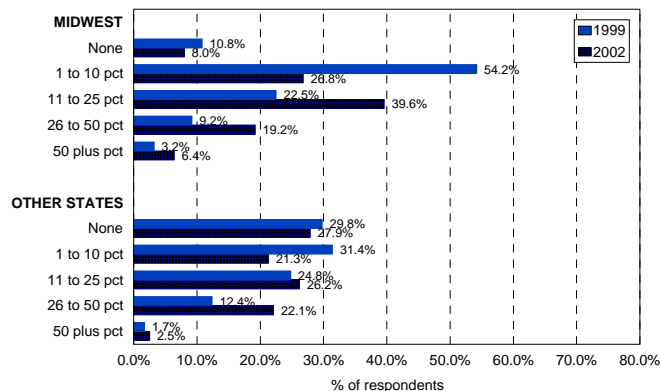


Weighted base: 371  
Average 1999: 12.7%, Average 2002: 20.3% of agronomic sales

There were significant differences in the importance of seed sales by region. In the Midwest, two-thirds of the respondents said that seed currently accounts for less than 10 percent of their total agronomic sales. However by 2002, two-thirds of the Midwest dealerships expected to have seed accounting for more than 10 percent of their sales (Figure 40). Non-Midwestern states also expected growth in their seed sales but the change was not nearly as dramatic as that expected in the Midwest.

**Figure 40. Seed Sales as a Percent of Agronomic Revenue by Region**

**Figure 40. Seed Sales as a Percent of Agronomic Revenue by Region**



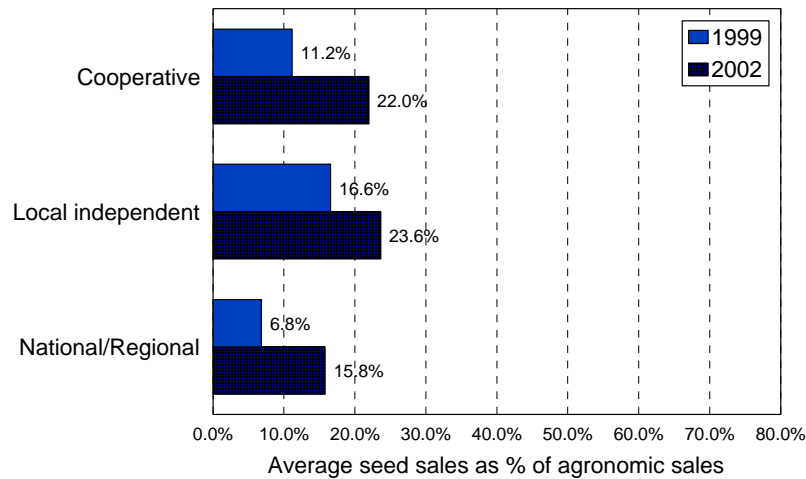
Weighted base: 249 and 122, statistically different by region at p<.05  
Avg Midwest 1999: 12.8% and 2002: 21.9%, Other 1999: 12.7% and 2002: 17.0% of agronomic sales



Figure 41 compares the average proportion of agronomic revenue made up of seed sales across organizational types in the Midwest. Though fewer independents said they sold seed, seed made up a larger average proportion of their sales than it did for either cooperatives or national/regional outlets. The most significant growth (percentage) from 1999 to 2002 was expected by national/regional outlets – increasing from an average of 7 percent of agronomic sales in 1999 to almost 16 percent in 2002. Cooperatives also expected significant growth in the importance of seed sales.

**Figure 41. Seed Sales as a Percent of Agronomic Revenue by Organization Type in the Midwest**

**Figure 41. Seed Sales as a Percent of Agronomic Revenue by Organization Type in the Midwest**

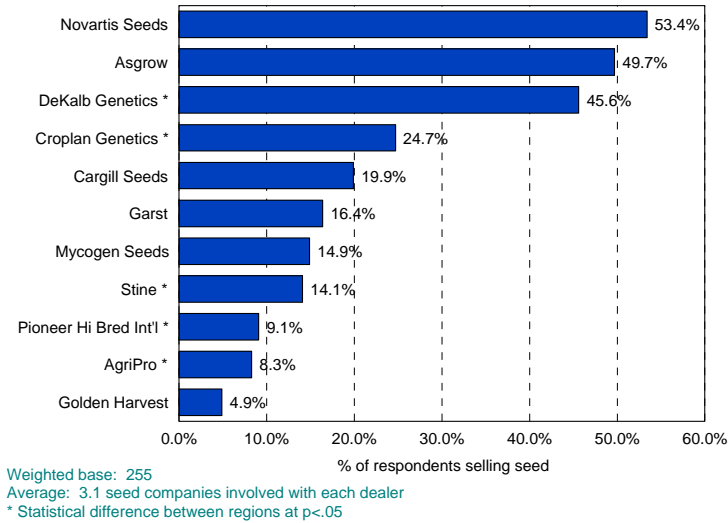


Weighted base: 123, 97, 29, respectively  
 Statistically different between organizational types at  $p < .05$

To get a better idea of which seed companies dealerships were working with, respondents were asked to indicate which seed companies they handled seed for in 1999/2000. This is broken out by region in Figures 42 and 43. On average, dealerships in the Midwest said they handled seed from 3.1 companies while dealerships outside the Midwest handled seed for 4.2 companies. In the Midwest, the top three seed companies were Novartis Seeds, Asgrow, and DeKalb Genetics (each handled by approximately half of the dealerships selling seed) while outside the Midwest, DeKalb Genetics, Asgrow, Pioneer Hi-Bred International, and Novartis Seeds were the top four seed companies. Within the Midwest, national/regional outlets handled seed from the largest number of companies (3.8) while local independents focused on fewer companies (2.7 on average).

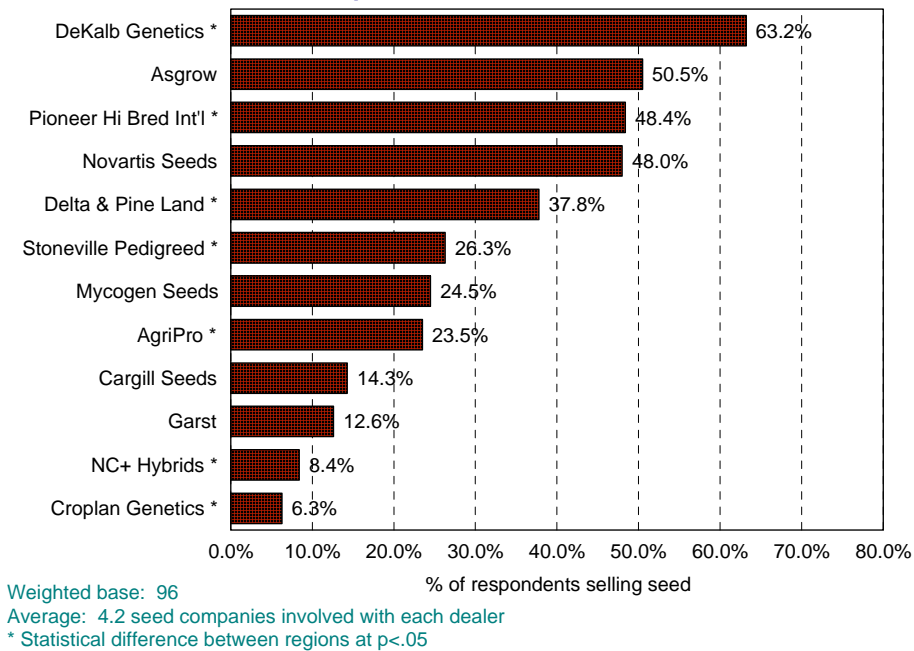
**Figure 42. Primary Seed Companies Handled by Dealers in the Midwest Region**

**Figure 42. Primary Seed Companies Handled by Dealerships in the Midwest Region**



**Figure 43. Primary Seed Companies Handled by Dealers Outside the Midwest**

**Figure 43. Primary Seed Companies Handled by Dealerships Outside the Midwest**



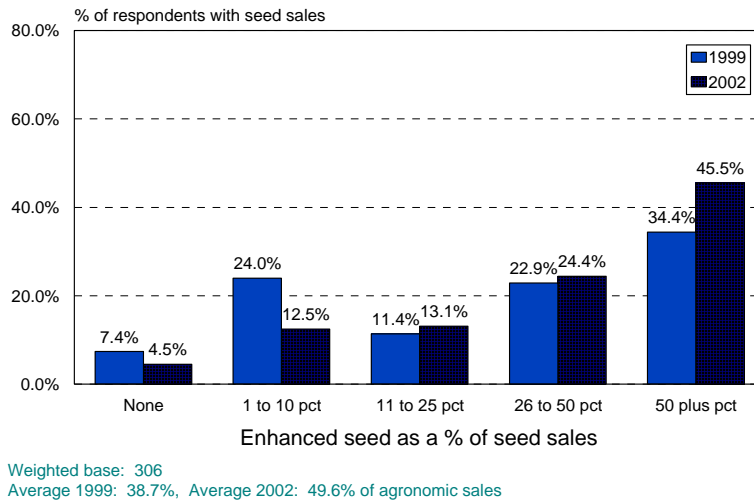
**Enhanced Seed Sales**

Given the rapid introduction of enhanced seed products over the past few years, it is clear that enhanced seed is no longer a specialty product in general. More than 4 out of 5 responding dealerships (81 percent) sold enhanced seed in 1999, up from 65 percent in 1998. Midwest dealerships were much more likely to sell enhanced seed relative to dealerships in other states – almost 87 percent of the Midwestern dealerships sold enhanced seed in 1999 (up from 80 percent in 1998). Only 56 percent of the non-Midwestern dealerships sold enhanced seed in 1999 (up from about 40 percent in 1998).

To better understand the importance of enhanced seed in the business, respondents were asked what percentage of their seed sales enhanced seed accounted for. Figure 44 shows the extremely rapid growth expected in this area. Currently, an average of 39 percent of the seed sales were generated by enhanced seed (up from 30 percent last year) but this is expected to grow to half of the seed sold by 2002. Almost half of the dealerships expect enhanced seed to account for over half of their seed sales by 2002 (46 percent).

**Figure 44. Enhanced Seed as a Percent of Seed Sales**

Figure 44. Enhanced Seed as a Percent of Seed Sales

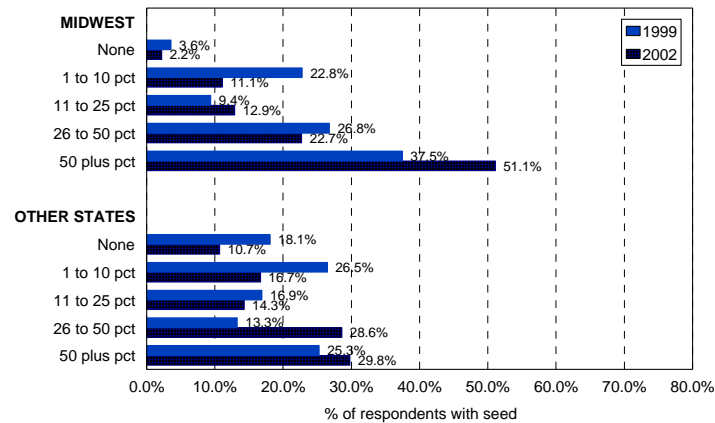


Though the proportion of enhanced seed sales is not as great in non-Midwest dealerships, growth outside the Midwest is still expected to be rapid. In the Midwest, enhanced seed accounted for an average of 42 percent of seed sales in 1999. Over a third of the dealerships indicated that enhanced seed accounted for over 50 percent of their 1999 seed sales. And, more than half of the dealerships expected enhanced seed to account for more than 50 percent of their seed sales in 2002 (Figure 45). For non-Midwest dealerships, though the overall proportion of enhanced seed was lower (30 percent of seed sales on average), the percentage of dealerships who expected enhanced seed to account for over half of their seed sales is expected to grow from 25 percent in 1999 to 30 percent in 2002.

Unlike last year's results where national/regional outlets were expecting significantly more growth in enhanced seed than other organizational types, this year there were no differences between the types of organizations in the Midwest – for either current enhanced seed sales or for expected sales of enhanced seed.

**Figure 45. Enhanced Seed as a Percent of Seed Sales by Region**

**Figure 45. Enhanced Seed as a Percent of Seed Sales by Region**



Weighted base: 224 and 83, statistically different by region at  $p < .05$   
 Avg Midwest 1999: 42.1% and 2002: 52.8%, Other 1999: 29.6% and 2002: 40.9% of agronomic sales

### ***Impact of Enhanced Seed on Business***

Perhaps the most fundamental question focuses on what enhanced seed will mean to the profitability of the dealership. We asked dealerships how they expected enhanced seed to affect their sales of fertilizer, chemicals, and seed; their service revenue; and their overall profit. The biggest change from last year's survey of dealerships' opinions about the impact of enhanced seed on their business is that respondents were not as wildly optimistic or pessimistic this year. As enhanced seed has become a larger part of their businesses (and perhaps better understood), fewer dealerships feel the future impacts will be quite so dramatic.

Virtually all dealerships believed that enhanced seed would help increase their seed sales. Fifteen percent of the dealerships said they expected to see seed sales increase by 30 percent or more within 3 years and another quarter expected an increase of 20 to 30 percent in seed sales (Figure 46). A quarter of the dealerships expected no change or a reduction in seed sales due to enhanced seed compared to only 10 percent in 1999. Those in the Midwest expected a much greater increase in seed sales than non-Midwest dealerships, with 45 percent of the dealerships in the Midwest expecting at least a 20 percent increase in seed sales compared to only 27 percent of non-Midwest firms (Figure 47).

Figure 46. Change Expected in Seed Sales

Figure 46. Change Expected in Seed Sales

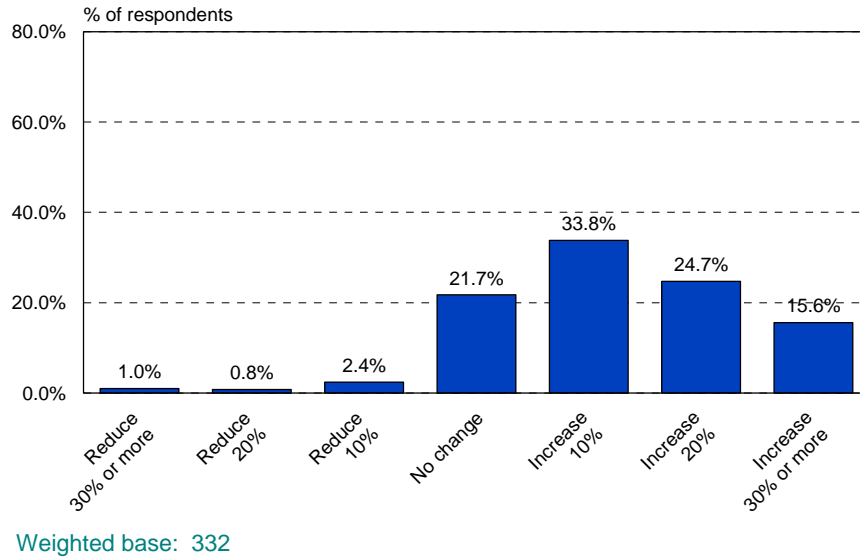
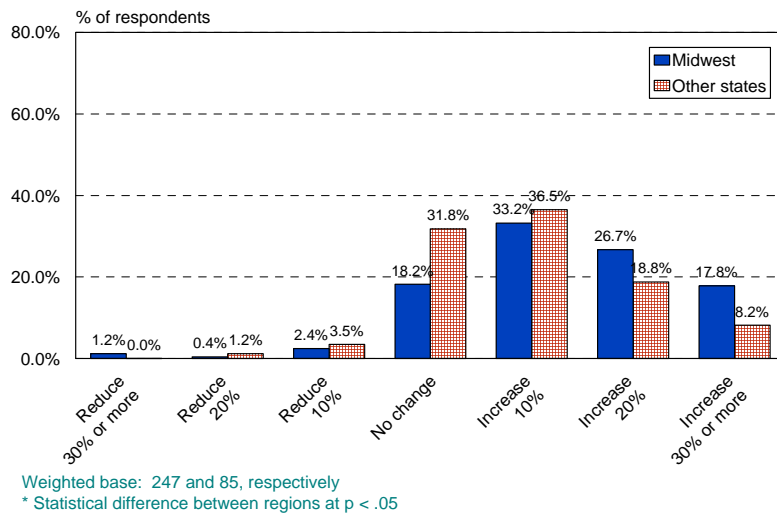


Figure 47. Change Expected in Seed Sales by Region

Figure 47. Change Expected in Seed Sales by Region

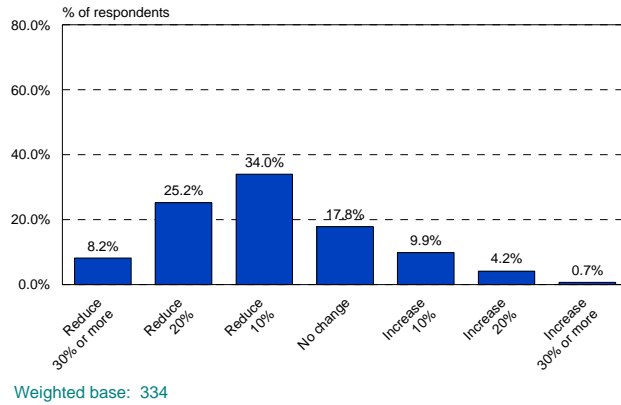


With rapid growth in the expected sales of enhanced seed, dealerships were asked what impact they expected enhanced seed to have on the rest of their business in the next 3 years – from product sales of chemicals, fertilizer and seed, to service revenue and overall profit.

Enhanced seed was expected to have a big influence on chemical sales with 8 percent of the dealerships expecting chemical sales to drop by 30 percent or more in the next 3 years due to enhanced seed (Figure 48). A third of the respondents thought enhanced seed would reduce chemical sales by at least 20 percent. Only a third of the participants thought enhanced seed would have no impact or lead to an increase in chemical sales over the next 3 years. Though there were no regional differences in respondents’ expectations of the impact on chemical sales, there were significant differences by organizational type, with over a quarter of the local independents expecting no change in chemical sales due to enhanced seed compared to only 12 percent of both cooperatives and national/regional outlets (Figure 49).

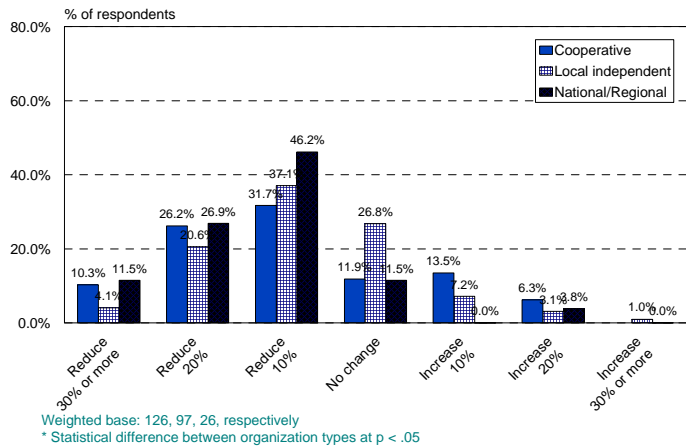
**Figure 48. Change Expected in Chemical Sales**

**Figure 48. Change Expected in Chemical Sales**



**Figure 49. Change Expected in Chemical Sales by Organization Type in the Midwest**

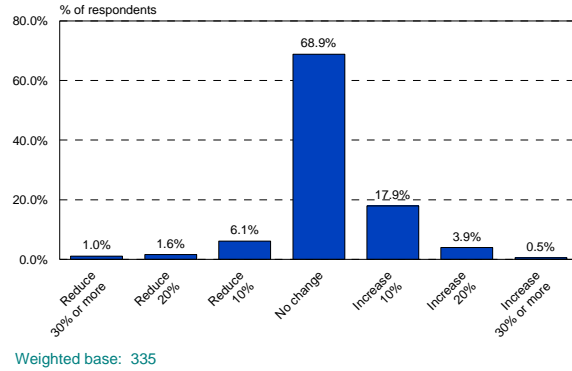
**Figure 49. Change Expected in Chemical Sales by Organization Type in the Midwest**



Fertilizer sales were not expected to be greatly impacted by enhanced seed. More than two out of three of the respondents thought enhanced seed would cause no change in their fertilizer sales (Figure 50) and 22 percent thought fertilizer sales would increase by at least 10 percent. There were no differences regionally or across organizational types.

Figure 50. Change Expected in Fertilizer Sales

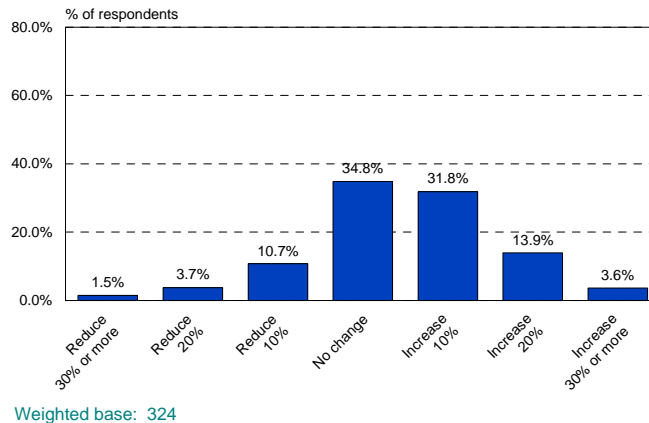
Figure 50. Change Expected in Fertilizer Sales



Service revenue, however, was expected to increase with enhanced seed sales – almost half (49 percent) of the respondents anticipated some increase in service revenue as a result of enhanced seed, with some one out of three dealerships expecting no change (Figure 51). Very few (16 percent) of the dealerships saw enhanced seed reducing their service revenue. There were no differences across regions or organizational types.

Figure 51. Change Expected in Service Revenue Sales

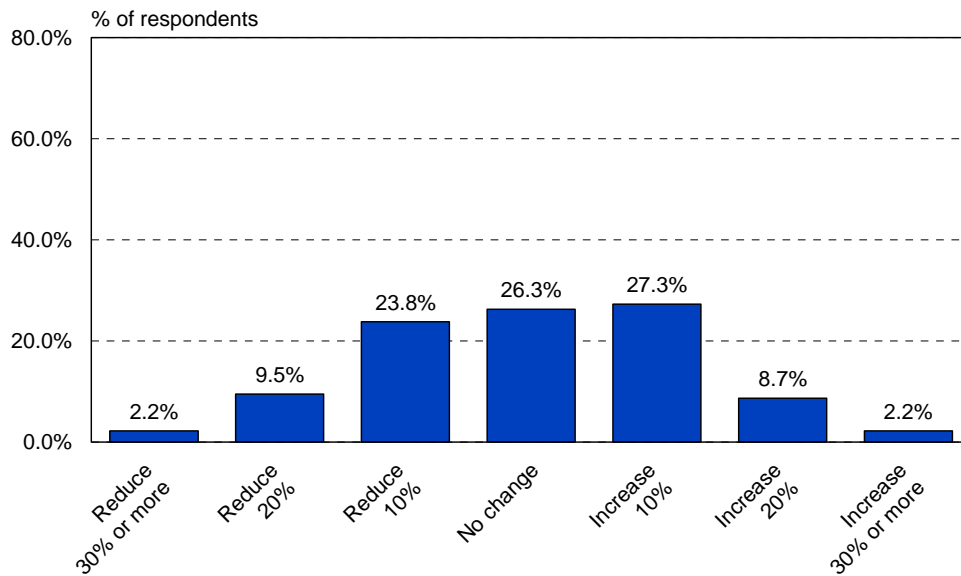
Figure 51. Change Expected in Service Revenue Sales



Overall, dealerships were mixed in their opinions about the impact enhanced seed was expected to have on their dealership. Almost four out of 10 of the respondents expected their overall profitability to increase due to enhanced seed (38 percent) (Figure 52) while three out of 10 of the dealerships surveyed expected profits to slip with the continued expansion of enhanced seed. There were no differences across regions or organizational types.

Figure 52. Change Expected in Overall Profit

Figure 52. Change Expected in Overall Profit



Weighted base: 329



## Summary

Precision technology and services continue to grow and expand in the agricultural market among both growers and retail agronomic dealerships. However, market conditions appeared to have slowed that growth and tempered expectations for the future relative to earlier years. While it is clear that many dealerships are planning for continued growth, the speed of the growth will depend on the ability to deliver and communicate the value precision brings to growers in a highly variable and uncertain marketplace.

Unlike precision technology and services, there is continued growth expected in the adoption and use of enhanced seed. And, while there remains tremendous uncertainty with respect to how public opinion of GMO's will evolve, dealerships clearly believe that enhanced seed will become an even more important part of their business in the future. Making the most of the enhanced seed opportunity will require that dealerships give some careful thought to how they can best add value to this 'added value' product and manage any negative impacts on their revenue from existing products and services, while at the same time remaining flexible enough to be able to react to changes in the political arena.

## **Appendix I: Questionnaire**

See Next Page

# 5th ANNUAL PRECISION AG AND ENHANCED SEED DEALERSHIP SURVEY

**FARM CHEMICALS**

• **Purdue University/Center  
for Agricultural Business**



*Play a part in agricultural history! Please fill out and return this brief survey in the enclosed pre-addressed, postage-paid envelope, and send to: **FARM CHEMICALS**, 37733 Euclid Ave., Willoughby, OH 44094; Fax: 440-942-0662. PLEASE RETURN BY MARCH 3, 2000.*

- Your primary responsibility: *[check one]*
  - Owner/general manager
  - Precision manager
  - Technical consultant/agronomist
  - Other: \_\_\_\_\_ (Please specify)
  - Departmental manager
  - Application manager
  - Sales/sales management
- Please indicate the number of full-time staff agronomists you have access to at your location or you share with other locations:  
Full-time agronomists at your location: \_\_\_\_\_ "0" if None  
Full-time agronomists shared with other locations: \_\_\_\_\_ "0" if None
- Are you a: *[check one]*
  - Cooperative
  - Independent dealership
  - Part of a national or regional (multi-state) chain of dealerships
- What was the total annual sales (in dollars) of agronomic products and services (fertilizer, chemicals, seed, services) at this location in 1999?
  - Under \$1,000,000
  - \$1,000,000 - under \$2,000,000
  - \$2,000,000 - under \$3,000,000
  - \$3,000,000 - under \$5,000,000
  - \$5,000,000 or more
- How many total retail outlets does your company own or manage? *[check one]*
  - 1
  - 2-5
  - 6-15
  - 16-25
  - More than 25
- What is the average size (in acres) of your customers? *[check one]*
  - Under 200 acres
  - 201 to 500
  - 501 to 1000
  - Over 1000
- Do you provide custom application?  No → go to Question 11  Yes → continue with Question 8
- In a typical year how many total acres do you custom apply at your location (fertilizer, chemicals, seeding - total acres including multiple applications)? *[check one]*
  - None → go to Question 11
  - Under 10,000 acres
  - 10,001 to 25,000 acres
  - 25,001 to 50,000 acres
  - over 50,000 acres
- In 1999, approximately what proportion of your total fertilizer sales was custom applied? \_\_\_\_\_ %
- In 1999, approximately what proportion of your total herbicide/pesticide sales was custom applied? \_\_\_\_\_ %

11. Please indicate other agronomic services you provide at your location [check all that you provide]

- Seed sales       Agronomic consulting       Soil sampling  
 Recordkeeping       Computer-aided field mapping       None of the above

12. Do you offer soil sampling following a grid pattern and/or by soil type?

- Grid pattern — Grid size most commonly used?  
 < 1 acre     1 ac. - 2.49 ac.     2.5 ac.     2.51 ac. - 5 ac.     Other: \_\_\_\_\_  
 Soil type       Other: \_\_\_\_\_

13. In which of the following ways does your dealership use precision technology? (check all that apply)

- Offer precision agronomic services for customers, including services such as soil sampling with GPS, field mapping with GIS, variable-rate application and/or agronomic recommendations based on GPS/GIS data  
 GPS guidance systems when applying uniform rates of fertilizer/chemicals to reduce skips and overlaps  
 Field mapping with GIS to document work for billing/insurance/legal purposes  
 Telemetry to send field information to home office from field  
 GPS to manage vehicle logistics, tracking location of vehicles, and guiding vehicles to next site  
 None of the above and do not plan to use any in the next three years (Skip to question 17 on Page 3)

14. Which "site-specific" ("precision") services/products will you offer in the following time periods?

Service	Fall 2000	2001	2002	Never	Don't Know
Field mapping (with GIS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manual variable rate application — fertilizer/lime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controller-driven (GPS), single nutrient variable rate application — fertilizer/lime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controller-driven (GPS), multiple nutrient variable rate application — fertilizer/lime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manual variable rate application — chemicals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controller-driven (GPS), variable rate application — chemicals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yield monitor sales/support/rental	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yield monitor data analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Variable seeding rates without GPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Variable seeding rates with GPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agronomic recommendations based on GPS/GIS data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soil sampling with GPS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

15. If you currently offer any of these services/products, what is the average per acre/per unit price you charge for individual services? (do not include bundled pricing)

Service	Price \$/acre	Price \$/other units (\$/map, \$/hour, etc.)
Field mapping (with GIS)	\$ _____/acre	\$ _____/(specify units) _____
Manual variable rate application — fertilizer/lime	\$ _____/acre	\$ _____/(specify units) _____
Controller-driven (GPS), single nutrient variable rate application — fertilizer/lime	\$ _____/acre	\$ _____/(specify units) _____
Controller-driven (GPS), multiple nutrient variable rate application — fertilizer/lime	\$ _____/acre	\$ _____/(specify units) _____
Manual variable rate application — chemicals	\$ _____/acre	\$ _____/(specify units) _____
Controller-driven (GPS) variable rate application — chemicals	\$ _____/acre	\$ _____/(specify units) _____
Yield monitor data analysis	\$ _____/acre	\$ _____/(specify units) _____
Variable seeding rates without GPS	\$ _____/acre	\$ _____/(specify units) _____
Variable seeding rates with GPS	\$ _____/acre	\$ _____/(specify units) _____
Agronomic recommendations based on GPS/GIS data	\$ _____/acre	\$ _____/(specify units) _____
Soil sampling with GPS	\$ _____/acre	\$ _____/(specify units) _____

## 5th ANNUAL PRECISION AG/ENHANCED SEED SURVEY

**FARM CHEMICALS** • Purdue University Center for Agricultural Business

16. As you assess the profitability of your precision service offerings (including all the precision services listed above, but not including conventional agronomic services), do you feel the revenue from your services:
- Does not currently cover the variable cost of offering services.
  - Covers the variable cost, but does not currently cover the fixed cost of offering the services.
  - Covers both the variable and fixed cost of offering the services, and is generating a positive profit for your business.
  - Do not really know how profitable your precision offerings are.
17. Please answer the following question whether or not you offer any precision services. Approximately what percentage of the total acreage you serve in your market area (all growers, not just your current customers) is currently using the following site-specific agricultural techniques? Approximately what percentage of the total acreage you serve will be using these techniques in three years (the year 2002)?

% of acres served (fill in blank with a percentage; indicate 0 if none)

Service	Currently	3 years from now (2002)
Field mapping (with GIS)	_____ %	_____ %
Manual variable rate application — fertilizer/time	_____ %	_____ %
Controller-driven (GPS), single nutrient variable rate application — fertilizer/time	_____ %	_____ %
Controller-driven (GPS), multiple nutrient variable rate application — fertilizer/time	_____ %	_____ %
Manual variable rate application — chemicals	_____ %	_____ %
Controller-driven (GPS), variable rate application — chemicals	_____ %	_____ %
Yield monitors	_____ %	_____ %
Agronomic recommendations based on GPS/GIS data	_____ %	_____ %
Soil sampling with GPS	_____ %	_____ %

18. What are the most challenging internal management problems you face in implementing precision services?

19. At this location, how much seed (both traditional and enhanced) did you sell in 1999, and how much do you expect to sell in 2002? (Please convert seed units to acres (A) of seed sold.)

SEED		DON'T SELL	UNDER 5,000 A	5,000-10,000 A	10,001-25,000 A	25,001-50,000 A	OVER 50,000 A
Corn	1999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2002	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soybean	1999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2002	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wheat	1999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2002	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cotton	1999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2002	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	1999	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2002	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Don't currently sell any seed or plan to sell any seed in the next three years. (Skip to Question 24)

## 5th ANNUAL PRECISION AG/ENHANCED SEED SURVEY

**FARM CHEMICALS • Purdue University Center for Agricultural Business**

20. What proportion of your total sales of agronomic products and services was accounted for by seed sales (of any kind) in 1999? What proportion of your total sales of agronomic products and services will be accounted for by seed sales (of any kind) in three years (2002)? (Enter the percentages in the blanks below.)

Seed as a percentage of total sales of agronomic products and services: 1999 \_\_\_\_\_ % 2002 (projected) \_\_\_\_\_ %

21. What proportion of your total seed sales was accounted for by enhanced seed in 1999? What proportion of your total seed sales will be accounted for by enhanced seed in 3 years (the year 2002)?

Enhanced seed sales as a proportion of total seed sales in 1999: \_\_\_\_\_ %

Enhanced seed sales as a proportion of total seed sales in 3 years (2002): \_\_\_\_\_ % (projected)

22. For which seed companies do you currently handle seed of any kind? (Check all that apply)

- |   |  |                                      |
|---|--|--------------------------------------|
| <input type="checkbox"/> AgriPro              | <input type="checkbox"/> Asgrow                | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Cargill Seeds        | <input type="checkbox"/> Croplan Genetics      | _____                                |
| <input type="checkbox"/> DeKalb Genetics      | <input type="checkbox"/> Delta & Pine Land     | _____                                |
| <input type="checkbox"/> Garst                | <input type="checkbox"/> Golden Harvest        | _____                                |
| <input type="checkbox"/> Mycogen Seeds        | <input type="checkbox"/> NC+ Hybrids           | _____                                |
| <input type="checkbox"/> Novartis Seeds       | <input type="checkbox"/> Pioneer Hi Bred Int'l | _____                                |
| <input type="checkbox"/> Stoneville Pedigreed |  |                                      |

23. How do you expect enhanced seed to affect your sales in each of the following areas over the next three years (by the year 2002)? (Check the appropriate response for each area of your business.)

	Reduce 30% or more	Reduce 20%	Reduce 10%	No change	Increase 10%	Increase 20%	Increase 30% or more
Fertilizer sales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical sales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seed sales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Service revenue	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall profitability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. What proportion of your customers has your location communicated with via e-mail during the last 12 months?
- None     1%-5%     6%-15%     16%-25%     26%-50%     Over 50%

25. Does your location/parent company have a Web site?

Yes     No

26. How many issues of **FARM CHEMICALS** magazine do you normally read?

4 out of 4     3 out of 4     2 out of 4     1 out of 4     0 out of 4

27. Approximately how much time do you spend reading an average issue of **FARM CHEMICALS**?

2 hours or more     1 to 2 hours     1/2 to 1 hour     Less than 1/2 hour     Don't read

28. How many people, other than yourself, read each copy of **FARM CHEMICALS** you receive?

None     One     Two     Three     Four     Five or more

29. What is your ZIP code? \_\_\_\_\_

30. In what state are you located? (use two-letter postal code) \_\_\_\_\_

Thank you for your cooperation! PLEASE SEND YOUR COMPLETED SURVEY TO:  
**FARM CHEMICALS, 37733 Euclid Ave., Willoughby, OH 44094, Fax: 440-942-0562.**

**DEADLINE: March 3, 2000**

## Appendix II: Statistical Weighting Scheme

The breakdown by region, by sales volume, and by organization type of respondents for the 1999 and 2000 surveys is shown below. The 2000 results were weighted by the 1999 proportions in order to make the year to year changes as comparable as possible.

	1999		2000	
	Number of respondents	Percent of respondents	Number of respondents	Percent of respondents
<b>Regions</b>				
Midwest	280	66.7%	321	60.7%
West	48	11.4%	59	11.2%
South	66	15.7%	115	21.7%
Northeast	26	6.2%	34	6.4%
<b>Annual sales \$/outlet</b>				
Under \$1 million	77	18.3%	116	21.9%
\$1 to under \$2 million	67	16.0%	131	24.8%
\$2 to under \$3 million	89	21.2%	101	19.1%
\$3 to under \$5 million	94	22.4%	80	15.1%
\$5 million or more	93	22.1%	101	19.1%
<b>Organization type</b>				
Cooperative	175	40.6%	198	37.4%
Local independent	195	45.2%	257	48.5%
Part of national/regional chain	60	14.2%	75	14.1%
<b>Total</b>	420		529	