



# Herbicide Selection and Management Practices Associated with Minnesota's 2012 Corn Production

Minnesota Department of Agriculture  
USDA, NASS, Minnesota Field Office

**November 2014**

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## Abstract

The Minnesota Department of Agriculture (MDA) is responsible for the development and promotion of herbicide Best Management Practices (BMPs) which optimize production and profitability while protecting the state's water resources. The MDA is also responsible for monitoring pesticide use and for promoting the adoption of associated BMPs. This survey was designed and conducted in partnership with the National Agricultural Statistics Service (NASS) to specifically assess the status of BMP awareness and adoption in relation to the use of corn herbicides.

In Minnesota, the corn herbicide active ingredients atrazine and acetochlor (and their breakdown products) are detected frequently in groundwater and surface water resources. Atrazine has not exceeded the applicable drinking water standards in groundwater. However, in 2001 and 2005, acetochlor concentrations exceeded surface water quality standards to protect aquatic life in two southern Minnesota watersheds<sup>1</sup>. The MDA has invested considerable staff time in water monitoring, development of BMP education programs, and BMP assessment. Atrazine and acetochlor are the main focus of this survey. Phone enumerators located at NASS contacted over 4,000 producers in early 2013. From this pool, approximately 1,700 farmers who raised corn during the 2012 growing season shared valuable information on herbicide selection and management.

The general purpose of this survey was to ask farmers about fundamental herbicide use practices such as record keeping, reading the label, scouting, responsibility for making decisions on product selection and timing, and knowledge about physical characteristics (soil texture, depth to groundwater, use of buffer strips, etc.). More specific questions related to atrazine and acetochlor included the use of split applications, reduced rates, and incorporation.

These types of surveys help MDA understand regulatory compliance, adoption of voluntary practices, need for additional information, and opportunities for future technical assistance.

Every other year, the MDA has partnered with NASS to produce a detailed report on pesticide use and rates used on the state's four major crops. Readers are encouraged to visit the most recent report, "2011 Pesticide Usage on Four Major Minnesota Crops" at <http://www.mda.state.mn.us/chemicals/pesticides/pesticideuse.aspx>

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<sup>1</sup> "Monitoring & Assessment for Agricultural Chemicals in the Environment" found on MDA Website at:

<http://www.mda.state.mn.us/monitoring>

## Acknowledgements

This survey was a cooperative effort by the Minnesota Department of Agriculture (MDA), the United States Department of Agriculture (USDA), National Agricultural Statistics Service (NASS), and the NASS Field Offices in Minnesota and North Dakota. The detailed information about herbicide use practices could not have been collected without the cooperation of the thousands of farmers who voluntarily responded to the survey in the midst of their busy lives, and for this we are extremely grateful. Similarly, the assistance of agricultural chemical dealer and cooperatives is much appreciated. Special thanks go to Doug Hartwig and Dan Lofthus, Director and Deputy Director, respectively of the NASS Minnesota Field Office and their respective staff for assistance with survey design, data collection and processing. The MDA is ultimately responsible for the representations of data provided in this report and for the design of the survey mechanism used to collect that data. Excellent participation and good record keeping practices by Minnesota farmers and agricultural chemical dealerships played a vital part in providing complete and detailed herbicide information.

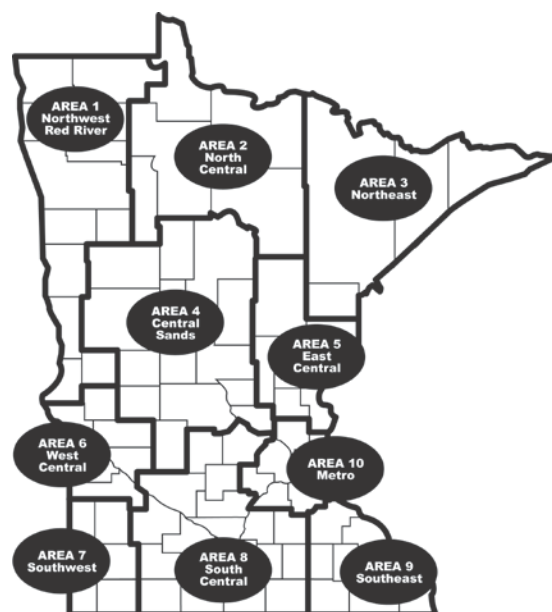
## 2012 Herbicide Use Practices Summary and Highlights

This report summarizes survey results for a number of important practices associated with herbicide use on Minnesota's 2012 corn acres. Over 1,700 producers participated in the telephone survey and herbicide information was collected for 461,268 corn acres, representing 5 percent of Minnesota's 8,400,000 corn acres. Survey questions focused on the 94 percent of the respondents that used herbicides for weed control. The survey targeted a variety of practices including herbicide selection and associated management practices (e.g., MDA's herbicide BMPs). This is the fourth herbicide survey performed by the MDA and NASS to collect information on herbicide management practices on Minnesota corn acres.

## Survey Design and Implementation

Ten Pesticide Monitoring Areas (noted as "PMA" throughout the report), were previously developed by MDA staff. Counties were clustered based on similarities in geology, soils, and crops. These areas also define the general boundaries of the monitoring regions used by the MDA water resource monitoring program. More information about PMA designations can be found at <http://www.mda.state.mn.us/chemicals/pesticides/~medi a/Files/chemicals/2009gwmnetdesign.ashx> Regional pesticide use information is used to help design and implement specific water quality monitoring and pesticide educational programs.

NASS developed a sampling population of 7,000 farms by randomly drawing from its entire database of all corn growers in Minnesota. There were 1,796 farmers that raised corn in 2012 and that completed the survey. The definition of "corn" for purposes of this report includes both grain and silage and excludes sweet corn and



popcorn. All growers were asked four basic questions regarding herbicide selection and management. The remaining questions were for those farmers who used atrazine or acetochlor. Due to the low intensity of row crop agriculture in portions of northern Minnesota, survey results for PMA 2 and PMA 3 were not reported separately.

## Introduction

### Data Collection Process and History

The MDA is required by state law to monitor pesticide use on a biennial basis. Minn. Stat. § 18B.064. In pursuit of fulfilling that responsibility, the MDA began exploring the possibility of using the existing framework of the NASS to enhance and broaden pesticide use monitoring efforts. NASS has a long history of providing statewide crop and production statistics. Over the last decade, NASS has also become an important information source for pesticide and fertilizer use. Several joint pilot projects evolved with the financial assistance from Environmental Protection Agency (EPA) and were conducted from 2001-2003. These pilots were essential to the final methodology used in this report.

The first pilot<sup>2</sup> was conducted in 2001 by expanding the existing Agricultural Resource Management Study (ARMS) developed by NASS. The normal number of participating Minnesota corn farms in an ARMS survey is about 150. The pilot increased the number of personal interviews to approximately 600 and most of the enhancements were focused on the southern third of the state. The pilot provided reliable regionally-enhanced data on pesticide product choices and application rates. Additionally, useful information on primary sources of pesticide management information, scouting, timing, and other pesticide management related information was obtained.

A second pilot<sup>3</sup> was developed with the goal of expanding to a statewide scale while reducing costs. In neighboring North Dakota, the USDA, NASS, the North Dakota Field Office, and North Dakota State University Extension had already established a strong tradition in collecting statewide pesticide use by using NASS telephone enumerators. MDA and NASS used many techniques from the North Dakota program, but decided to expand the level of detail by including pesticide application rates. Historically, most mail or telephone style surveys have been unsuccessful at quantifying pesticide rates. Due to the numerous formulations, different application rates and units of measure (i.e. Active Ingredient [a.i.] can be expressed in pounds, ounces, pints or quarts), complications can quickly develop. Another major complicating factor may result due to the farmer using the services of a commercial pesticide applicator. If the farmer did not apply the product, the likelihood that the farmer would be familiar with the product and corresponding rate decreases significantly.

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<sup>2</sup> “Expanded Minnesota Agricultural Statistics Pesticide Use Data”, 2003, by NASS and MDA.

<sup>3</sup> Unpublished data. From the September 20, 2003 EPA Report.

The second pilot survey was conducted in 2003 to test two methods of collecting pesticide rate information. “Method One” was conducted in Douglas County with 150 randomly selected farm operators. Operators were interviewed over the phone by the NASS enumerators. If the operator did not know the pesticides and/or rates, no additional follow-up work was conducted and the data was limited to information that was provided. “Method Two” was used in neighboring Grant County, where another 150 farm operators were contacted, and when farm records were incomplete, follow-up calls were made to the pesticide dealer to complete the survey. The number of surveys with complete data sets significantly increased with the additional assistance from the dealerships. Eighty-three percent of the surveys were complete in Grant County, where dealer follow-up calls were made, compared to forty-six percent in Douglas County. Equally impressive was the overall support by the local dealerships.

Subsequently, statewide surveys are conducted using “Method Two” from the pilot project conducted in Douglas and Grant Counties.

Farmers are interviewed over the phone in April and May. These are “cold calls,” meaning that the farmers did not get any type of notification about the survey prior to the contact. Consequently, all information collected using this approach is based upon either the participant’s memory or information readily available during the interview. The interviews typically last from five to ten minutes.

Survey questions can be found in Appendix 1. Corresponding question numbers (noted as “Q” followed by the survey question number) are incorporated throughout the report and also in the table captions. The reader is encouraged to reference the survey to help interpret the results.

Questions are grouped into four categories including:

1. **General information.** Who applied the product, label and active ingredients, and record-keeping;
2. **Scouting for weeds and related practices.** Scouting, mapping, weed type, density, and herbicide resistant corn varieties;
3. **Water resources.** Physical distances from groundwater, surface water and buffers, and irrigation management plans; and
4. **General practices.** Herbicide rotations and dealer involvement in herbicide management.

After obtaining some very general NASS information, participants were then asked if they grew corn during the 2012 cropping season (Q.1). The interview process ended if they had not produced field or silage corn. Participants were then asked to identify the number of corn acres planted (Q.2). Table 1 includes the number of respondents and associated corn acres by county and Pesticide Monitoring Area. Also, included in Table 1 is the NASS total corn acres for Minnesota (2012) and the percentage of acres surveyed.

This survey typically involves only corn herbicide use practices. However, in 2012, questions regarding the use of insecticides with the active ingredient chlorpyrifos were added to the survey. These inquiries were attached to the survey due to chlorpyrifos detections in surface waters around the state. The farmers surveyed typically grow corn in addition to soybeans. In the MDA's 2011 Pesticide Report, chlorpyrifos was only applied to one percent of the surveyed corn crop, but was applied to twenty percent of surveyed soybean acres<sup>4</sup>.

## Data Reporting and Limitations

The primary purpose of this survey was to obtain an understanding of basic herbicide management practices associated with corn production. Participants were asked to identify the herbicides used in very generic terms. Some knowledge of the herbicides used (i.e. soil applied, post-emergent, etc.) is essential to understand the current management strategies associated with them. It is important to note that the MDA and its partners provide a highly detailed herbicide use and application rate report on a biennial basis<sup>5</sup>.

Due to the simplified method used to collect what is typically considered complex data, it is imperative that the reader understand the limitations of the data sets. Many surveys conducted by NASS employ advanced sampling strategies which are designed to statistically represent a non-homogenous population, thus "weighting" the data to account for sample size, county size, and crop acreage, etc. Such strategies can be very expensive and are not without their own limitations.<sup>6</sup> This survey did not employ such strategies; rather, corn farmers were randomly selected from across Minnesota. Therefore, weighting across areas or counties was not performed. The MDA can be contacted to further discuss interpretation of the survey data.

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<sup>4</sup> "2011 Pesticide Usage on Four Major Minnesota Crops" found on the MDA website at: <http://www.mda.state.mn.us/chemicals/pesticides/pesticideuse.aspx>

<sup>5</sup> "2011 Pesticide Usage on Four Major Minnesota Crops" found on the MDA website at: <http://www.mda.state.mn.us/chemicals/pesticides/pesticideuse.aspx>

<sup>6</sup> For an explanation of survey methods and data quality associated with annual county-level data, visit the NASS "Quick Stats" Frequently Asked Questions website at: <http://www.nass.usda.gov/QuickStats/Screens/faqs.htm>



**Table 1. Summary of respondents and corresponding corn acres by county and PMAs.**

County	Pesticide Monitoring Area (PMA)	Number of Respondents	2012 Planted Corn Acres <sup>s</sup>	Surveyed Corn Acres	Percentage of Acres Surveyed
Grant	1	10	131,000	4,249	3
Kittson	1	4	13,700	1,265	9
Mahnomen	1	4	**	1,040	**
Marshall	1	7	32,800	864	3
Norman	1	12	109,000	5,186	5
Pennington	1	1	**	25	**
Polk	1	10	113,000	4,008	4
Red Lake	1	5	23,000	964	4
Roseau	1	5	16,200	1,450	9
Traverse	1	14	141,000	7,275	5
Wilkin	1	10	106,000	4,527	4
<b>Totals/Averages</b>	<b>1</b>	<b>95</b>	<b>829,700</b>	<b>39,093</b>	<b>5</b>
Becker	4	22	63,300	4,074	6
Benton	4	26	63,500	2,319	4
Cass	4	7	**	1,342	**
Crow Wing	4	7	**	1,483	**
Douglas	4	16	72,000	2,178	3
Hubbard	4	3	**	229	**
Kandiyohi	4	22	175,000	5,453	3
Morrison	4	70	108,000	6,611	6
Otter Tail	4	51	179,000	12,240	7
Pope	4	21	122,000	4,310	4
Sherburne	4	9	33,800	1,758	5
Stearns	4	99	33,800	12,477	37
Todd	4	48	87,600	5,727	7
Wadena	4	16	23,700	2,371	10
<b>Totals/Averages</b>	<b>4</b>	<b>417</b>	<b>961,700</b>	<b>62,572</b>	<b>7</b>
Aitkin	5	4	**	186	**
Chisago	5	11	33,400	1,647	5
Isanti	5	10	37,000	1,988	5
Kanabec	5	9	15,600	694	4
Mille Lacs	5	15	28,400	2,079	7
Pine	5	16	24,100	1,492	6
<b>Totals/Averages</b>	<b>5</b>	<b>65</b>	<b>138,500</b>	<b>8,086</b>	<b>6</b>
Big Stone	6	16	104,000	5,975	6
Chippewa	6	16	157,000	7,812	5
Lac Qui Parle	6	22	182,000	7,721	4
Stevens	6	19	150,000	6,665	4
Swift	6	22	202,000	11,551	6
Yellow Medicine	6	27	206,000	17,442	8
<b>Totals/Averages</b>	<b>6</b>	<b>122</b>	<b>1,001,000</b>	<b>57,166</b>	<b>6</b>

County	Pesticide Monitoring Area (PMA)	Number of Respondents	2012 Planted Corn Acres <sup>§</sup>	Surveyed Corn Acres	Percentage of Acres Surveyed
Lincoln	7	20	127,000	6,127	5
Lyon	7	30	199,000	12,319	6
Murray	7	26	185,000	9,003	5
Nobles	7	24	207,000	5,750	3
Pipestone	7	22	124,000	4,871	4
Rock	7	25	148,000	8,278	6
<b>Totals/Averages</b>	<b>7</b>	<b>147</b>	<b>990,000</b>	<b>46,348</b>	<b>5</b>
Blue Earth	8	28	198,000	8,718	4
Brown	8	47	168,000	9,640	6
Cottonwood	8	32	177,000	10,643	6
Faribault	8	25	220,000	13,264	6
Freeborn	8	35	213,000	10,115	5
Jackson	8	28	201,000	7,202	4
Le Sueur	8	21	97,000	5,393	6
Martin	8	24	228,000	9,580	4
McLeod	8	36	127,000	8,216	6
Meeker	8	35	133,000	10,582	8
Nicollet	8	22	132,000	3,158	2
Redwood	8	41	251,000	18,578	7
Renville	8	43	270,000	17,699	7
Rice	8	38	96,000	6,055	6
Sibley	8	39	170,000	9,464	6
Steele	8	20	126,000	6,417	5
Waseca	8	19	127,000	4,048	3
Watonwan	8	20	140,000	10,318	7
Wright	8	34	84,000	6,961	8
<b>Totals/Averages</b>	<b>8</b>	<b>587</b>	<b>3,158,000</b>	<b>176,051</b>	<b>6</b>
Dodge	9	23	134,000	7,011	5
Fillmore	9	36	197,000	8,426	4
Goodhue	9	41	168,000	9,091	5
Houston	9	22	63,000	3,377	5
Mower	9	30	222,000	5,503	2
Olmstead	9	27	131,000	8,074	6
Wabasha	9	41	102,000	7,341	7
Winona	9	42	90,800	4,563	5
<b>Totals/Averages</b>	<b>9</b>	<b>262</b>	<b>1,107,800</b>	<b>53,386</b>	<b>5</b>
Anoka	10	3	8,800	49	1
Carver	10	22	63,800	2,981	5
Dakota	10	24	92,200	8,122	9
Hennepin	10	10	15,400	1,890	12
Scott	10	18	41,600	3,103	7
Washington	10	9	21,600	1,623	8
<b>Totals/Averages</b>	<b>10</b>	<b>76</b>	<b>243,400</b>	<b>17,768</b>	<b>8</b>
<b>State</b>	<b>All</b>	<b>1,796</b>	<b>8,436,000</b>	<b>461,268</b>	<b>5</b>

<sup>§</sup> Note: USDA/NASS Minnesota Corn Acreage Planted

\* Not reported by NASS

## Statewide Herbicide Applications and Management on Corn

Ninety four percent (94%) of the respondents reported using herbicides and those respondents managed 97% of the corn acres reported in this survey (Table 2). As previously stated, if herbicides were not used, the respondent's survey was then concluded.

Tables 3 through 33 contain information from all corn producers that used herbicides. Because, not all farmers answered every question, the sum of total acres and the sum of total respondents are sometimes less than the statewide averages.

Participants were then asked who made the application (Q. 3). Forty-one percent (41%) of the respondents reported self-applied, 48% of the respondents reported custom applied and 12% of the respondents reported both self-applied and custom applied. Table 3 summarizes who applied the application and the responses are grouped by PMAs.

Farmers who applied their own herbicides averaged 347 acres of corn while farmers who had pesticides custom applied averaged 165 acres of corn. Farmers who both self-applied and custom applied herbicides raised an average of 402 acres of corn.

**Table 2. Percentage of respondents that used corn herbicides.**

Pesticide Monitoring Area	Do You Use Herbicides?	Percent of All Respondents
1 – Northwest Red River	Yes	98
	No	2
4 – Central Sands	Yes	91
	No	9
5 – East Central	Yes	94
	No	6
6 – West Central	Yes	95
	No	5
7 – Southwest	Yes	97
	No	3
8 – South Central	Yes	94
	No	6
9 – Southeast	Yes	94
	No	6
10 – Metro	Yes	94
	No	6
Statewide	Yes	94
Statewide	No	6

**Table 3. “Did you: Apply herbicides yourself? Have herbicides custom applied? Both?” (Q.3)**

<b>Pesticide Monitoring Area</b>	<b>Application Type</b>	<b>Percent of Respondents</b>	<b>Average Corn Acres per Respondent</b>
1 – Northwest Red River	Self-Applied	53	561
1 – Northwest Red River	Custom Applied	28	210
1 – Northwest Red River	Both	19	341
4 – Central Sands	Self-Applied	39	190
4 – Central Sands	Custom Applied	55	112
4 – Central Sands	Both	6	286
5 – East Central	Self-Applied	43	103
5 – East Central	Custom Applied	49	119
5 – East Central	Both	8	295
6 – West Central	Self-Applied	45	697
6 – West Central	Custom Applied	41	271
6 – West Central	Both	15	425
7 – Southwest	Self-Applied	46	397
7 – Southwest	Custom Applied	37	233
7 – Southwest	Both	17	292
8 – South Central	Self-Applied	41	382
8 – South Central	Custom Applied	45	199
8 – South Central	Both	14	471
9 – Southeast	Self-Applied	35	255
9 – Southeast	Custom Applied	56	142
9 – Southeast	Both	9	468
10 – Metro	Self-Applied	28	329
10 – Metro	Custom Applied	56	121
10 – Metro	Both	16	352
Statewide	Self-Applied	41	347
Statewide	Custom Applied	48	165
Statewide	Both	12	402

Farmers were asked, “Do you know the active ingredients (a.i.) of the herbicides you used in 2012?” (Q.4). Based upon previous surveys, most farmers identified the product name (i.e. “Roundup”, etc.), but identifying the AI (i.e. glyphosate) was considerably more challenging. Of all statewide respondents (self-applicators and those that hired a custom applicator), 51% stated they knew the a.i. in their herbicide applications and 7% stated they knew some of the a.i. (Table 4). Sixty-five percent of the farmers that applied the products themselves<sup>7</sup> were able to identify the a.i. It must be emphasized that farmers were asked these questions “on the spot” and were not given the opportunity to check their records during the telephone interview.

**Table 4. “Do you know the active ingredients of the herbicides you used in 2012?” (Q.4)**

<b>Pesticide Monitoring Area</b>	<b>Knew the Active Ingredients</b>	<b>Percent of All Respondents</b>	<b>Percent of “Self-Applicators”</b>
1 – Northwest Red River	Yes	57	57
1 – Northwest Red River	No	38	39
1 – Northwest Red River	Some	5	4
4 – Central Sands	Yes	56	69
4 – Central Sands	No	37	22
4 – Central Sands	Some	7	11
5 – East Central	Yes	51	62
5 – East Central	No	38	31
5 – East Central	Some	11	8
6 – West Central	Yes	48	54
6 – West Central	No	43	35
6 – West Central	Some	9	12
7 – Southwest	Yes	47	56
7 – Southwest	No	45	35
7 – Southwest	Some	9	9
8 – South Central	Yes	53	70
8 – South Central	No	41	26
8 – South Central	Some	6	5
9 – Southeast	Yes	43	67
9 – Southeast	No	48	28
9 – Southeast	Some	9	5
10 – Metro	Yes	42	48
10 – Metro	No	56	48
10 – Metro	Some	2	4
<b>Statewide</b>	<b>Yes</b>	<b>51</b>	<b>65</b>

<sup>7</sup> Farmers that applied pesticides themselves, referred to as “self-applicators,” includes farmers that self-apply and farmers that self-apply and custom apply (both), but not farmers who only had herbicides custom applied.

<b>Pesticide Monitoring Area</b>	<b>Knew the Active Ingredients</b>	<b>Percent of All Respondents</b>	<b>Percent of “Self-Applicators”</b>
<b>Statewide</b>	<b>No</b>	<b>42</b>	<b>30</b>
<b>Statewide</b>	<b>Some</b>	<b>7</b>	<b>5</b>

\*Totals may not add due to rounding

Producers were asked if they kept pesticide application records on the farm (Q.5). Sixty-six percent of all statewide respondents kept all their herbicide records on the farm and 3% kept some records on the farm (Table 5). Eighty-four percent of the farmers that applied their own herbicides kept records on the farm.

**Table 5. “Do you keep herbicide application records on your farm?” (Q.5)**

<b>Pesticide Monitoring Area</b>	<b>Kept “On Farm” Pesticide Records</b>	<b>Percent of All Respondents</b>	<b>Percent of Self-Applicators</b>
1 – Northwest Red River	Yes	81	85
1 – Northwest Red River	No	17	11
1 – Northwest Red River	Some	2	4
4 – Central Sands	Yes	55	60
4 – Central Sands	No	42	38
4 – Central Sands	Some	2	2
5 – East Central	Yes	64	74
5 – East Central	No	31	19
5 – East Central	Some	5	6
6 – West Central	Yes	74	84
6 – West Central	No	22	11
6 – West Central	Some	3	5
7 – Southwest	Yes	77	88
7 – Southwest	No	21	9
7 – Southwest	Some	3	3
8 – South Central	Yes	71	80
8 – South Central	No	27	17
8 – South Central	Some	2	2
9 – Southeast	Yes	57	65
9 – Southeast	No	39	29
9 – Southeast	Some	4	6
10 – Metro	Yes	69	79
10 – Metro	No	28	18
10 – Metro	Some	2	3
Statewide	Yes	66	84
Statewide	No	31	18
Statewide	Some	3	3

\*Totals may not add due to rounding

Participants were asked about the practice of reading the label (Q.6) and the results are provided in Table 6. Eighty-nine percent of all statewide respondents who applied herbicide themselves usually read the label. This percentage drops to 64% for farmers who hired custom applicators.

**Table 6. “Do you usually read the label for pesticide products applied on your farm?” (Q.6)**

<b>Pesticide Management Area</b>	<b>Response to “Reading the Label”</b>	<b>Percent of All Respondents</b>	<b>Percent of Self-Applicators</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>75</b>	<b>90</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>25</b>	<b>10</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>55</b>	<b>86</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>45</b>	<b>14</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>61</b>	<b>85</b>
<b>5 – East Central</b>	<b>No</b>	<b>39</b>	<b>15</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>64</b>	<b>88</b>
<b>6 – West Central</b>	<b>No</b>	<b>36</b>	<b>12</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>78</b>	<b>89</b>
<b>7 – Southwest</b>	<b>No</b>	<b>22</b>	<b>11</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>66</b>	<b>89</b>
<b>8 – South Central</b>	<b>No</b>	<b>34</b>	<b>11</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>54</b>	<b>90</b>
<b>9 – Southeast</b>	<b>No</b>	<b>46</b>	<b>10</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>57</b>	<b>91</b>
<b>10 – Metro</b>	<b>No</b>	<b>43</b>	<b>9</b>
<b>Statewide</b>	<b>Yes</b>	<b>64</b>	<b>89</b>
<b>Statewide</b>	<b>No</b>	<b>36</b>	<b>12</b>

\*Totals may not add due to rounding



Participants were asked if they applied atrazine to their corn acres. A “Yes” response means they did use atrazine on at least **some** of their corn acres. A “No” response means they did not use atrazine on any of their corn acres. Table 7 details the responses to the question of whether atrazine was used and the percentage of farmers who knew if they applied atrazine (answered yes or no). Statewide, thirteen percent of the respondents applied atrazine on some of their acres.

**Table 7. “Was Atrazine applied on any of your corn acres in 2012, premixes included?” (Q.7)**

<b>Pesticide Monitoring Area</b>	<b>Atrazine Applied</b>	<b>Percent of All Respondents</b>	<b>Percent of Respondents who Knew<sup>§</sup></b>
1 – Northwest Red River	Yes	8	8
1 – Northwest Red River	No	82	92
1 – Northwest Red River	Don't Know	10	
4 – Central Sands	Yes	9	11
4 – Central Sands	No	79	89
4 – Central Sands	Don't Know	11	
5 – East Central	Yes	28	31
5 – East Central	No	61	69
5 – East Central	Don't Know	11	
6 – West Central	Yes	9	9
6 – West Central	No	86	91
6 – West Central	Don't Know	5	
7 – Southwest	Yes	10	11
7 – Southwest	No	84	89
7 – Southwest	Don't Know	6	
8 – South Central	Yes	11	12
8 – South Central	No	81	88
8 – South Central	Don't Know	6	
9 – Southeast	Yes	23	26
9 – Southeast	No	65	74
9 – Southeast	Don't Know	11	
10 – Metro	Yes	20	22
10 – Metro	No	69	78
10 – Metro	Don't Know	11	
<b>Statewide</b>	<b>Yes</b>	<b>13</b>	<b>14</b>
<b>Statewide</b>	<b>No</b>	<b>78</b>	<b>86</b>
<b>Statewide</b>	<b>Don't Know</b>	<b>9</b>	

<sup>§</sup> Percent was calculated using only those respondents who answered yes or no to the question.

\*Totals may not add due to rounding

Ten percent (161 farmers) of the producers were not aware whether their herbicide package included atrazine (as an AI). Of this subgroup, 22% (or 36 farmers) knew the product(s) in their package. Of the farmers that knew the product name(s), it was determined that 36% (or 10 farmers) did apply a product within their herbicide package that contained atrazine.

Tables 8-9 pertain to the farmers applying atrazine. Included are those farmers who answered, “Yes”, to the question: “Was atrazine applied on any of your corn acres?” Farmers who answered, “I don’t know”, were included if they were later determined to have applied atrazine through identification of the product name. These farmers were classified through Q.7, Q.8, and Q.9.

**Table 8. “Was Atrazine incorporated on any of your corn acres in 2012, premixes included?” (Q.10)**

<b>Pesticide Monitoring Area</b>	<b>Was Atrazine Incorporated</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>14</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>86</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>52</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>48</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>47</b>
<b>5 – East Central</b>	<b>No</b>	<b>53</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>45</b>
<b>6 – West Central</b>	<b>No</b>	<b>55</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>21</b>
<b>7 – Southwest</b>	<b>No</b>	<b>79</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>29</b>
<b>8 – South Central</b>	<b>No</b>	<b>71</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>37</b>
<b>9 – Southeast</b>	<b>No</b>	<b>63</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>25</b>
<b>10 – Metro</b>	<b>No</b>	<b>75</b>
<b>Statewide</b>	<b>Yes</b>	<b>36</b>
<b>Statewide</b>	<b>No</b>	<b>64</b>

\*Totals may not add due to rounding

**Table 9. “Was Atrazine split applied on any of your corn acres in 2012, premixes included?” (Q.11)**

<b>Pesticide Monitoring Area</b>	<b>Was Atrazine Split Applied</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>29</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>71</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>10</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>90</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>13</b>
<b>5 – East Central</b>	<b>No</b>	<b>87</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>9</b>
<b>6 – West Central</b>	<b>No</b>	<b>91</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>8</b>
<b>7 – Southwest</b>	<b>No</b>	<b>92</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>11</b>
<b>8 – South Central</b>	<b>No</b>	<b>89</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>18</b>
<b>9 – Southeast</b>	<b>No</b>	<b>82</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>6</b>
<b>10 – Metro</b>	<b>No</b>	<b>94</b>
<b>Statewide</b>	<b>Yes</b>	<b>13</b>
<b>Statewide</b>	<b>No</b>	<b>87</b>

\*Totals may not add due to rounding

**Table 10. “Was Acetochlor applied on any of your corn acres in 2012, premixes included?” (Q.12)**

<b>Pesticide Monitoring Area</b>	<b>Acetochlor Applied</b>	<b>Percent of All Respondents</b>	<b>Percent of Respondents who Knew<sup>§</sup></b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>27</b>	<b>28</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>68</b>	<b>72</b>
<b>1 – Northwest Red River</b>	<b>Don’t Know</b>	<b>5</b>	
<b>4 – Central Sands</b>	<b>Yes</b>	<b>24</b>	<b>28</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>63</b>	<b>72</b>
<b>4 – Central Sands</b>	<b>Don’t Know</b>	<b>12</b>	
<b>5 – East Central</b>	<b>Yes</b>	<b>26</b>	<b>31</b>
<b>5 – East Central</b>	<b>No</b>	<b>59</b>	<b>69</b>
<b>5 – East Central</b>	<b>Don’t Know</b>	<b>15</b>	
<b>6 – West Central</b>	<b>Yes</b>	<b>48</b>	<b>50</b>
<b>6 – West Central</b>	<b>No</b>	<b>47</b>	<b>50</b>
<b>6 – West Central</b>	<b>Don’t Know</b>	<b>5</b>	
<b>7 – Southwest</b>	<b>Yes</b>	<b>55</b>	<b>56</b>
<b>7 – Southwest</b>	<b>No</b>	<b>43</b>	<b>44</b>
<b>7 – Southwest</b>	<b>Don’t Know</b>	<b>3</b>	
<b>8 – South Central</b>	<b>Yes</b>	<b>41</b>	<b>43</b>
<b>8 – South Central</b>	<b>No</b>	<b>53</b>	<b>57</b>
<b>8 – South Central</b>	<b>Don’t Know</b>	<b>6</b>	
<b>9 – Southeast</b>	<b>Yes</b>	<b>40</b>	<b>46</b>
<b>9 – Southeast</b>	<b>No</b>	<b>47</b>	<b>54</b>
<b>9 – Southeast</b>	<b>Don’t Know</b>	<b>13</b>	
<b>10 – Metro</b>	<b>Yes</b>	<b>33</b>	<b>39</b>
<b>10 – Metro</b>	<b>No</b>	<b>53</b>	<b>61</b>
<b>10 – Metro</b>	<b>Don’t Know</b>	<b>14</b>	
<b>Statewide</b>	<b>Yes</b>	<b>37</b>	<b>40</b>
<b>Statewide</b>	<b>No</b>	<b>55</b>	<b>60</b>
<b>Statewide</b>	<b>Don’t Know</b>	<b>9</b>	

<sup>§</sup> Percent was calculated using only those respondents who answered yes or no to the question.

\*Totals may not add due to rounding

Editor’s Note. Due to an error in data collection, additional acetochlor information was not gathered for this report. All follow up inquiries are not included in this report. With data pool, being smaller, there was a substantial increase with farmers who knew if acetochlor was applied.

Due to the straight-forward nature of the remaining tables, only a minimal amount of supporting information was provided under the “Editor’s Notes”.

**Table 11. “Was Acetochlor incorporated on any of your corn acres in 2012, premixes included?” (Q.15)**

<b>Pesticide Monitoring Area</b>	<b>Was Acetochlor Incorporated</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>29</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>71</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>39</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>61</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>25</b>
<b>5 – East Central</b>	<b>No</b>	<b>75</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>51</b>
<b>6 – West Central</b>	<b>No</b>	<b>49</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>39</b>
<b>7 – Southwest</b>	<b>No</b>	<b>61</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>45</b>
<b>8 – South Central</b>	<b>No</b>	<b>55</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>17</b>
<b>9 – Southeast</b>	<b>No</b>	<b>83</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>48</b>
<b>10 – Metro</b>	<b>No</b>	<b>52</b>
<b>Statewide</b>	<b>Yes</b>	<b>38</b>
<b>Statewide</b>	<b>No</b>	<b>62</b>

\*Totals may not add due to rounding

**Table 12. “Was Acetochlor split applied on any of your corn acres in 2012, premixes included?” (Q.16)**

<b>Pesticide Monitoring Area</b>	<b>Was Acetochlor Split Applied</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>4</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>96</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>13</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>87</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>0</b>
<b>5 – East Central</b>	<b>No</b>	<b>100</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>12</b>
<b>6 – West Central</b>	<b>No</b>	<b>88</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>8</b>
<b>7 – Southwest</b>	<b>No</b>	<b>92</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>6</b>
<b>8 – South Central</b>	<b>No</b>	<b>94</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>10</b>
<b>9 – Southeast</b>	<b>No</b>	<b>90</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>17</b>
<b>10 – Metro</b>	<b>No</b>	<b>83</b>
<b>Statewide</b>	<b>Yes</b>	<b>9</b>
<b>Statewide</b>	<b>No</b>	<b>91</b>

\*Totals may not add due to rounding

## Herbicide Program Decisions

Questions 17-20 were related to herbicide decisions. Only farmers who applied atrazine or acetochlor answered these questions. Of the 1,796 farmers surveyed, 729 (41%) applied either atrazine or acetochlor. The following questions were answered by those 729 farmers who applied atrazine or acetochlor.

**Table 13. “Who decides what products to apply?” (Q.17)**

<b>Pesticide Monitoring Area</b>	<b>Who Decides What Product to Apply</b>	<b>Percent of All Respondents</b>
1 – Northwest Red River	Farmer	43
1 – Northwest Red River	Dealer/Consultant	18
1 – Northwest Red River	Both	39
4 – Central Sands	Farmer	23
4 – Central Sands	Dealer/Consultant	34
4 – Central Sands	Both	43
5 – East Central	Farmer	42
5 – East Central	Dealer/Consultant	21
5 – East Central	Both	38
6 – West Central	Farmer	35
6 – West Central	Dealer/Consultant	14
6 – West Central	Both	51
7 – Southwest	Farmer	30
7 – Southwest	Dealer/Consultant	20
7 – Southwest	Both	50
8 – South Central	Farmer	34
8 – South Central	Dealer/Consultant	17
8 – South Central	Both	49
9 – Southeast	Farmer	18
9 – Southeast	Dealer/Consultant	32
9 – Southeast	Both	50
10 – Metro	Farmer	17
10 – Metro	Dealer/Consultant	37
10 – Metro	Both	46
Statewide	Farmer	29
Statewide	Dealer/Consultant	24
Statewide	Both	48

\*Totals may not add due to rounding

**Table 14. “Who decides when to apply the herbicides?” (Q.18)**

<b>Pesticide Monitoring Area</b>	<b>Who Decides When to Apply Herbicides</b>	<b>Percent of All Respondents</b>
<b>1 – Northwest Red River</b>	<b>Farmer</b>	<b>43</b>
<b>1 – Northwest Red River</b>	<b>Dealer/Consultant</b>	<b>18</b>
<b>1 – Northwest Red River</b>	<b>Both</b>	<b>39</b>
<b>4 – Central Sands</b>	<b>Farmer</b>	<b>23</b>
<b>4 – Central Sands</b>	<b>Dealer/Consultant</b>	<b>34</b>
<b>4 – Central Sands</b>	<b>Both</b>	<b>43</b>
<b>5 – East Central</b>	<b>Farmer</b>	<b>42</b>
<b>5 – East Central</b>	<b>Dealer/Consultant</b>	<b>21</b>
<b>5 – East Central</b>	<b>Both</b>	<b>38</b>
<b>6 – West Central</b>	<b>Farmer</b>	<b>35</b>
<b>6 – West Central</b>	<b>Dealer/Consultant</b>	<b>14</b>
<b>6 – West Central</b>	<b>Both</b>	<b>51</b>
<b>7 – Southwest</b>	<b>Farmer</b>	<b>30</b>
<b>7 – Southwest</b>	<b>Dealer/Consultant</b>	<b>20</b>
<b>7 – Southwest</b>	<b>Both</b>	<b>50</b>
<b>8 – South Central</b>	<b>Farmer</b>	<b>34</b>
<b>8 – South Central</b>	<b>Dealer/Consultant</b>	<b>17</b>
<b>8 – South Central</b>	<b>Both</b>	<b>49</b>
<b>9 – Southeast</b>	<b>Farmer</b>	<b>18</b>
<b>9 – Southeast</b>	<b>Dealer/Consultant</b>	<b>32</b>
<b>9 – Southeast</b>	<b>Both</b>	<b>50</b>
<b>10 – Metro</b>	<b>Farmer</b>	<b>17</b>
<b>10 – Metro</b>	<b>Dealer/Consultant</b>	<b>37</b>
<b>10 – Metro</b>	<b>Both</b>	<b>46</b>
<b>Statewide</b>	<b>Farmer</b>	<b>29</b>
<b>Statewide</b>	<b>Dealer/Consultant</b>	<b>24</b>
<b>Statewide</b>	<b>Both</b>	<b>48</b>

\*Totals may not add due to rounding



**Table 15. “Who scouts your fields?” (Q.19)**

<b>Pesticide Monitoring Area</b>	<b>Who Scouts Your Fields</b>	<b>Percent of All Respondents</b>
1 – Northwest Red River	Farmer	43
1 – Northwest Red River	Dealer/Consultant	32
1 – Northwest Red River	Both	25
1 – Northwest Red River	Field Not Scouted	0
4 – Central Sands	Farmer	43
4 – Central Sands	Dealer/Consultant	31
4 – Central Sands	Both	23
4 – Central Sands	Field Not Scouted	3
5 – East Central	Farmer	63
5 – East Central	Dealer/Consultant	4
5 – East Central	Both	29
5 – East Central	Field Not Scouted	4
6 – West Central	Farmer	49
6 – West Central	Dealer/Consultant	16
6 – West Central	Both	35
6 – West Central	Field Not Scouted	0
7 – Southwest	Farmer	45
7 – Southwest	Dealer/Consultant	29
7 – Southwest	Both	24
7 – Southwest	Field Not Scouted	1
8 – South Central	Farmer	56
8 – South Central	Dealer/Consultant	19
8 – South Central	Both	24
8 – South Central	Field Not Scouted	2
9 – Southeast	Farmer	44
9 – Southeast	Dealer/Consultant	29
9 – Southeast	Both	25
9 – Southeast	Field Not Scouted	1
10 – Metro	Farmer	46
10 – Metro	Dealer/Consultant	31
10 – Metro	Both	23
10 – Metro	Field Not Scouted	0
Statewide	Farmer	49
Statewide	Dealer/Consultant	24
Statewide	Both	25
Statewide	Field Not Scouted	2

\*Totals may not add due to rounding

**Table 16. “Who determines if application setbacks or restrictions are appropriate on your farm?” (Q.20)**

<b>Pesticide Monitoring Area</b>	<b>Who Determines Setbacks</b>	<b>Percent of All Respondents</b>
1 – Northwest Red River	Farmer	54
1 – Northwest Red River	Dealer/Consultant	11
1 – Northwest Red River	Both	36
1 – Northwest Red River	Neither	0
4 – Central Sands	Farmer	29
4 – Central Sands	Dealer/Consultant	39
4 – Central Sands	Both	27
4 – Central Sands	Neither	5
5 – East Central	Farmer	46
5 – East Central	Dealer/Consultant	25
5 – East Central	Both	25
5 – East Central	Neither	4
6 – West Central	Farmer	40
6 – West Central	Dealer/Consultant	30
6 – West Central	Both	29
6 – West Central	Neither	2
7 – Southwest	Farmer	41
7 – Southwest	Dealer/Consultant	29
7 – Southwest	Both	26
7 – Southwest	Neither	4
8 – South Central	Farmer	44
8 – South Central	Dealer/Consultant	28
8 – South Central	Both	27
8 – South Central	Neither	2
9 – Southeast	Farmer	32
9 – Southeast	Dealer/Consultant	29
9 – Southeast	Both	37
9 – Southeast	Neither	2
10 – Metro	Farmer	29
10 – Metro	Dealer/Consultant	40
10 – Metro	Both	37
10 – Metro	Neither	2
Statewide	Farmer	39
Statewide	Dealer/Consultant	30
Statewide	Both	29
Statewide	Neither	2

\*Totals may not add due to rounding

## Scouting for Weeds and Related Practices

**Table 17. “Has someone mapped weed infestations in any of your fields in the last three years?” (Q.21)**

<b>Pesticide Monitoring Area</b>	<b>Weed Infestations Mapped Last 3 Years</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>18</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>82</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>12</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>88</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>4</b>
<b>5 – East Central</b>	<b>No</b>	<b>96</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>11</b>
<b>6 – West Central</b>	<b>No</b>	<b>89</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>29</b>
<b>7 – Southwest</b>	<b>No</b>	<b>71</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>13</b>
<b>8 – South Central</b>	<b>No</b>	<b>87</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>15</b>
<b>9 – Southeast</b>	<b>No</b>	<b>85</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>11</b>
<b>10 – Metro</b>	<b>No</b>	<b>89</b>
<b>Statewide</b>	<b>Yes</b>	<b>15</b>
<b>Statewide</b>	<b>No</b>	<b>85</b>

\*Totals may not add due to rounding

**Table 18. “Do you choose herbicides based on type of weeds and/or density of weeds?” (Q.22)**

<b>Pesticide Monitoring Area</b>	<b>Herbicide Choice Based on Weeds</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>96</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>4</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>90</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>10</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>83</b>
<b>5 – East Central</b>	<b>No</b>	<b>17</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>97</b>
<b>6 – West Central</b>	<b>No</b>	<b>3</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>98</b>
<b>7 – Southwest</b>	<b>No</b>	<b>2</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>91</b>
<b>8 – South Central</b>	<b>No</b>	<b>9</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>89</b>
<b>9 – Southeast</b>	<b>No</b>	<b>11</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>91</b>
<b>10 – Metro</b>	<b>No</b>	<b>9</b>
<b>Statewide</b>	<b>Yes</b>	<b>92</b>
<b>Statewide</b>	<b>No</b>	<b>8</b>

\*Totals may not add due to rounding

## Water Resources and Soil Resources

Table 19. “Do you know the soil texture of your farm?” (Q.23)

<b>Pesticide Monitoring Area</b>	<b>Soil Texture Known of Farm Soils</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>93</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>7</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>90</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>10</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>88</b>
<b>5 – East Central</b>	<b>No</b>	<b>13</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>84</b>
<b>6 – West Central</b>	<b>No</b>	<b>16</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>78</b>
<b>7 – Southwest</b>	<b>No</b>	<b>22</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>88</b>
<b>8 – South Central</b>	<b>No</b>	<b>12</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>78</b>
<b>9 – Southeast</b>	<b>No</b>	<b>22</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>83</b>
<b>10 – Metro</b>	<b>No</b>	<b>17</b>
<b>Statewide</b>	<b>Yes</b>	<b>85</b>
<b>Statewide</b>	<b>No</b>	<b>15</b>

\*Totals may not add due to rounding

**Table 20. “Do you know the organic matter level of your farm soils?” (Q.24)**

<b>Pesticide Monitoring Area</b>	<b>Organic Matter Known of Farm Soils</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>82</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>18</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>58</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>42</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>63</b>
<b>5 – East Central</b>	<b>No</b>	<b>38</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>79</b>
<b>6 – West Central</b>	<b>No</b>	<b>21</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>76</b>
<b>7 – Southwest</b>	<b>No</b>	<b>24</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>73</b>
<b>8 – South Central</b>	<b>No</b>	<b>27</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>56</b>
<b>9 – Southeast</b>	<b>No</b>	<b>44</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>51</b>
<b>10 – Metro</b>	<b>No</b>	<b>49</b>
<b>Statewide</b>	<b>Yes</b>	<b>67</b>
<b>Statewide</b>	<b>No</b>	<b>33</b>

\*Totals may not add due to rounding

**Table 21. “Do you know the depth to the water table in your field?” (Q.25)**

<b>Pesticide Monitoring Area</b>	<b>Knowledge of Depth to the Water Table</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>32</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>68</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>38</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>62</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>42</b>
<b>5 – East Central</b>	<b>No</b>	<b>58</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>32</b>
<b>6 – West Central</b>	<b>No</b>	<b>68</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>46</b>
<b>7 – Southwest</b>	<b>No</b>	<b>54</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>40</b>
<b>8 – South Central</b>	<b>No</b>	<b>60</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>26</b>
<b>9 – Southeast</b>	<b>No</b>	<b>74</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>37</b>
<b>10 – Metro</b>	<b>No</b>	<b>63</b>
<b>Statewide</b>	<b>Yes</b>	<b>37</b>
<b>Statewide</b>	<b>No</b>	<b>63</b>

\*Totals may not add due to rounding

Editor’s Note: Respondents that answered, “No” were then asked whether they believed that the depth to groundwater exceeded 30 feet. Table 22 details those responses.

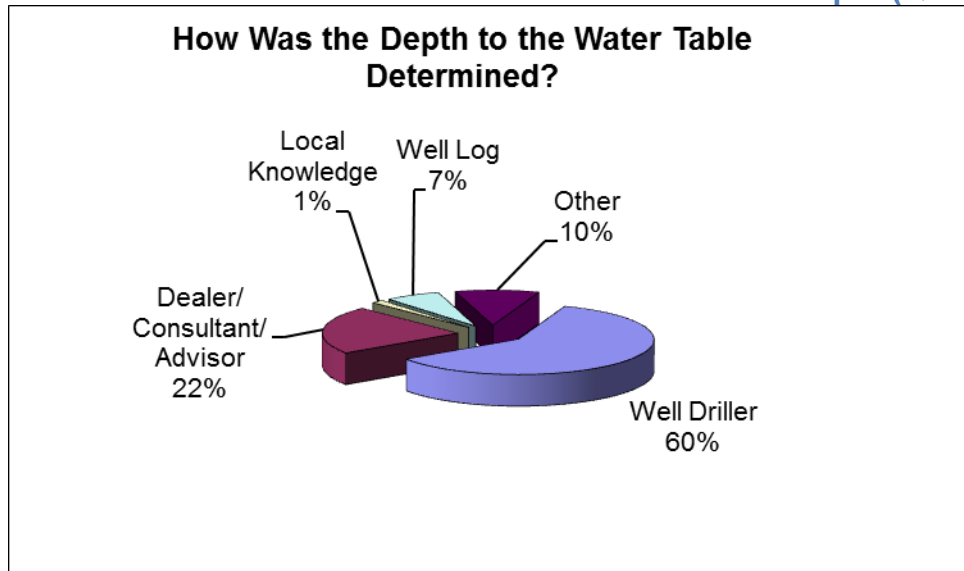
**Table 22. “Is the water table at a depth greater than 30 feet?” (Q.26)**

Pesticide Monitoring Area	“Yes” Response Percent of Respondents	“No” Response Percent of Respondents	Don’t Know Response Percent of Respondents
1 – Northwest Red River	46	29	25
4 – Central Sands	46	29	25
5 – East Central	38	38	25
6 – West Central	41	36	24
7 – Southwest	51	28	21
8 – South Central	39	33	27
9 – Southeast	58	19	23
10 – Metro	51	29	20
<b>Statewide</b>	<b>46</b>	<b>30</b>	<b>25</b>

\*Totals may not add due to rounding

Editor’s Note: Respondents who answered, “Yes”, to question 26 were then asked, “How was the depth primarily determined?” Figure 1 details their responses.

**Figure 1. Information sources used to determine water table depth (Q.26)**





**Table 23. “Are any streams, lakes, or other surface waters immediately adjacent to or in your corn fields?” (Q.27)**

<b>Pesticide Monitoring Area</b>	<b>Surface Water Adjacent to or in Field</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>29</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>71</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>31</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>69</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>33</b>
<b>5 – East Central</b>	<b>No</b>	<b>67</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>45</b>
<b>6 – West Central</b>	<b>No</b>	<b>55</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>32</b>
<b>7 – Southwest</b>	<b>No</b>	<b>68</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>38</b>
<b>8 – South Central</b>	<b>No</b>	<b>62</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>20</b>
<b>9 – Southeast</b>	<b>No</b>	<b>80</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>11</b>
<b>10 – Metro</b>	<b>No</b>	<b>89</b>
<b>Statewide</b>	<b>Yes</b>	<b>32</b>
<b>Statewide</b>	<b>No</b>	<b>68</b>

\*Totals may not add due to rounding

Editor’s Note: Respondents who answered, “Yes” to question 27 were then asked, “Are there filter strips or vegetative buffers on any of these acres?” Table 24 details their responses.

**Table 24. “Are there filter strips or vegetative buffers on any of these acres?” (Q.28.a)**

<b>Pesticide Monitoring Area</b>	<b>Filter Strips or Buffers</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>75</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>25</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>85</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>15</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>100</b>
<b>5 – East Central</b>	<b>No</b>	<b>0</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>82</b>
<b>6 – West Central</b>	<b>No</b>	<b>18</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>88</b>
<b>7 – Southwest</b>	<b>No</b>	<b>12</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>88</b>
<b>8 – South Central</b>	<b>No</b>	<b>12</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>93</b>
<b>9 – Southeast</b>	<b>No</b>	<b>7</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>100</b>
<b>10 – Metro</b>	<b>No</b>	<b>0</b>
<b>Statewide</b>	<b>Yes</b>	<b>88</b>
<b>Statewide</b>	<b>No</b>	<b>12</b>

\*Totals may not add due to rounding

Editor’s Note: Respondents who answered “Yes” to question 28a in regards to having filter strips or vegetative buffers were then asked, “Were they required as part of a conservation program?” Table 25 details their responses.

**Table 25. “Were they required as part of a conservation program?”(Q.28.a.i)**

<b>Pesticide Monitoring Area</b>	<b>Response</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>17</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>83</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>36</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>64</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>0</b>
<b>5 – East Central</b>	<b>No</b>	<b>100</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>36</b>
<b>6 – West Central</b>	<b>No</b>	<b>64</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>26</b>
<b>7 – Southwest</b>	<b>No</b>	<b>74</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>40</b>
<b>8 – South Central</b>	<b>No</b>	<b>60</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>24</b>
<b>9 – Southeast</b>	<b>No</b>	<b>76</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>50</b>
<b>10 – Metro</b>	<b>No</b>	<b>50</b>
<b>Statewide</b>	<b>Yes</b>	<b>33</b>
<b>Statewide</b>	<b>No</b>	<b>67</b>

\*Totals may not add due to rounding

**Table 26. “Do you irrigate corn?” (Q.29)**

<b>Pesticide Monitoring Area</b>	<b>Irrigation</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>0</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>100</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>14</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>86</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>0</b>
<b>5 – East Central</b>	<b>No</b>	<b>100</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>7</b>
<b>6 – West Central</b>	<b>No</b>	<b>93</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>0</b>
<b>7 – Southwest</b>	<b>No</b>	<b>100</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>3</b>
<b>8 – South Central</b>	<b>No</b>	<b>97</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>0</b>
<b>9 – Southeast</b>	<b>No</b>	<b>100</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>14</b>
<b>10 – Metro</b>	<b>No</b>	<b>86</b>
<b>Statewide</b>	<b>Yes</b>	<b>4</b>
<b>Statewide</b>	<b>No</b>	<b>96</b>

\*Totals may not add due to rounding

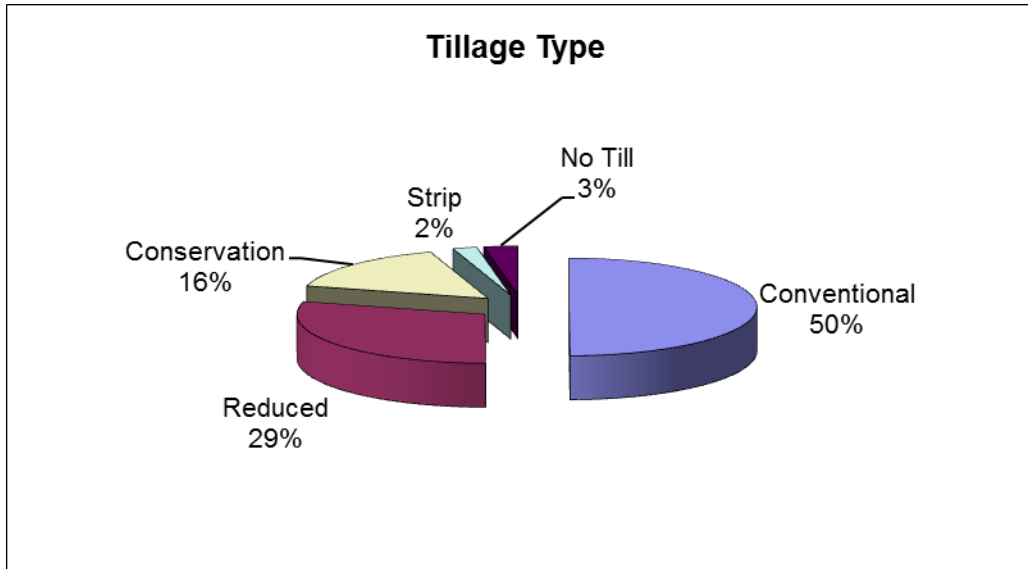
**Table 27. “Do you have an irrigation water management plan?” (Q.30)**

<b>Pesticide Monitoring Area</b>	<b>Irrigation Water Management Plan</b>	<b>Percent of Respondents</b>
<b>Statewide</b>	<b>Yes</b>	<b>58</b>
<b>Statewide</b>	<b>No</b>	<b>42</b>

\*Totals may not add due to rounding

Editor’s Note. Only four percent (or 31) of the farmers used irrigation on corn acres; due to the small numbers of farmers irrigating, only statewide data is reported.

Figure 2. “What type of tillage did you use before planting on the majority of your corn acres?” (Q.31)



### General Practices for Herbicide Application

Table 28. “Do you use precision applications for herbicides (variable rate applications)?” (Q.32)

Pesticide Monitoring Area	Variable Rate Applications	Percent of Respondents
1 – Northwest Red River	Yes	25
1 – Northwest Red River	No	75
4 – Central Sands	Yes	36
4 – Central Sands	No	64
5 – East Central	Yes	17
5 – East Central	No	83
6 – West Central	Yes	37
6 – West Central	No	63
7 – Southwest	Yes	54
7 – Southwest	No	46
8 – South Central	Yes	46
8 – South Central	No	54
9 – Southeast	Yes	33
9 – Southeast	No	67
10 – Metro	Yes	40
10 – Metro	No	60
Statewide	Yes	40

Pesticide Monitoring Area	Variable Rate Applications	Percent of Respondents
Statewide	No	60

Table 29. “In general, do you alternate use of herbicide products to keep weeds from becoming resistant to herbicides?” (Q.33)

Pesticide Monitoring Area	Response to Using Alternative Herbicide	Percent of Respondents
1 – Northwest Red River	Yes	93
1 – Northwest Red River	No	7
4 – Central Sands	Yes	76
4 – Central Sands	No	24
5 – East Central	Yes	87
5 – East Central	No	13
6 – West Central	Yes	92
6 – West Central	No	8
7 – Southwest	Yes	91
7 – Southwest	No	9
8 – South Central	Yes	88
8 – South Central	No	12
9 – Southeast	Yes	83
9 – Southeast	No	17
10 – Metro	Yes	86
10 – Metro	No	14
Statewide	Yes	86
Statewide	No	14

\*Totals may not add due to rounding

**Table 30. “Did you reduce from previous applications, the rate per acre of any corn herbicide?” (Q.34)**

<b>Pesticide Monitoring Area</b>	<b>Reduced Rate from Previous Applications</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>21</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>79</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>42</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>58</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>39</b>
<b>5 – East Central</b>	<b>No</b>	<b>61</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>13</b>
<b>6 – West Central</b>	<b>No</b>	<b>87</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>30</b>
<b>7 – Southwest</b>	<b>No</b>	<b>70</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>34</b>
<b>8 – South Central</b>	<b>No</b>	<b>66</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>37</b>
<b>9 – Southeast</b>	<b>No</b>	<b>63</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>40</b>
<b>10 – Metro</b>	<b>No</b>	<b>60</b>
<b>Statewide</b>	<b>Yes</b>	<b>33</b>
<b>Statewide</b>	<b>No</b>	<b>67</b>

\*Totals may not add due to rounding

**Table 31. “Did you select an herbicide with a different mode of action to reduce weed resistance to herbicides?” (Q.35)**

<b>Pesticide Monitoring Area</b>	<b>Selected Herbicide with Different Mode of Action to Reduce Weed Resistance</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>71</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>29</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>56</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>44</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>64</b>
<b>5 – East Central</b>	<b>No</b>	<b>36</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>85</b>
<b>6 – West Central</b>	<b>No</b>	<b>15</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>89</b>
<b>7 – Southwest</b>	<b>No</b>	<b>11</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>80</b>
<b>8 – South Central</b>	<b>No</b>	<b>20</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>67</b>
<b>9 – Southeast</b>	<b>No</b>	<b>33</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>68</b>
<b>10 – Metro</b>	<b>No</b>	<b>32</b>
<b>Statewide</b>	<b>Yes</b>	<b>74</b>
<b>Statewide</b>	<b>No</b>	<b>26</b>

\*Totals may not add due to rounding



**Table 32. “Did you choose a particular herbicide to reduce impacts to surface water or groundwater?” (Q.36)**

<b>Pesticide Monitoring Area</b>	<b>Chose Herbicide to Reduce Impact to Surface or Groundwater</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>33</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>67</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>41</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>59</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>57</b>
<b>5 – East Central</b>	<b>No</b>	<b>43</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>44</b>
<b>6 – West Central</b>	<b>No</b>	<b>56</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>58</b>
<b>7 – Southwest</b>	<b>No</b>	<b>42</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>46</b>
<b>8 – South Central</b>	<b>No</b>	<b>54</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>48</b>
<b>9 – Southeast</b>	<b>No</b>	<b>52</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>45</b>
<b>10 – Metro</b>	<b>No</b>	<b>55</b>
<b>Statewide</b>	<b>Yes</b>	<b>47</b>
<b>Statewide</b>	<b>No</b>	<b>53</b>

\*Totals may not add due to rounding

**Table 33. “Did you band herbicide applications to reduce use?” (Q.37)**

<b>Pesticide Monitoring Area</b>	<b>Banded Herbicide Applications to Reduce Use</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Yes</b>	<b>7</b>
<b>1 – Northwest Red River</b>	<b>No</b>	<b>93</b>
<b>4 – Central Sands</b>	<b>Yes</b>	<b>9</b>
<b>4 – Central Sands</b>	<b>No</b>	<b>91</b>
<b>5 – East Central</b>	<b>Yes</b>	<b>22</b>
<b>5 – East Central</b>	<b>No</b>	<b>78</b>
<b>6 – West Central</b>	<b>Yes</b>	<b>2</b>
<b>6 – West Central</b>	<b>No</b>	<b>98</b>
<b>7 – Southwest</b>	<b>Yes</b>	<b>10</b>
<b>7 – Southwest</b>	<b>No</b>	<b>90</b>
<b>8 – South Central</b>	<b>Yes</b>	<b>6</b>
<b>8 – South Central</b>	<b>No</b>	<b>94</b>
<b>9 – Southeast</b>	<b>Yes</b>	<b>9</b>
<b>9 – Southeast</b>	<b>No</b>	<b>91</b>
<b>10 – Metro</b>	<b>Yes</b>	<b>3</b>
<b>10 – Metro</b>	<b>No</b>	<b>97</b>
<b>Statewide</b>	<b>Yes</b>	<b>7</b>
<b>Statewide</b>	<b>No</b>	<b>93</b>

\*Totals may not add due to rounding

## Statewide Insecticide Applications and Management on Crops

Questions 38-42 are related to insecticide decisions. Only corn farmers who applied products containing chlorpyrifos answered these questions. Of the 1,796 farmers surveyed, 233 (13%) applied chlorpyrifos. The following questions were answered by those 233 farmers who applied chlorpyrifos.

**Table 34. “Did you use one of the following insecticides that contain the same active ingredient (chlorpyrifos) in the 2012 crop season on any of your crops?” (Q.38)**

Pesticide Monitoring Area	Apply an Insecticide with Chlorpyrifos	Percent of Respondents
1 – Northwest Red River	Yes	17
1 – Northwest Red River	No	68
1 – Northwest Red River	Don't Know	15
4 – Central Sands	Yes	9
4 – Central Sands	No	81
4 – Central Sands	Don't Know	9
5 – East Central	Yes	5
5 – East Central	No	88
5 – East Central	Don't Know	7
6 – West Central	Yes	23
6 – West Central	No	65
6 – West Central	Don't Know	12
7 – Southwest	Yes	24
7 – Southwest	No	68
7 – Southwest	Don't Know	8
8 – South Central	Yes	17
8 – South Central	No	72
8 – South Central	Don't Know	11
9 – Southeast	Yes	7
9 – Southeast	No	83
9 – Southeast	Don't Know	11
10 – Metro	Yes	12
10 – Metro	No	80
10 – Metro	Don't Know	7
Statewide	Yes	14
Statewide	No	76
Statewide	Don't Know	10

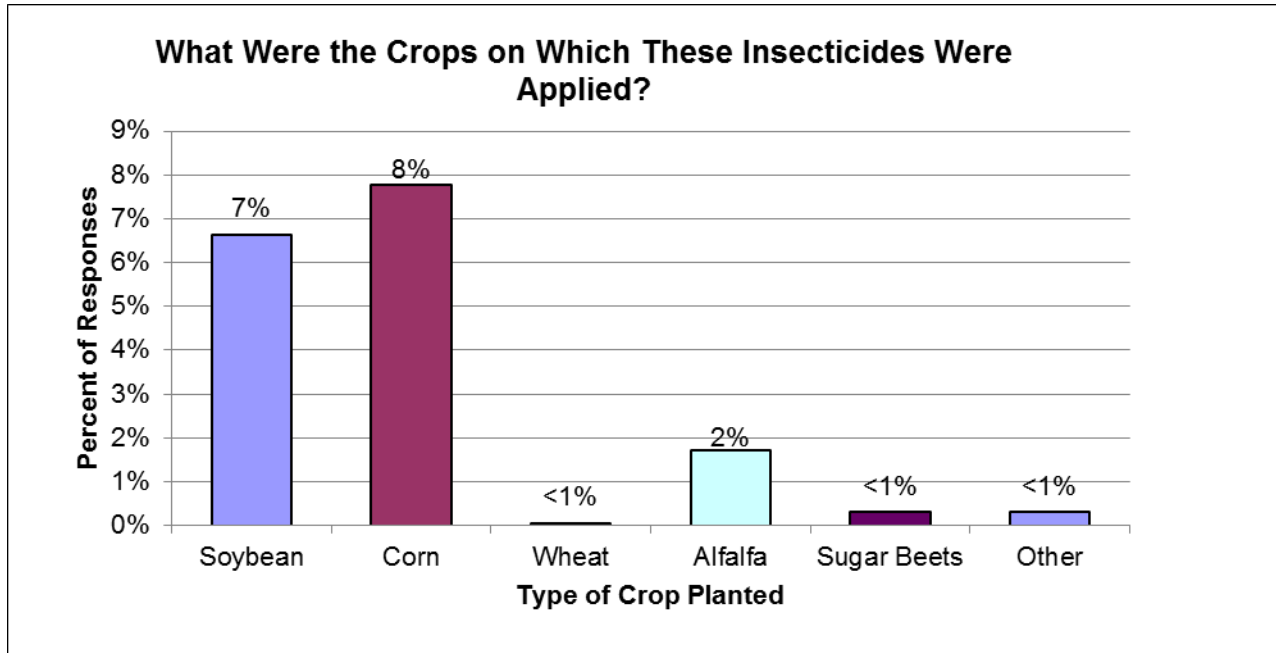
\*Totals may not add due to rounding

**Table 35. “Were any of these insecticide applications applied post-emergence?”  
(Q.39)**

<b>Pesticide Monitoring Area</b>	<b>Chlorpyrifos Applied Post-emergence</b>	<b>Percent of Respondents</b>
1 – Northwest Red River	Yes	44
1 – Northwest Red River	No	38
1 – Northwest Red River	Don't Know	19
4 – Central Sands	Yes	37
4 – Central Sands	No	26
4 – Central Sands	Don't Know	37
5 – East Central	Yes	67
5 – East Central	No	33
5 – East Central	Don't Know	0
6 – West Central	Yes	31
6 – West Central	No	50
6 – West Central	Don't Know	19
7 – Southwest	Yes	26
7 – Southwest	No	38
7 – Southwest	Don't Know	35
8 – South Central	Yes	38
8 – South Central	No	32
8 – South Central	Don't Know	30
9 – Southeast	Yes	38
9 – Southeast	No	13
9 – Southeast	Don't Know	50
10 – Metro	Yes	30
10 – Metro	No	30
10 – Metro	Don't Know	40
Statewide	Yes	36
Statewide	No	33
Statewide	Don't Know	31

Thirteen (13%) percent (233 farmers) of all surveyed farmers (1,796 farmers) have applied an insecticide with the active ingredient, chlorpyrifos, to treat infestations. Figure 3 represents all farmers who applied any type of pesticide. The farmers surveyed grew corn as their primary crop and soybeans, alfalfa, sugar beets, wheat, or other (such as small grains or edible beans) as their secondary crops. Some farmers applied chlorpyrifos on more than one crop, so percentages can total more than the percent of surveyed farmers (13%)

**Figure 3. “What were the crops on which these insecticides (containing chlorpyrifos) were applied?” (Q.40)**



**Table 36. “Did you make this application yourself or was it custom applied?”  
(Q.41)**

<b>Pesticide Monitoring Area</b>	<b>Self-Application or Custom Application Containing Chlorpyrifos</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Self-Applied</b>	<b>38</b>
<b>1 – Northwest Red River</b>	<b>Custom Applied</b>	<b>63</b>
<b>4 – Central Sands</b>	<b>Self-Applied</b>	<b>57</b>
<b>4 – Central Sands</b>	<b>Custom Applied</b>	<b>43</b>
<b>5 – East Central</b>	<b>Self-Applied</b>	<b>67</b>
<b>5 – East Central</b>	<b>Custom Applied</b>	<b>33</b>
<b>6 – West Central</b>	<b>Self-Applied</b>	<b>48</b>
<b>6 – West Central</b>	<b>Custom Applied</b>	<b>52</b>
<b>7 – Southwest</b>	<b>Self-Applied</b>	<b>32</b>
<b>7 – Southwest</b>	<b>Custom Applied</b>	<b>68</b>
<b>8 – South Central</b>	<b>Self-Applied</b>	<b>51</b>
<b>8 – South Central</b>	<b>Custom Applied</b>	<b>49</b>
<b>9 – Southeast</b>	<b>Self-Applied</b>	<b>50</b>
<b>9 – Southeast</b>	<b>Custom Applied</b>	<b>50</b>
<b>10 – Metro</b>	<b>Self-Applied</b>	<b>50</b>
<b>10 – Metro</b>	<b>Custom Applied</b>	<b>50</b>
<b>Statewide</b>	<b>Self-Applied</b>	<b>48</b>
<b>Statewide</b>	<b>Custom Applied</b>	<b>52</b>

**Table 37. “Was the application made with a ground sprayer or by aircraft?” (Q.42)**

<b>Pesticide Monitoring Area</b>	<b>Applications by Ground Sprayer or Aircraft</b>	<b>Percent of Respondents</b>
<b>1 – Northwest Red River</b>	<b>Ground</b>	<b>56</b>
<b>1 – Northwest Red River</b>	<b>Aircraft</b>	<b>44</b>
<b>4 – Central Sands</b>	<b>Ground</b>	<b>82</b>
<b>4 – Central Sands</b>	<b>Aircraft</b>	<b>18</b>
<b>5 – East Central</b>	<b>Ground</b>	<b>100</b>
<b>5 – East Central</b>	<b>Aircraft</b>	<b>0</b>
<b>6 – West Central</b>	<b>Ground</b>	<b>68</b>
<b>6 – West Central</b>	<b>Aircraft</b>	<b>32</b>
<b>7 – Southwest</b>	<b>Ground</b>	<b>59</b>
<b>7 – Southwest</b>	<b>Aircraft</b>	<b>41</b>
<b>8 – South Central</b>	<b>Ground</b>	<b>71</b>
<b>8 – South Central</b>	<b>Aircraft</b>	<b>29</b>
<b>9 – Southeast</b>	<b>Ground</b>	<b>86</b>
<b>9 – Southeast</b>	<b>Aircraft</b>	<b>14</b>
<b>10 – Metro</b>	<b>Ground</b>	<b>90</b>
<b>10 – Metro</b>	<b>Aircraft</b>	<b>10</b>
<b>Statewide</b>	<b>Ground</b>	<b>72</b>
<b>Statewide</b>	<b>Aircraft</b>	<b>28</b>

## Appendix 1. Survey Form

P.O. Box 7068  
St. Paul, MN 55107-7068  
Telephone: 651-296-2230 or 1-800-453-7502  
FAX: 651-296-3185 or 1-800-839-2186

MINNESOTA  
AGRICULTURAL  
STATISTICS  
SERVICE

### Annual Pesticide Survey: Herbicide Applications and Practices on Corn in Planning for or During the 2012 Growing Season

Please make necessary corrections in name and address on the label.

1. Did you grow corn on your operation in 2012?

(Exclude sweet corn and popcorn)

**Yes**                       **No** - conclude interview

2. How many corn acres were planted for field corn in 2012?

### General Information

3. On your 2012 corn acres, did you:

Apply herbicides yourself?                      1

Have herbicides custom applied?                      2

Both?                      3

Don't use herbicides [conclude interview]                      4

4. Do you know the active ingredients of the herbicides you used on corn acres in 2012?

Yes = 1               No = 3               Some = 5

5. Do you keep herbicide application records on your farm?

Yes = 1               No = 3               Some = 5

6. Do you usually read the label for pesticide products applied on your farm?

Yes = 1               No = 3



**Atrazine Specific Questions**

7. Was Atrazine applied on any of your corn acres in 2012, premixes included?

Yes = 1 (go to 10)       No = 3 (go to 12)       Don't Know = 5

8. Do you know the products applied to your corn acres in 2012?

Yes = 1       No = 3

9. Were any of the following products applied on your corn acres in 2012?

\*\*Computer list of products used

Yes = 1       No = 3 (go to 12)

10. Was Atrazine incorporated on any of your corn acres in 2012, premixes included?

Yes = 1       No = 3       I Don't Know = 5

11. Was Atrazine split-applied on any of your corn acres in 2012, premixes included?

Yes = 1       No = 3       I Don't Know = 5

**Acetochlor Specific Questions**

12. Was Acetochlor applied on any of your corn acres in 2012, premixes included?

Yes = 1 (go to 15)       No = 3 (go to 17)       Don't Know = 5

13. Do you know the products applied to your corn acres in 2012?

Yes = 1       No = 3 (go to 17)

14. Were any of the following products applied on your corn acres in 2012?

\*\*Computer list of products used

Yes = 1       No = 3 (go to 17)

15. Was Acetochlor incorporated on any of your corn acres in 2012, premixes included?

Yes = 1       No = 3       Don't Know = 5

16. Was Acetochlor split-applied on any of your corn acres in 2012, premixes included?

Yes = 1       No = 3       Don't Know = 5

**What Decisions Do You and or Your Fertilizer Dealer or Crop Consultant Make in Regard to Your Herbicide Program?**

17. Who decides what products to apply?

- I do (the farmer)? 1   
Dealer/Crop consultant? 3  Enter Code  
Both together? 5

18. Who decides when to apply the herbicides?

- I do (the farmer)? 1   
Dealer/Crop consultant? 3  Enter Code  
Both together? 5

19. Who scouts your fields?

- I do (the farmer)? 1   
Dealer/Crop consultant? 2  Enter Code  
Both together? 3   
Fields not Scouted? 4

20. Setbacks or restrictions are part of many pesticide labels. Who determines if applications setbacks or restrictions are appropriate on your farm?

- I do (the farmer)? 1   
Dealer/Crop consultant? 2  Enter Code  
Both together? 3   
Neither? 4

**Scouting for Weeds and Related Practices**

21. Has someone mapped weed infestations in any of your corn fields in the last three years?

- Yes = 1       No = 3

22. Do you choose herbicides based on type of weeds and/or density of weeds?

- Yes = 1       No = 3

**Water Resources and Soil Resources**

23. Do you know the soil texture of your farm?

Yes = 1       No = 3

24. Do you know the organic matter level of your farms soils?

Yes = 1       No = 3

25. Do you know the depth to the water table in your fields?

Yes = 1       No = 3

26. Is the water table at a depth greater than 30 feet?

Yes = 1       No = 3 (go to 29)       Don't Know = 5 (go to 29)

If yes, how was the depth primarily determined? (Check one)

Well driller for drinking water      1

Local knowledge      2

A dealer, consultant or crop advisor      3

Well log      4

None of the above      5

27. Are any streams, lakes or other surface waters immediately adjacent to or in your corn fields?

Yes = 1       No = 3      (if no go to 29)

28a. Are there filter strips or vegetative buffers on any of these acres?

Yes = 1       No = 3      (if no go to 29)

i. If YES, were they required as part of a conservation program?

Yes = 1       No = 3

29. Do you irrigate corn?

Yes = 1       No = 3 (if no go to 32)

If, yes,

30. Do you have an irrigation water management plan?

Yes = 1       No = 3

31. What type of tillage did you use before planting on the majority of your corn acres? (Fall and Spring)
- Conventional < 15 residue 1
- Reduced Tillage 15 – 30? 2
- Conservation Tillage > 30? 3
- Strip Tillage 4
- No Tillage 5

**General Practices for Corn Acres Only**

32. Do you use precision applications for herbicides (variable rate applications)?
- Yes = 1       No = 3

33. In general, do you alternate use of herbicide products to keep weeds from becoming resistant to herbicides?

Yes = 1       No = 3

34. Did you reduce from previous applications, the rate per acre of any corn herbicide?

Yes = 1       No = 3

35. Did you select an herbicide with a different mode of action to reduce weed resistance to herbicides?

Yes = 1       No = 3

36. Did you choose a particular herbicide to reduce impacts to surface water or groundwater?

Yes = 1       No = 3

37. Did you band herbicide applications to reduce use?

Yes = 1       No = 3

**Insecticide Use and Application Methods on All Crops**

38. Did you use one of the following insecticides that contain the same active ingredient?

Lorsban, Colbalt, Govern, Hatchet, Nufos, Pilot, or Yuma

Yes = 1       No = 3

39. Were any of these insecticide applications applied post emergence?

Yes = 1       No = 2       Don't Know = 3

40. What were the crops on which these insecticides were applied?

- Soybean 1
- Corn 2
- Wheat 3
- Alfalfa 4
- Sugar Beets 5
- Other 6

41. Did you make this application yourself or was it custom applied?

- Self = 1       Custom = 2

42. Was the application made with a ground sprayer or by aircraft?

- Ground sprayer = 1       Aircraft = 2