SEGREGATING TRANSGENIC GRAINS: RESULTS OF A SURVEY AMONG COUNTRY ELEVATORS IN SOUTH DAKOTA

by

Bashir A. Qasmi, Clayton J. Wilhelm, and Evert Van der Sluis[1]

Research Report No. 2003-02
Economics Department
South Dakota State University
December 2003

Abstract

Using responses from a mail survey conducted among 203 South Dakota grain elevator managers in 2002, we analyzed the degree to which their elevators were prepared to segregate non-transgenic from commodity grains. Results showed four percent of the managers expected their own, and ten percent expected a competing elevator be dedicated to handling only non-transgenic or identity preserved grains within five years. Only four and one percent of the elevators handled non-transgenic corn and soybeans, respectively, and only one percent participated in identity preserved grains. One in five elevator managers in the state reported having tested corn for transgenic material, and none of the respondents conducted any genetic testing for soybeans in 2001. Further, 17 and two percent reported having buyers inquire about segregated non-transgenic or identity preserved corn, and such soybeans, respectively. Among those handling corn (soybeans), 29 (30) percent was familiar with the non-transgenic corn (soybean) market and 53 (58) percent was willing to participate in these markets at an average premium of 28 (37) cents per bushel. One in five elevators are able to participate in segregating non-transgenic and commodity grains without additional capital outlays. Thus, if a sizable demand for non-transgenic grains develops, the South Dakota grain handling industry appears ready to deal with it.

---

[1] Bashir A. Qasmi and Evert Van der Sluis are Associate Professors of Economics, and Clayton J. Wilhelm is a former Graduate Research Assistant in Economics Department at South Dakota State University. This research was funded by the Agricultural Experiment Station project SD281069-H and the Agricultural and Biological Sciences College Biotech project SD00983-S.

All correspondence regarding this report should be sent to Dr. Bashir A. Qasmi: South Dakota State University, Economics Department, Scobey Hall, Box 504, Brookings, SD 57007-0895.

This research report is also available electronically at http://agecon.lib.umn.edu.

Authors wish to thank the reviewers of this publication for their comments and recommendations: Dr. Larry Janssen, Professor of Economics, and Mr. Alan May, Grain Extension Specialist, SDSU Economics Department. The authors are, however, responsible for any errors contained in this report.

CONTENTS

LIST OF TABLES

Page

1. INTRODUCTION

In 2002, cash receipts from crop production in South Dakota totaled $1.76 billion, accounting for 38% of all receipts of agricultural producers in the state (South Dakota Agricultural Statistics Service, 2003). The three most important crops grown in South Dakota are soybeans, corn, and wheat. In 2001, South Dakota ranked 8th in the production of corn and soybean and 9th in wheat production among the nation's crop producing states (South Dakota Agricultural Statistics Service, 2003). These three crops accounted for 86% of all cash receipts from marketing crops in the state.

Due to the state's reliance on grain production, the importance of an efficient and dynamic grain handling system cannot be over-emphasized. The economic vitality of South Dakota's grain producers depends, in part, on the ability of the grain handling system in the state to adapt to changing market conditions and to stay competitive.

The grain handling industry in South Dakota has been changing for some years. The number of commercial grain elevators in the state has decreased considerably over the last three decades. Also, the average capacities and transportation capabilities of existing facilities are much greater than in the past. This trend is in line with the American grain handling industry as a whole, which is geared to moving large quantities of bulk commodities efficiently.

A new form of agricultural biotechnology entails altering the genetic structure of existing organisms through various deoxyribonucleic acid (DNA) transfer methods between organisms. In the case of plants, the genetic engineering process involves the transfer of recombinant DNA that is expressed as a particular trait or utility into the seed of a different plant species.

Grains that are genetically modified via modern biotechnology are developed to display a number of beneficial attributes. Examples of these attributes include improved tolerance to cold temperatures and resistance to otherwise harmful chemicals (Ginder, 2001). Genetically modified (or transgenic) varieties of corn and soybeans resistant to Roundup®, a non-selective herbicide, were the first transgenic grains planted in South Dakota and have been used by agricultural producers in the state since 1996 (USDA, 2002).

The popularity of these "input-trait" grains stems from their increased ease of management and, often, lower production costs. They do not, however, directly offer any increased value to the consumer. Many consumers, in fact, attempt to avoid products containing ingredients from biotech grains altogether.

The technology to produce transgenic grains also may produce grain varieties with enhanced "output traits." Output-trait grains are genetically engineered for characteristics such as nutritional contents or flavors that increase the value of the product for the end-user (Ginder, 2001). Plant scientists have been breeding some output-trait specialty grains, such as high oil corn, through conventional breeding methods (i.e. non-transgenic hybrids). Genetic manipulation, however, holds additional possibilities for altering output traits that would either not be possible or take much more time through conventional methods.

The ability to alter the genetic structure of organisms does not come without risks. A number of consumer groups throughout the world have expressed opposition to the use of transgenic grains. Some consumer groups argue that the production of these transgenic crops has outpaced the relevant research. This has resulted in concerns about

unknown negative consequences of growing genetically engineered crops and consuming their products for humans and livestock. Consequently, some consumers have been unwilling to purchase products containing ingredients from genetically modified (GM) crops (Gaskell, 2000).

In a number of countries there is a strong interest in restricting the importation of genetically modified organisms (GMOs), either through a labeling system or by completely disallowing products containing ingredients from GMOs beyond a certain tolerance threshold. The European Union (EU), for example, implemented a mandatory labeling policy in 2000. According to this policy, food products containing 1% or more GM material must be labeled as such (Rousu, *et al.*, 2002). These trends highlight the possibility of expanded market demand for non-transgenic grains and, therefore, the need for segregating non-transgenic grains from commodity grains (which may be commingled with transgenic grains) at the farm and elevator levels.

Problem Statement

While South Dakota is leading in the adoption of transgenic corn and soybeans at the farm level, the uncertainty surrounding the demand for non-transgenic grains has important implications for the state. If the grain handling industry is not prepared to evolve with the changing market demand for segregated non-transgenic grains, producers and handlers may miss opportunities to capture possible premiums for segregated non-transgenic grains.

The grain marketing system in the U. S. has evolved to handle large quantities of bulk commodities very effectively, and the grain handling industry has made large capital investment in the current market infrastructure. However, the current system is generally

regarded as being not well-suited for handling many different types of grain segregated based on quality attributes. An efficient grain handling system ought to be able to adapt to changing market conditions to ensure that the demands from discriminating buyers of specialty grains, including non-transgenic grains, commingled commodity grains, and oilseeds are satisfied. The focus of this study is to investigate if South Dakota grain elevators can effectively participate in the segregation of non-transgenic from transgenic grains without incurring large additional capital investments or additional handling costs.

> According to Lin, *et al.* (2000, p. 263), "Segregation requires that crops be kept separate to avoid commingling during planting, harvesting, loading, and unloading, storage and transport. This supply chain system requires cleaning of equipment such as combines and augers, as well as transport and storage facilities. Such a handling process may not involve containerized shipment, but testing to check for the presence of biotech content throughout the marketing system is critical."

Besides segregation, specialty crops can be kept separately by way of identity preservation (IP). Successful IP systems allow for an accurate labeling of end products as well as other identification methods. The explicit and implicit costs of IP systems can range from facility cleaning expenses to underutilized storage capacity outlays and increased shipping costs (Maltsbarger and Kalaitzandonakes, 2000). IP system requirements are typically more controlled than methods that only segregate one type of grain from another. Industry sources describe identity preservation as a process by which a crop is grown, usually under contract, handled, processed, and delivered under controlled conditions, whereby the end-user of the product is assured that it has maintained its unique identity from farm gate to its final use. Segregation, on the other hand, entails separating a specific type or grade of a crop from other crop types or grades. This includes segregating non-transgenic grain from its commodity counterpart

containing input-trait transgenic grains. Generally, the segregation of various crops does not require high levels of precision, whereas IP systems typically require stricter levels of segregation. For example, output-trait transgenic crops are expected to have high values and thus are likely to be channeled through an IP system to retain the integrity of their value-enhancing attributes.

Only elevator managers' attitudes and the extent of participation in IP grain markets are investigated in this study. Other aspects of IP grain markets are not investigated as the IP grain market is not the focus of this study.

Objectives

The first objective of this research is to analyze the readiness of South Dakota grain elevators to segregate non-transgenic grains from commodity grains, which may contain transgenic material. The second objective is to assess ability of the elevators to participate in identity preservation, should market demand for such grains develop. Specific objectives of this research are:

1) To gauge South Dakota elevator managers' attitudes regarding participation in segregating non-transgenic grains and in IP systems.
2) To assess the current level of participation in segregating non-transgenic grains and IP systems among grain elevators in South Dakota.
3) To inventory the physical infrastructure and storage facilities at country elevators in South Dakota to determine their readiness to participate in grain segregation.

Justification and Organization of the Study

This study is the first to investigate South Dakota grain elevators' ability to adapt to potential non-transgenic grain market segregation. The findings of this study will assist individuals involved in grain handling, including agricultural producers, elevator managers, and distributors, as well as policy makers concerned about improving the state's and the region's grain marketing efficiency.

This research report contains six sections. Following the introduction, Section II provides a review of the literature related to transgenic segregation and identity preservation in the grain market. Research methods and data collection issues are discussed in Section III. Survey results are reported in Sections IV and are followed by a summary in Section V.

II. LITERATURE REVIEW

South Dakota grain elevators' ability to participate in the segregation of non-transgenic grains from their commodity counterparts has not been studied previously. However, a number of studies on segregation and IP systems have been conducted elsewhere. A short review of these studies follows.

Direct Contract Concerns and Market Chain Objectives

Baumel and McVey (2001) noted that many grain processors and elevator managers participate in segmented specialty grain markets and use direct contracts as a means to lower the risks associated with handling such grains. They pointed out that the risks assumed by elevators participating in IP or non-transgenic segregation include low production yields. Production shortfalls may make it impossible for the elevator to meet sales contract quantity requirements and, therefore, may require the elevator to purchase the difference on the open market. On the other hand, unexpectedly higher production yields could surpass the amount of specialty grain the elevator has committed to sell and force it to hold a speculative position on the additional quantity of specialty grain. Other risks include quality deviations and a possibility of contamination with commodity grain. Identity-preservation or segregation of any kind implies increased handling costs at all levels of the marketing chain in general and at the elevator level in particular.

Ginder (1999) described three core objectives for participants at each level of the grain marketing system. The first is to preserve or develop a positive consumer image. The second objective is to avoid losses from selling a product at a discount, and the third objective is to capture price premiums. These objectives play an important role in determining the extent to which a particular market agent participates in the segregation

of non-transgenic grains. Entities farther down the market line will likely be more concerned about selling products with transgenic ingredients than those distant from consumer markets, in their efforts to project and preserve a positive image to customers.

Food manufacturers and retailers tend to be risk averse. Ginder asserted that even a small possibility of lost sales may drive these participants in the food market system to a self-imposed labeling system. In fact, private sector labeling is common in the United States as well as in the EU. A labeling system, whether self-imposed or administratively mandated, would necessitate the use of an IP or strict segregation mechanism to validate such labels.

Retailers have special leverage due to their position as the transaction point to the final consumer. Manufacturers must meet the demands for quality standards from retailers or risk losing their business. Consumer image takes precedence over plant efficiency and low production costs within sales-oriented brand companies. Thus, some manufacturers may seek non-transgenic ingredients even though it may mean paying a premium to processors (Ginder, 2001, P. 9).

Some transgenic grain varieties are designed to increase crop value rather than alter production practices. These grains must also be handled through an IP mechanism to avoid co-mingling with other varieties. Usually, the input-trait grains are destined for commodity lots, whereas the output-trait grains are identity-preserved to protect their value (Ginder, 2001).

Market Demand and Interest in Segmentation

Lin (2002) analyzed several survey studies of Midwestern grain elevators, to gauge the market demand for non-commodity grains and estimate additional handling

costs of segregating non-transgenic corn and soybeans. The author found that the demand for segregated non-transgenic corn accounted for only one to two percent of U.S. production in 1999 and the demand for non-transgenic soybeans amounted to only two to three percent of production that year. Most of the demand for these two non- transgenic crops comes from Japan and the EU.

Although the non-transgenic corn and soybean markets remain relatively small, some U.S. processors have already adopted a policy of not accepting transgenic corn varieties that are not approved by the EU. These processors fear transgenic contamination would compromise their ability to export non-transgenic crops (Lin, 2002).

The additional cost of segregating grain requires the presence of price premiums. The price premiums serve as compensation for the costs involved with segregating non-commodity grains over and above the costs incurred with handling conventional commodity corn. In 2000, common price premiums to crop producers ranged from $0.05 to $0.10 per bushel for segregated non-transgenic corn and $0.10 to $0.15 per bushel for segregated non-transgenic soybeans (Lin, 2002). The premiums tended to increase with more restrictive tolerance thresholds, allowing buyers to accept with a greater degree of certainty that no genetically engineered product would be present.

Sparks Companies Inc., an agricultural market research firm, conducted a survey of 100 grain handling facilities in the Midwest in the fall of 1999. The study reported that 11% and 8% of the respondents differentiated non-transgenic corn and non-transgenic soybeans, respectively (Lin, 2002). According to this study, one percent of the respondents offered a premium for non-transgenic corn, while three percent offered a

premium for non-transgenic soybeans. The premiums for these segregated grains varied widely depending on geographic location and intended end-use.

Another survey held among 1,200 elevators throughout the U.S. in February of 2000 indicated that 24% of the respondents were planning on segregating non-transgenic corn for the 2000 harvest season. The survey also reported that 20% of respondents planned to segregate non-transgenic soybeans. The percentage of facilities planning to participate in non-transgenic segregation increased from previous years because elevator managers were predicting the implementation of stricter food labeling regulations in countries outside of the EU (Lin, 2002).

In 2001, the American Corn Growers Association polled 1,141 grain elevators in 10 Midwestern states. The survey found that over 30% of the elevators were either requiring or suggesting segregation at their facility. For this survey 37 of the 1,141 polled elevators were from South Dakota. Three (8%) of the South Dakota respondents either required or suggested segregation of transgenic corn in 2001 (American Corn Growers Association, 2001).

Researchers at the Department of Agricultural and Consumer Economics at the University of Illinois administered a survey in 1998 to over 200 grain handlers and asked them if they participated in segregating specialty corn or soybeans. The researchers noted that 90% of grain handlers were segregating high oil corn (HOC) or synchrony treated soybeans (STS), a non-biotech, herbicide-tolerant variety (Lin, 2002). The Illinois study concluded that the additional segregation costs (excluding the purchasing premiums) incurred by the handling facilities amounted to $0.06 per bushel for HOC and

$0.18 per bushel for STS. Average purchase premiums paid to producers in 1998 were $0.12 for HOC and $0.15 for STS soybeans (Lin, 2002).

PRESIP Model

Maltsbarger and Kalaitzandonakes (2000) constructed a Process and Economic Simulation of Identity-Preservation (PRESIP) model. This model was built to follow commodity and IP lots from the farm through the elevator system to outgoing shipments in order to estimate handling cost differences. The model consists of three modules: 1) an Elevator Asset Configuration Module, 2) an Elevator Grain Flow Module, and 3) an Elevator Economic Analysis Module.

The Elevator Asset Configuration Module represents a facility's physical infrastructure such as dumping pits, storage bins, etc. The Elevator Grain Flow Module considers the flow of incoming trucks carrying commodity or IP grains. Together, the first and second modules track all grain arriving at the elevator to its intended usage (in this case, outbound shipment or in-house grinding). The Elevator Economic Analysis Module was used to estimate IP costs in three categories; coordination costs, logistical expenses, and opportunity costs.

The model was used to analyze the impacts of varying volumes and delivery times of identity-preserved high oil corn (HOC) using a five percent contamination threshold (95% pure) during peak harvest (HD) and via buyer call (BCD) on three grain elevators displaying varying characteristics. The results of this study indicate that one of the three elevators analyzed was the most efficient in handling IP grains, achieving IP grain handling costs ranging from approximately $0.16 to $0.27 per bushel under different scenarios. The researchers further found that the configuration of each elevator

played an important role in determining the costs associated with handling IP grains. The elevator handling IP grains most efficiently was located in Illinois and consisted of several small bins, providing flexibility by allowing the manager to participate in IP grain handling without sacrificing much storage space. This suggests that the opportunity costs of participating in IP or non-transgenic markets can be substantial.

The researchers further noted that the availability of specialty grain was also an important factor in determining opportunity costs. Obviously, the lost commodity margin revenues were much greater when the local supply of specialty grain was too small relative to the expected quantities.

Segregation of Wheat at Country Elevators in Kansas

Herrman, *et al.* (1999) conducted an economic engineering study of country elevators in Kansas regarding the feasibility of segregating different varieties of non-transgenic wheat. The authors collected data from a random sample of 50 elevators and developed a simulation model based on receiving capacity and number of receiving points at each facility.

The authors estimated that in case of an average harvest, costs of segregating two varieties of wheat ranged from $0.0188 to $0.0558 per bushel, depending upon the facility configuration and burden rates (total quantity of grain handled in a year divided by the storage capacity of the facility). Higher burden rates, indicating higher operating efficiency, resulted in lower segregation costs in each model. The cost of segregating three varieties of wheat ranged from $0.0193 to $0.0647 per bushel. The availability of a second driveway and bucket elevator (that is, an elevator consisting of several buckets mounted on a chain or a conveyor belt which move materials up at 90 degrees into

storage bins or processing units) contributed to the efficiency in all scenarios because the multiple receiving points allowed for more flexibility and faster unloading times.

These studies indicate that the lost margin revenues from not handling commodity grain potentially accounts for a large proportion of the costs of segregating non-commodity grain at the elevator level. In addition to the opportunity costs, the available quantity of the specialty grain is also important. That is, the more specialty grain is available, the lower the overall cost of segregating IP and non-transgenic grains.

The studies further suggest that bin configuration plays an important role in any type of segregation. Facilities with several relatively small storage units are potentially more efficient in handling segregated non-transgenic grains than those having only large storage facilities. Although large facilities with relatively large bins face a comparatively high risk of underutilizing storage space, they often have more receiving points. Multiple receiving points allow for more flexibility and fewer bottlenecks when unloading grain trucks during peak seasons. Due to their flexibility and relatively high operating efficiencies, large facilities are able to efficiently handle segregated grains if sufficient quantities of these specialized grains are available.

III. RESEARCH METHODOLOGY AND DATA COLLECTION

The objectives of this research are to assess the readiness of South Dakota grain elevators to participate in a segmented grain market, where non-transgenic grains are segregated from other grains. Because this involves assessing the physical infrastructure of individual facilities as well as their managers' attitudes, the study involved conducting a survey among the grain elevator managers. Each grain elevator was treated as a separate entity, and data regarding the elevators' infrastructures and the elevator managers' opinions were collected through a mail survey.

The mail survey involved 1) updating an existing list of operating grain elevators and defining South Dakota regions, 2) developing and pre-testing the questionnaire, 3) administering the mail survey, and 4) analyzing the response distribution and tabulating the results. Below, we will describe each of the four steps.

Updating the List of Grain Elevators and Defining Regions

All commercial grain storage facilities in South Dakota are licensed and bonded through the South Dakota Public Utilities Commission (PUC). A list of these along with their addresses and capacities was obtained (South Dakota Public Utilities Commission, 2002). However, because some of these elevators were no longer operating, the list was updated by dropping those no longer members of the South Dakota Grain & Feed Association. The remaining list contained 203 grain elevators operating in South Dakota during the year 2002 (see Appendix A).

The National Agricultural Statistics Service of the USDA has divided South Dakota into nine crop reporting districts, based on weather and soil condition variations, and thus grain production variation. Most of the grain in the state is produced in the five regions east of the Missouri River. Lack of rainfall and relatively poor soil conditions

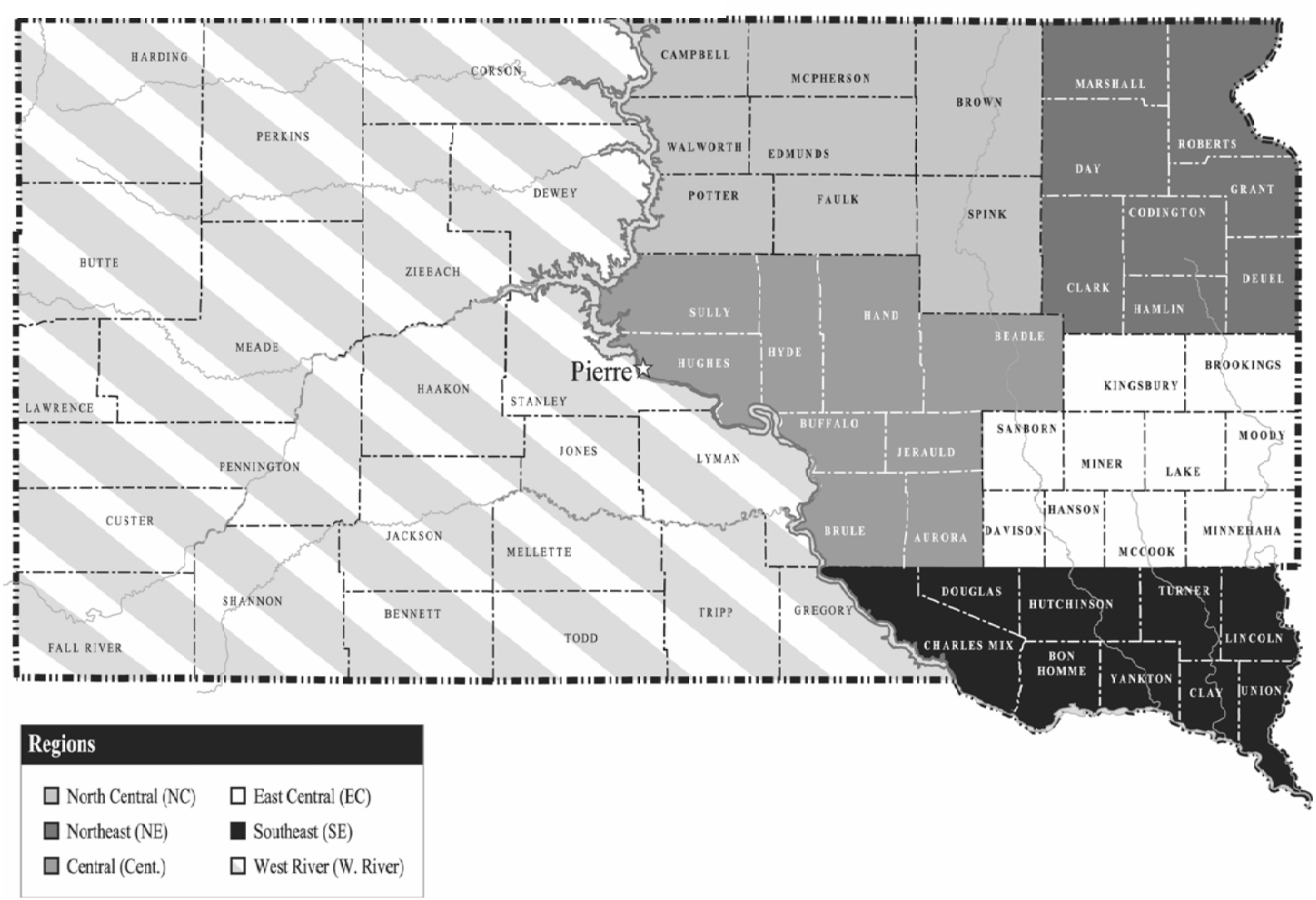
contribute to relatively low levels of grain production in the four regions located west of the Missouri river. For the purpose of this research, the four crop reporting districts were combined into one region named "West River," resulting in a statewide total of 6 regions (Figure1).

Developing and Pre-testing the Questionnaire

The purpose of the mail questionnaire was to gather information on the storage capacities of the elevators and or whether the storage facilities could be segmented into different storage units dedicated to handle different grains. The other information sought concerned the quantities of different types of grain (corn, soybeans, and wheat) handled by the elevators during calendar year 2001, and whether or not the elevator was on a working railway line. The survey instrument also inquired whether the elevator had segregated non-transgenic grains from their commodity counterparts, participated in IP, and utilized any genetic testing and special handling procedures.

The mail survey questionnaire was designed so that elevator managers would be able to complete it easily and accurately. The questionnaire was organized into five sections (A through E) so respondents could bypass sections that did not apply to their facility. The first category of questions (section A) dealt with the elevator managers' attitudes toward non-transgenic segregation and IP. The respondents were asked to rank their attitudes toward various statements regarding grain market segmentation on a 1 through 5 Likert scale (1 for strongly disagree and 5 for strongly agree).

Figure 1. South Dakota, Study Regions



The questions in sections B and C were developed specifically for the facilities handling corn and soybeans, respectively. The respondents were asked if they handled any quantities of segregated non-transgenic or IP grains. Respondents were also asked about the testing methods and the structure of the premium used for such grains. Elevator managers not participating in IP or segregation were asked if they would consider doing so and what additional premium would be necessary to entice their involvement in these segments of the grain markets.

The questions in section D of the survey instrument related to wheat. The wheat section only contained questions dealing with IP. Questions related to handling non-transgenic wheat were not included, because genetically modified wheat was not commercially available during the period covered by the survey (calendar year 2001).

Information about the number of available storage units at each facility and their capacities was necessary to assess which facilities were physically capable of segmenting different types of grain. The questions in section E of the questionnaire dealt with information regarding facility infrastructure and storage bin configurations. These questions were designed to find each elevator's total storage capacity, whether or not the facility could be divided into separable storage units and, if so, the capacity of each separable unit. This information is essential, because storage bin configuration can have significant impacts on the costs of segmentation. There are a number of different ways to utilize available storage space, and any underutilization of space can contribute to increases in the opportunity costs for the operation. The final section of the questionnaire requested information regarding the elevator managers' education, training, and experience and provided space for the managers to offer any additional comments.

A draft questionnaire was developed and pre-tested among selected grain elevator managers and officials from the South Dakota Grain & Feed Association and the South Dakota Wheat Commission. A number of adjustments and refinements were made to the questionnaire to correct the problems identified in pre-testing. Pre-testing showed that a respondent could complete the questionnaire in 10 to 20 minutes, depending upon the number of grains handled at the facility. If certain sections did not apply to a particular respondent, the questionnaire could be completed in less time. Appendix B includes a copy of the mail survey instrument used to collect the data.

Administration of the Mail Survey

The mail survey was administered using a variation of the method proposed by Salant and Dillman (1994). A notification letter explaining the importance of the upcoming survey was mailed to all grain elevator managers in South Dakota on March 13, 2002. The actual questionnaire accompanied by a cover letter was mailed to the managers of the elevators on March 20, 2002. Three weeks after the initial mailing of the survey, a postcard was sent reminding the elevator managers of the importance of their participation in the study. Two weeks later, another reminder with a second copy of the questionnaire was mailed to all non-responding elevator managers, in an effort to increase the response rate. Completed surveys were returned to the Department of Economics and were checked for completeness and inconsistencies. In some cases, follow-up telephone calls were made to the respondents to either complete any omitted information or to clarify inconsistencies in the returned questionnaires.

Response Distribution and Tabulation of Results

In total, 82 (i.e. 40%) usable questionnaires were received. Regional response rates varied from 33% in the North Central region to 47% in the Central and West River regions (Table 1). The responses from each region were sufficient to ensure the release of regional results without compromising the confidentiality of individual responses. Responses from the returned questionnaires were tabulated, and written comments were summarized by region for interpretation.

Table 1. Distribution of Responding Elevators and Capacity Information

Region	Total Number of Elevators	Responding Elevators		Avg. Capacity of Responding Elevators	Avg. Capacity of Non-Responding Elevators	Other Non-Responding Elevators[a]
		(number)	(%)	(1,000 bu.)	(1,000 bu.)	(number)
1. North Central	39	13	33	799	637	9
2. Northeast	33	14	42	833	427	7
3. Central	19	9	47	826	789	4
4. East Central	38	13	34	787	615	6
5. Southeast	42	18	43	904	505	8
6. West River	32	15	47	389	704	10
SD	**203**	**82**	**40**	**605**	**741**	**44**

[a]Capacity information not available.

IV. SURVEY RESULTS

In this chapter we present the results of the mail survey of South Dakota grain elevators regarding the handling of segregated non-transgenic and identity-preserved grain. All respondents were elevator managers in South Dakota. Thus, while the study's findings are most applicable to South Dakota, similarities in the grain handling industry in the region make the results of this study relevant to grain elevators throughout the Midwest.

Distribution of Grain Elevators by Region and Capacity

In 2001, there were 203 grain elevators operating in South Dakota. However, storage capacity information was only available for 159 of these elevators (Table 2). Of these 159 elevators, 25% were classified as large (with a storage capacity of more than 800 th bu), 38% were of medium size (with a storage capacity ranging from 400 to 800 th bu), and 37% were small (with a storage capacity of less than 400 th bu). In total, 82 usable surveys were returned, amounting to a response rate of 40%. Hence, the sample is representative of the grain elevators operating in South Dakota. All size categories of elevators and all geographic regions of the state are well represented in this sample (Table 3).

Grain elevator managers in South Dakota indicated having extensive experience in the grain handling industry. On a statewide basis, 78% of the responding elevator managers reported having five or more years experience as elevator managers and 91% of the respondents reported having five or more years of experience in the grain industry. Four out of five elevator managers reported having at least 10 years of experience in the grain industry (Table 4).

Table 2. Number of Grain Elevators in South Dakota, by Size, 2001

Region/State	Small (<400 th bu)	Medium (400-800 th bu)	Large (>800 th bu)	Total[a]	Other Elevators[b]
1. North Central	11	12	7	30	9
2. Northeast	9	11	6	26	7
3. Central	5	4	6	15	4
4. East Central	9	15	8	32	6
5. Southeast	15	11	8	34	8
6. West River	10	8	4	22	10
SD	**59**	**61**	**39**	**159**	44
	(37.1%)	**(38.4%)**	**(24.5%)**	**(100%)**	

[a] Elevators with known capacity information

[b] Capacity information for these elevators not available

Source: South Dakota Public Utilities Commission (2002).

Table 3. Responding Elevators by Region and Storage Capacity

Region/State	Small (<400 th bu)	Medium (400-800 th bu)	Large (>800 th bu)	Total
1. North Central	2	8	3	13
2. Northeast	2	7	5	14
3. Central	3	3	3	9
4. East Central	3	6	4	13
5. Southeast	5	6	7	18
6. West River	9	6	-	15
SD (No.)	**22**	**36**	**24**	**82**
	(27%)	**(44%)**	**(29%)**	**(100%)**

Table 4. Elevator Managers' Experience

Experience	Respondents Reporting Experience as an Elevator Manager (No.)	(%)	Respondents Reporting Experience in the Grain Industry (No.)	(%)
0-5 Years	18	22	7	9
5-10 Years	13	16	7	9
10-20 Years	25	31	27	33
20-30 Years	20	25	27	33
30 or more Years	5	6	13	16
TOTAL	81	100	81	100

Managers' Attitudes for Grain Market Segmentation

To gauge their expectations and attitudes regarding non-transgenic and IP grain markets, elevator managers were asked to respond to a number of statements. These statements and the responses are listed in Table 5. Elevator managers were generally either unsure or did not expect many elevators to become dedicated to handling strictly non-transgenic or IP grains. Only four percent of the respondents agreed that their elevators would be dedicated to handling strictly non-transgenic grains within five years, while 66% did not agree with this statement and 30% were unsure.

Ten percent of the respondents agreed that at least one of their competitors would be dedicated to non-transgenic grains within five years, while 45% did not agree with this statement, and another 45% were not sure. Similar responses were found among the managers about the possibility for elevators to be exclusively dedicated to handling IP grains. Only four percent of the respondents agreed, while 62% did not agree that their

Table 5. Elevator Managers' Opinions on Selected Segmentation Issues

Statement	Strongly Disagree (%)	Disagree (%)	Not Sure (%)	Agree (%)	Strongly Agree (%)
My elevator will be dedicated to strictly non-GM grains within 5 years.	29	37	30	4	0
At least one of my competitors will be dedicated to non-GM grains within 5 years.	12	33	45	9	1
My elevator will be dedicated to Identity-Preserved (IP) grains within 5 years.	22	40	34	4	0
At least one of my competitors will be dedicated to IP grains within 5 years.	11	34	45	10	0
U.S. corn markets will be completely segregated into commodity and non-GM corn over the next 5 years.	15	40	30	13	1
U.S. corn markets will be completely segregated into commodity and IP corn over the next 5 years.	11	46	30	11	1
U.S. soybean markets will be completely segregated into commodity and non-GM soybeans over the next 5 years.	15	43	29	12	1
U.S. soybean markets will be completely segregated into commodity and IP soybeans over the next 5 years.	12	44	33	10	1
U.S. winter wheat markets will be completely segregated into commodity and non-GM winter wheat over the next 5 years.	12	38	38	11	1
U.S. winter wheat markets will be completely segregated into commodity and IP winter wheat over the next 5 years.	12	39	38	10	1
U.S. spring wheat markets will be completely segregated into commodity spring wheat and non-GM spring wheat over the next 5 years.	11	35	40	12	1
U.S. spring wheat markets will be completely segregated into commodity and IP spring wheat over the next 5 years.	11	34	44	10	1

elevators would be dedicated to identity-preserved grains within five years, and 34% were unsure. Further, 10% of the respondents agreed, while 45% did not agree that at least one of their competitors would be dedicated to identity-preserved grains within five years and another 45% were not sure.

Eleven to 14% of the elevator managers believed that the grain and oilseeds markets will be segregated into commodity and non-transgenic or commodity and IP markets within five years. Fourteen percent of elevator managers agreed, whereas 55% did not agree that the U.S. corn market would be completely segregated into commodity and non-transgenic markets over the next five years, and 30% were unsure. Similarly, 12% of respondents agreed, while 57% did not agree that the U.S. corn market would be completely segregated into commodity and IP markets over the next five years, and 30% were unsure. Responses regarding the segmentation of U.S. markets for soybeans, winter wheat, and spring wheat were very similar to those for the corn market (Table 5).

These results highlight that grain elevator managers were aware of the great degree of uncertainty about the future direction of the market. About 11 to 14% of the elevator managers felt that, over time, some form of market segregation will emerge for each of the corn, soybeans, and winter and spring wheat markets. Respondents appeared unsure about whether future markets will be split into having either segregated commodity and non-transgenic grains, commodity and IP grains, or separate markets for commodity, non-transgenic, and IP crops in the future.

Segregated Non-Transgenic and IP Grain Handled by the Elevators

Besides gauging elevator mangers' expectations about the future form of grain markets, the survey was used to assess the degree of participation in segmented grain

markets among South Dakota elevators. Accordingly, respondents were asked if they segregated any non-transgenic corn or soybeans from their respective commodity counterparts during the year 2001. Further, the respondents were asked about the quantities of the segregated grains handled, if any. The respondents were also asked about their experience with genetic testing methods, cleaning of equipment, premiums, and the storage units dedicated to non-transgenic grain at their elevators during 2001.

Only three (4%) respondents handled non-transgenic corn separately. Two of these facilities were in the Northeast Region and the third was in the West River region. The average quantity of segregated corn handled by the elevators was 250 thousand bushels. One facility, located in the West River Region, performed a genetic test at the time of purchase and followed a practice of obtaining written assurance from the seller, stating that the grain was produced according to conditions prescribed in the contract. This elevator also cleaned loading and unloading equipment prior to handling the non-transgenic corn. In the other two cases, the elevators only obtained the sellers' verbal assurance. All three elevators maintained separate non-transgenic dedicated bins. The elevators did not disclose any premiums paid or received for non-transgenic corn.

Only one elevator (one percent of the respondents), located in the North Central Region, handled 5,000 bushels of non-transgenic soybeans separately from conventional commodity soybeans. In this case, the elevator obtained a written assurance from the seller that the soybeans were non-transgenic. This elevator also cleaned the relevant equipment and dedicated bins before handling the non-transgenic soybeans. The elevator paid a premium of 40 cents per bushel to the seller for the non-transgenic soybeans. However, the elevator failed to receive any premium for non-transgenic soybeans. The

respondent reported that a buyer willing to pay a premium for the non-transgenic soybeans could not be located in a timely manner, and the elevator decided to discontinue the speculative position to avoid additional opportunity costs of unused storage space in the dedicated bin.

Only one elevator (one percent of the respondents), located in the Southeastern Region, participated in identity preservation during the year 2001. This facility handled 200 thousand bushels of IP corn and paid a premium of 15 cents per bushel for the IP corn that year. However, the respondent chose not to disclose the premium received by the elevator for the IP corn. The grain at this elevator was tested at the time of purchase and the handling equipment and bins were cleaned thoroughly before filling the bins with the IP corn.

Genetic Testing of Grain at Responding Elevators

In September of 2000, Cry9C, a protein found in the biotech corn StarLink™ that was approved for certain feed uses but not approved by the EPA for human consumption, was discovered in some brands of taco shells sold in retail stores. This incident prompted many grain handling facilities to test inbound grain lots for the presence of the Cry9C protein to avoid cross-contamination and the associated risks (Lin, 2002). Obviously, this resulted in an increased interest in genetic testing of corn.

In total, 18 (22%) responding elevators conducted genetic tests on corn during calendar year 2001. These tests[2] were performed to determine if the tested corn was free

[2] Industry sources indicate two major methods of performing genetic testing on corn and soybeans. One test is a protein assay test (commonly referred to as a lateral flow strip test), and the second is the polymerase chain reaction (PCR) test. Lateral flow strip test kits are available for use at the elevator and are recommended for export shipment analysis. The PCR test is more sensitive in the detection of transgenic material and is conducted only in laboratories (Lin, *et al.*, 2000).

from the Cry9C protein. Fifteen respondents performed lateral flow strip tests for Cry9C corn (Table 6). Six of these elevators performed these tests on-site using their own labor, while the remaining nine employed outside help to conduct these tests at an average cost of $7.44 per test and an average turnaround time of 1.9 days. Three additional elevators employed a more sensitive laboratory (PCR) test at an average cost of $10.00 per sample and an average turnaround time of about 2.3 days (Table 6). None of the respondents conducted any genetic testing for soybeans at the time of the survey.

Buyers Indicating Interest in Non-Transgenic or IP Grain

The demand for non-transgenic and IP grain plays an important role in elevator managers' decisions to handle these grains segregated from their commodity counterparts. The survey participants were asked if their grain buyers had expressed interest in segregated non-transgenic corn or soybeans, IP corn, IP soybeans, or IP wheat in 2001. On a statewide basis, 14 (17%) and five (6%) respondents reported that their buyers had shown interest in non-transgenic corn and soybeans, respectively (Table 7). Only three (four percent) and two (two percent) of the elevators reported buyers' interest in IP corn and soybeans, respectively. Most of these elevators were in the North Central, Northeast, and East Central regions of the state, which are relatively close to the Minneapolis market.

Presently, buyers seem to be showing a very limited interest in IP wheat. Only one elevator in the Northeast Region and one in the West River Region reported buyers' interest in IP wheat (Table 7).

Table 6. Elevators Involved in Genetic Testing of Corn for StarLinkTM in 2001

Region	Strip Test (On-site)	Strip Test (Outside Help)			PCR Test (Outside Help)		
	No. of Elevators	No. of Elevators	Avg. Cost per Sample	Turnaround Time (days)	No. of Elevators	Avg. Cost per Sample	Turnaround Time (days)
NC	-	-	-	-	1	$6.00	3
NE	1	6	$8.00	2	-	-	-
Cent.	-	1	$8.00	2	-	-	-
EC	2	-	-	-	2	$12	2
SE	2	1	$5.00	1	-	-	-
W. River	1	1	$6.00	2	-	-	-
SD	**6**	**9**	**$7.44**	**1.89**	**3**	**$10.00**	**2.33**

Table 7. Buyers Interest in Non-Transgenic and IP Grains

Region/State	Corn		Soybeans		Wheat	
	(No.)	(%)	(No.)	(%)	(No.)	(%)
Buyers Inquiries for Non-GM Grain:						
1. North Central	3	23	3	23	-	-
2. Northeast	3	21	-	-	-	-
3. Central	1	11	-	-	-	-
4. East Central	5	38	2	15	-	-
5. Southeast	1	6	-	-	-	-
6. West River	1	7	-	-	-	-
SD	**14**	**17**	**5**	**6**	**-**	**-**
Buyers Inquiries for IP Grain:						
1. North Central	2	15	1	8	-	-
2. Northeast	1	7	-	-	1	7
3. Central	-	-	-	-	-	-
4. East Central	-	-	-	-	-	-
5. Southeast	-	-	1	6	-	-
6. West River	-	-	-	-	1	7
SD	**3**	**4**	**2**	**2**	**1**	**1**

Reasons for Not Participating in Market Segmentation

Elevator managers who did not handle segregated non-transgenic or IP grains in 2001 were asked to list the three most important reasons for not participating in these specialty grain markets. Their responses are reported in Table 8. The three most commonly cited reasons for not handling non-transgenic or IP grains were 1) concerns regarding efficient bin space utilization, 2) lack of market outlets or premiums, and 3) risk of contamination of the specialty grain at the elevator (Table 8). The next three most commonly cited reasons are 4) testing inconvenience, 5) availability of these specialty grains, and 6) time constraints.

There were, however, some exceptions to this generality in the case of elevators handling corn. Managers of large elevators handling corn cited bin space utilization and the risk of contamination of the specialty grains at the elevator as the two most common reasons for not handling non-transgenic or IP corn (Appendix C). On the other hand, the managers of small elevators handling corn cited lack of premium and focus on supply to feed and ethanol plants as the two most common reasons for not handling non-transgenic and IP corn.

The differences in the reasons for not handling non-transgenic or IP corn between elevators of different sizes are understandable. Large elevators tend to have large bins. Therefore, dedicating one large bin to non-transgenic corn at these elevators may run a high risk of underutilization of bin storage capacity. On the other hand, bins at small elevators tend to be of smaller size and in many cases of varying size. Accordingly, dedicating a bin to non-transgenic corn at small elevators generally entails a much lower risk of incurring a high opportunity cost of unused storage space in the dedicated bin.

Table 8. Reasons Cited by Elevators for Not Participating in Segmentation

	Non-GM Corn	IP Corn	Non-GM Soybeans	IP Soybeans	IP Wheat
Number of Respondents[a]	73	75	66	67	57
Cited Reasons for Not Participating:					
Bin Space Utilization	42%	41%	41%	31%	39%
Lack of Market/Premium	38%	29%	26%	34%	26%
Risk of Contamination	32%	28%	20%	21%	19%
Testing Inconvenience	18%	9%	9%	9%	9%
Availability	12%	12%	8%	7%	18%
Time	14%	15%	8%	7%	4%
Mainly Sell to Feed/Ethanol	15%	11%	2%	0%	0%
Transportation	4%	4%	3%	4%	2%

[a]South Dakota elevators handling the grain but not participating in segmentation.

A large number of small elevators in South Dakota handling corn rely heavily on supplying corn to local feed lots, feed mills, and ethanol plants. Consequently, bin space utilization, lack of market outlets or premiums, and the risk of contamination are relatively less important reasons for small elevators for not handling segregated non-transgenic corn.

The analysis of the responses of elevators handling soybeans but not non-transgenic soybeans showed that regardless of elevator size, the most cited reason for not handling non-transgenic soybeans was bin space utilization (Appendix C). However, large elevators more frequently cited the lack of a market or a premium (cited by 40%) as compared to small elevators (cited by seven percent) as a reason for not segregating non-transgenic soybeans.

The responses of the elevators handling soybeans but not IP soybeans did not show much variation by elevator size (Appendix C). Similarly, the responses of elevators handling wheat but not IP wheat also did not show much variation by elevator size (Appendix C).

Willingness to Consider Segregation

Elevator managers were asked about their willingness to consider handling segregated non-transgenic grains and about the average premiums they expect for handling such specialty grains. Their answers are summarized in Table 9. Among those who handled corn, 29% of managers in the state were familiar with the segregation of non-transgenic corn and 53% indicated being willing to consider participating in such a system for an average premium of 28 cents per bushel. The North Central, Northeast, East Central, and Southeast are the four top corn-producing regions (Qasmi and Wilhelm, 2002). In these regions, 42% to 72% of elevator managers were willing to consider handling segregated non-transgenic corn for a premium of 23 cents to 30 cents per bushel.

Of those who handled soybeans, 30% of elevator managers were familiar with the segregation of non-transgenic soybeans and 58% indicated their willingness to consider handling these specialty soybeans for an average premium of 37 cents per bushel. In the top four soybean-producing (North Central, Northeast, East Central, and Southeast) regions, 31% to 73% of elevator managers were willing to consider segregating non-transgenic soybeans for an average premium of 30 cents to 50 cents per bushel.

Table 9. Elevator Managers Willing to Consider Non-Transgenic Grain Segregation and the Desired Premiums in 2001

Region/State	Total Number of Respondents (No.)	Respondents Familiar With Segregation (%)	Respondents Willing to Consider Segregation (%)	Avg. Desired Premium to Consider Segregation (Cents/bu)
Elevators Handling Corn:				
1. North Central	12	50.0	66.7	30
2. Northeast	14	21.4	42.9	23
3. Central	8	12.5	62.5	37
4. East Central	12	16.7	41.7	23
5. Southeast	18	44.4	72.2	25
6. West River	12	16.7	25.0	34
SD	**76**	**28.9**	**52.6**	**28**
Elevators Handling Soybeans:				
1. North Central	11	54.5	72.7	50
2. Northeast	14	14.3	64.3	42
3. Central	7	14.3	57.1	39
4. East Central	13	23.1	30.8	31
5. Southeast	18	38.9	72.2	30
6. West River	4	25.0	25.0	18
SD	**67**	**29.9**	**58.2**	**37**
Elevators Handling Wheat:				
1. North Central	12	50.0	66.7	29
2. Northeast	13	15.4	46.2	38
3. Central	6	33.3	50.0	53
4. East Central	6	0.0	33.3	18
5. Southeast	6	50.0	33.3	50
6. West River	15	33.3	40.0	47
SD	**58**	**46.6**	**46.6**	**38**

Among those who handled wheat, 47% of elevator managers were familiar with grain segregation and were willing to consider segregating non-transgenic wheat if the average premium for such wheat was 38 cents per bushel. In the case of the top four wheat-producing (West River, North Central, Northeast, and Central) regions, 40% to 67% of elevator managers were willing to consider segregating wheat for an average premium ranging from 29 cents to 53 cents per bushel.

As in the case of commodity grains, the costs of handling specialty grains are volume dependent. Hence, the desired premiums for different segregated non-transgenic grains reported by elevator managers must be viewed as rough estimates. The cost of segregating grains and the associated premiums will decrease as the market demand for non-transgenic grains increases or the quantity of segregated grain handled by an elevator increases. The availability of farmer-owned storage for specialty grains can also influence the feasibility of handling segregated non-transgenic grains at the elevator.

Elevator Infrastructure and Ability to Segment Storage Facilities

An elevator can handle a non-transgenic grain segregated from its commodity counterpart only if its infrastructure -- consisting of legs, a conveyer system, and storage facilities -- can accommodate handling and storing a number of different types of grains. Most South Dakota grain elevators use a self-cleaning drag chain conveyer system to deliver grain from the leg to the designated storage unit. This type of conveyer can be cleaned by simply running it empty for a few minutes until it is free from any leftover grain from previous lots. In some cases, a few bushels of specialty grain are then run through the leg and conveyer system in order to flush out any leftover grain pieces from

the previous batch. Therefore, these self-cleaning conveyer systems at an elevator would be quite helpful in adapting the elevators to segregating different types of grains.

An elevator can handle a non-transgenic grain segregated from its commodity counterpart only if the elevator's storage facility can be divided into a number of separate units. For example, an elevator handling two crops (say, corn and soybeans) would need to have a facility with four separate storage units if it would handle both non-transgenic and commodity varieties of each type of grain. In some cases, an elevator manager may decide to adopt two-tier segregation for corn, requiring an additional storage unit at the facility[3]. Therefore, it can be assumed that the ability to divide the storage facility into four or preferably five separate units is a sign that the elevator is equipped to segregate non-transgenic from commodity corn and soybeans without significant additional capital investment.

The respondents were asked if the storage facilities at their elevator could be segmented into a number of units. They were further asked to list each of these potentially separate units along with their individual storage capacities. For the state as a whole, 29% of the elevator managers, accounting for 27% of the total storage capacity, reported that their elevators can be divided into at least four separate storage units (see Table 10). The elevators that can divide their storage facilities into at least four separate units ranged from eight percent in the East Central Region to 40% in the West River Region and 46% in the North Central Region.

[3] Two-tier segregation refers to a system that keeps non-transgenic corn that is completely free from GM material separate from non-transgenic corn that may contain certain EU-approved GM material up to a certain threshold level. Both non-transgenic varieties are also kept segregated from conventional commodity corn. If a two-tier segregation system is to be used for corn, a facility also handling non-transgenic soybeans segregated from commodity soybeans must consist of at least five separable storage units.

Table 10. Elevators Capable of Segmenting Facilities, 2002

Region/State	Elevators with Separable Storage Units (No.)	Elevators with Separable Storage Units (%)	Total Capacity at Elevators with Separable Units (mil bu)	Total Capacity at Elevators with Separable Units (%)
Elevators with 4 or more Separable Units:				
1. North Central	6	46	3.61	35
2. Northeast	2	14	2.47	21
3. Central	3	33	4.31	58
4. East Central	1	8	0.79	8
5. Southeast	6	33	3.37	21
6. West River	6	40	2.45	42
SD	**24**	**29**	**16.99**	**27**
Elevators with 5 or more Separable Units:				
1. North Central	4	31	2.66	26
2. Northeast	2	14	2.47	21
3. Central	1	11	3.1	42
4. East Central	1	8	0.79	8
5. Southeast	2	11	1.45	9
6. West River	4	27	2.1	36
SD	**14**	**17**	**12.57**	**20**

On a statewide basis, 17% of the elevator managers, accounting for 20% of the total storage capacity, reported that their facilities could be divided into five separate storage units (Table 10). Regionally, the proportion of elevators that can divide their storage facilities into at least five units, ranges from eight percent in the East Central Region to 27% in the West River region, and 31% in the North Central Region. Thus, 17% of the elevators in South Dakota, accounting for 20% of the total storage capacity in the state, would be able to participate in segmenting non-transgenic grains from their commodity counterparts without a large capital outlay.

V. SUMMARY AND CONCLUSIONS

The advent of genetically modified grain varieties has important implications for crop producers and handlers. Transgenic varieties of corn and soybeans tolerant to the non-selective herbicide (glyphosate), were the first transgenic grains introduced in U.S. in 1996. These input-trait grains have rapidly become popular among South Dakota crop producers due to their increased ease of management and, often, lower production costs.

Although input-trait grains can increase production efficiency, they do not directly offer any increased value to the consumers. Many consumers attempt to avoid products containing transgenic grain ingredients altogether. As a result, a number of countries have restricted the imports of grains containing GMOs, either through a labeling system, or by completely disallowing the products containing ingredients from GMOs beyond a certain tolerance threshold. As a result, the demand for non-transgenic grains will potentially increase in the future, as well as the need for segregating non-transgenic grains from their commodity counterparts at the farm and the elevator levels.

Over the past several decades, the grain handling industry across the U.S. in general and in South Dakota in particular has developed a high degree of specialization in handling bulk commodities. If consumer demand moves the market in a segregated direction, the South Dakota grain handling system can choose to either continue supplying only commodity grains or modify their operations to also supply non-transgenic grains segregated from their commodity counterparts. Thus, it is important to assess the current ability and future potential of grain handlers in the state to adapt to changing market conditions without large additional capital outlays.

In this report, we provide and analyze the degree to which South Dakota grain elevators are prepared to segregate non-transgenic grains from commodity grains, should a sizeable demand for such grains develop. In particular, the objectives were to 1) gauge the elevator managers' attitudes regarding participation in segregated non-transgenic grains and IP systems, 2) assess the elevators' current level of participation in segregated non-transgenic grains and IP systems, and 3) inventory storage facilities at the elevators and determine the extent to which these elevators can handle non-transgenic grains segregated from their commodity counterparts without large capital outlays.

Data were collected by way of a mail survey conducted among all 203 grain elevators operating in South Dakota in 2002. In total, 82 usable questionnaires were received, representing 40% of all South Dakota elevators, distributed relatively evenly across the state. It was determined that these responses represented the population of South Dakota grain elevators quite well in terms of size, location, and types of grains handled.

Although few managers in South Dakota expected that their elevators would be dedicated to handling only non-transgenic or IP grains within the next five years, over twice as many managers expected that a competing elevator would do so within five years. This indicates elevator managers feel this type of market segmentation may play some role in the South Dakota grain market in the near future. The managers are, however, reluctant to play the role of early adopters.

Overall, one-third of the elevator managers in South Dakota were unsure if U.S. markets for corn, soybeans, and wheat would be completely segregated into commodity, non-transgenic, and IP markets within five years. Only 11% to 14% of the respondents

felt that U.S. grain markets would evolve into such segmented markets. There did not seem to be a significant difference among the elevator managers in their views on future developments in the corn, soybean, or wheat markets. Again, these responses are consistent with an overall attitude of uncertainty regarding the role of segregated non-transgenic and IP grains in the near future.

At time of the survey, very few elevators in South Dakota actually handled non-transgenic grains. In 2001, only three respondents (four percent) handled non-transgenic corn and one (one percent) indicated handling non-transgenic soybeans. During the same year, only one (one percent) respondent participated in IP grains.

One in five elevator managers in the state reported having tested corn for transgenic material in 2001. None of the respondents conducted any genetic testing for soybeans. The genetic tests on corn were conducted under the extraordinary conditions associated with the advent of StarLink™ incident. Nevertheless, these tests did provide the elevator personnel with practical experience in testing and handling segregated grains, which will be valuable if the elevator decides to handle segregated grains in the future.

If coordinated non-transgenic segregation or IP systems are to be implemented on a large scale, buyers must be willing to pay premiums for non-transgenic or IP grains. One in five respondents (17%) reported having buyers inquire about segregated non-transgenic or IP corn. It is likely that these inquiries were to some extent influenced by the StarLink™ incident. Buyers' interested in non-transgenic or IP soybeans and IP wheat was reported to be much lower. Only five (six percent) and two (two percent) respondents reported that their buyers had shown interest in non-transgenic or IP

soybeans and wheat. Nevertheless, the inquiries indicate a potential for the emergence of a limited demand for non-transgenic and IP grains.

The elevator managers that did not handle segregated non-transgenic or IP grains during 2001 were asked to list their reasons for not participating in these specialty grain markets. The three most commonly cited reasons were 1) concerns regarding efficient storage space utilization, 2) lack of market demand/premiums, and 3) the risk of contamination. The next three cited reasons were 4) testing inconvenience, 5) non-availability of the specialty grain, and 6) time concerns.

Among the respondents who handled corn, 29% stated being familiar with the non-transgenic corn market and 53% indicated their willingness to consider participation in such a system for an average premium of 28 cents per bushel. Among the respondents who handled soybeans, 30% were familiar with the non-transgenic soybeans market and 58% were willing to consider participation in such a market at an average premium of 37 cents per bushel.

At present, no transgenic wheat variety has been released for commercial production. Nevertheless, a spirited public debate regarding the desirability of the release of transgenic wheat varieties is underway. Among the elevator managers handling wheat, 47% were willing to handle segregated non-transgenic wheat for an average premium of 38 cents per bushel if and when transgenic wheat varieties are released for commercial production. These premium expectations by the elevator managers seem to be large enough to offset the increased handling costs, to provide some additional return to the elevators, and to enable the elevators to pass a portion of the premium to producers to compensate them for altering their production and handling practices.

Elevators must have a physical infrastructure that is adaptable to segregating different types of grain, if it is to participate in segregating non-transgenic grains. About 17% of the grain elevators in the state have the storage facilities that can be divided into five different storage units. These elevators account for 20% of the total storage capacity in the state. This indicates that roughly one in five grain elevators in South Dakota can participate in segregating non-transgenic grains from their commodity counterparts without additional capital outlays if market demands for these grains will develop in the future. While the demand for non-transgenic grains will likely be only for a small portion of the total grain demand, the South Dakota grain handling industry appears ready to meet the demand for segregated non-transgenic grains, should a sizable demand for such grains develop.

VI. REFERENCES

American Corn Growers Association. (2001) ACGF 2001 State Elevator Survey. http://www.acgf.org/programs/survey-results/2001/default.asp

Baumel, C. Phillip, and McVey, Marty J. (2001) "The Real Cost of Identity-Preservation in the Grain Production and Distribution System", Iowa State University, Grain Elevator and Processing Society. http://www.geaps.com/proceedings/2001/Grain_identity.cfm

Gaskell, George. (2000) "Agricultural Biotechnology And Public Attitudes In The European Union." *AgBioForum* 3, 2&3 (2000): 87-96. http://www.agbioforum.org/v3n23/v3n23a04-gaskell.htm

Ginder, Roger G. (1999) "GMO Labeling: Effects on Core Business Objectives in the grains Value Chain" ISU ICM Workshop, Ames Iowa, December 1999. http://www.extension.iastate.edu/Pages/grain/gmo/99valuec.pdf

Ginder, Roger G. (2001) "Channeling, Identity Preservation and Value Chain: Lessons From the Recent Problems with Starlink Corn." March 2001 http://www.extension.iastate.edu/Pages/grain/publications/buspub/0103channel.pdf.

Herrman, Timothy J., Boland, Michael, and Heishman, Adam. (1999) "Economic Feasibility of Wheat Segregation at Country Elevators", Kansas State University. http://www.wheatimprovement.org/Forum/2/herman.html.

Lin, W. W., Chambers, W., and Harwood, J. (2000) "Biotechnology: U.S. Grain Handlers Look Ahead," *Agricultural Outlook*, AGO-270, April 2000, pp.29-34. http://www.ers.usda.gov/publications/agoutlook/apr2000/ao270h.pdf

Lin, William W. (2002) Estimating the Costs of Segregation for Non-biotech Maize and Soybeans in *Market Developments for Genetically Modified Foods*, ed., V. Santaniello, R.E. Evenson and D. Zilberman, CAB International 2002. http://www.agbiotechnet.com/pdfs/085199573x/085199573xCh21.pdf

Maltsbarger, Richard, and Kalaitzandonakes, Nicholas. (2000) "Direct and Hidden Costs in Identity-Preserved Supply Chains." *AgBioForum* 3, 4 (2000): 236-242. http://www.agbioforum.org/v3n4/v3n4a10-maltsbarger.htm

Qasmi, Bashir A., and Wilhelm, Clayton J. (2002) "Grain Production and Handling Trends in South Dakota and Their Implications", South Dakota State University, Department of Economics Staff Paper 2002-5. http://agecon.lib.umn.edu/cgi-bin/detailview.pl?paperid=6432

Rousu, Matthew, Huffman, Wallace E., Shogren, Jason F., and Tegene, Abebayehu. (2002) "Are U.S. Consumers Tolerant of GM Foods?" International Consortium on Agricultural Biotechnology Research. http://www.economia.uniroma2.it/conferenze/icabr/download/papers2002download.htm

Salant, Priscilla, and Dillman, Don A. (1994) "How to Conduct Your Own Survey", John Wiley & Sons, Inc. 1st Edition.

South Dakota Agricultural Statistics Service. (2003) *South Dakota Agricultural Statistics Bulletin*, USDA, National Agricultural Statistics Service, Washington, D.C. http://www.nass.usda.gov/sd/bulletin/toc3bltn.htm

South Dakota Grain and Feed Association. (2002) "2001 South Dakota Grain & Feed Association Directory" South Dakota Grain and Feed Association, Aberdeen, South Dakota 57402.

South Dakota Public Utilities Commission. (2002) South Dakota Grain Elevators Storage Capacity Data, Unpublished, Warehouse Division, Public Utilities Commission, Capital Building, 1st floor, 500 East Capital Avenue, Pierre, SD 57501.

United States Department of Agriculture. (2002) "Crop Production-Acreage-Supplement." National Agricultural Statistics Service, Agricultural Statistics Board, Report No. PCP-BBA (2002). http://usda.mannlib.cornell.edu/reports/nassr/field/pcp-bba/acrg0602.txt.

VII. APPENDIX A

Grain Elevators Operating in South Dakota as of March 2002

No.	Region	Town	Zip	Name of Elevator
1	EC	Brookings	SD 57006	AgFirst Farmers Cooperative
2	EC	Colton	SD 57018	Colton Farmers Elevator Co.
3	EC	Colton	SD 57018	Colton Farmers Elevator Co. (Lyons Elevator)
4	EC	Crooks	SD 57020	Eastern Farmers Co-op
5	SE	Davis	SD 57021	Eastern Farmers Co-op
6	EC	Dell Rapids	SD 57022	Dell Rapids Co-op Grain
7	EC	Egan	SD 57024	Eastern Farmers Co-op
8	EC	Egan	SD 57024	Egan Area Farmers, LLC DBA: Egan Grain
9	SE	Elk Point	SD 57025	Southeast Farmers Elevator Co-op
10	SE	Elk Point	SD 57025	Southeast Farmers Elevator Co-op
11	EC	Elkton	SD 57026	Elkton Farmers Elevator
12	SE	Freeman	SD 57029	Fremar Farmers Co-Op, Inc.
13	SE	Freeman	SD 57029	Dakota Valley Grain, Inc.
14	EC	Garretson	SD 57030	Eastern Farmers Co-op
15	SE	Gayville	SD 57031	Wakonda Grain and Transport
16	SE	Harrisburg	SD 57032	Eastern Farmers Co-op
17	EC	Hartford	SD 57033	Hartford Farmers Elevator
18	SE	Hudson	SD 57034	Farmers Elevator Company
19	EC	Humboldt	SD 57035	Farmers Elevator Company
20	SE	Hurley	SD 57036	Eastern Farmers Co-op
21	SE	Irene	SD 57037	Riley Company, Inc.
22	SE	Jefferson	SD 57038	Southeast Farmers Elevator Co-op
23	SE	Lesterville	SD 57040	Lesterville Feed & Grain, Inc.
24	SE	Lesterville	SD 57040	Tri County Ag Service - Lesterville, Utica & Volin
25	EC	Madison	SD 57042	Madison Farmers Elevator Co.
26	EC	Madison	SD 57042	Domestic Seed & Supply, Inc.
27	SE	Marion	SD 57043	Fremar Farmers Co-Op, Inc.
28	SE	Marion	SD 57043	Dakota Valley Grain, LLC
29	SE	Menno	SD 57045	Farmers Grain & Stock Company
30	SE	Mission Hill	SD 57046	Farmers Elevator Company of Mission Hill
31	EC	Montrose	SD 57048	Farmers Union Co-op Assoc.
32	EC	Nunda	SD 57050	Madison Farmers Elevator
33	EC	Oldham	SD 57051	Lake Preston Co-operative Assoc.
34	EC	Oldham	SD 57051	Green Thumb Commodities, Inc.
35	SE	Parker	SD 57053	Cargill AgHorizons
36	EC	Ramona	SD 57054	Madison Farmers Elevator Co.
37	EC	Rowena	SD 57056	Splitrock Feeds
38	EC	Salem	SD 57058	Farmers Union Co-op. Assoc.
39	SE	Scotland	SD 57059	Dakota Plains Ag Center, LLC
40	EC	Sherman	SD 57060	Eastern Farmers Co-op

(Continued)

No.	Region	Town	Zip	Name of Elevator
41	EC	Sinai	SD 57061	Sinai Co-operative Elevator Co.
42	SE	Springfield	SD 57062	Co-op, Inc.
43	SE	Springfield	SD 57062	Kingsburg Grain & Feed
44	SE	Tabor	SD 57063	Tabor Feed & Grain
45	SE	Tea	SD 57064	Eastern Farmers Co-op
46	SE	Tyndall	SD 57066	Co-op, Inc.
47	EC	Valley Springs	SD 57068	Valley Springs Farmers Co-op
48	SE	Vermillion	SD 57069	Vermillion Fertilizer & Grain Elevator, Inc.
49	SE	Vermillion	SD 57069	Cargill AgHorizons
50	SE	Viborg	SD 57070	Viborg Co-op Elevator Association
51	EC	Volga	SD 57071	Land O'Lakes Ag Service Center
52	EC	Volga	SD 57071	South Dakota Soybean Processors, Inc.
53	SE	Wakonda	SD 57073	Wakonda Grain & Transport
54	EC	Wentworth	SD 57075	Eastern Farmers Co-op
55	SE	Worthing	SD 57077	Eastern Farmers Co-op
56	SE	Yankton	SD 57078	Dakota Plains Ag Center, LLC
57	SE	Yankton	SD 57078	Yaggie's, Inc.
58	NE	Grover	SD 57201	Watertown Co-op Elevator Assoc.
59	NE	Watertown	SD 57201	Watertown Co-op. Elevator Association
60	NE	Watertown	SD 57201	Kermit's Farm Center
61	NE	Watertown	SD 57201	Notheast Terminal, Inc.
62	NE	Watertown	SD 57201	Hesco, Inc.
63	NE	Waverly	SD 57202	South Shore Elevator Company, Inc.
64	EC	De Smet	SD 57231	Lake Preston Co-operative Assoc.
65	NE	Estelline	SD 57234	Estelline Co-operative Grain Co.
66	NE	Florence	SD 57235	Florence Farmers Elevator
67	NE	Garden City	SD 57236	Wallace Farmers Elevator Co.
68	NE	Hayti	SD 57241	Hayti Farmers Elevator Co.
69	NE	Hazel	SD 57242	Hazel Farmers Elevator
70	NE	Henry	SD 57243	Watertown Co-op Elevator Assoc.
71	NE	LaBolt	SD 57246	LaBolt Farmers Grain Co.
72	NE	Lake Norden	SD 57248	Lake Norden Farmers Elevator Co.
73	EC	Lake Preston	SD 57249	Lake Preston Co-operative Assoc.
74	NE	Milbank	SD 57252	State Line Farmers/Div. of Cenex Harvest States
75	NE	New Effington	SD 57255	Farmers Co-op Elevator
76	NE	Peever	SD 57257	Browns Valley Community Elevator
77	NE	Revillo	SD 57259	Revillo Farmers Elevator
78	NE	Rosholt	SD 57260	Farmers Co-op Elevator Co.
79	NE	Roslyn	SD 57261	Roslyn Elevator
80	NE	Sisseton	SD 57262	Farmers Co-op Elevator
81	NE	South Shore	SD 57263	South Shore Elevator Company
82	NE	Stockholm	SD 57264	Nassau Farmers Elevator Co.
83	NE	Summit	SD 57266	Summit Elevator, Inc.

(Continued)

No.	Region	Town	Zip	Name of Elevator
84	NE	Toronto	SD 57268	Ag. First Farmers Co-operative
85	NE	Vienna	SD 57271	Cargill AgHorizons
86	NE	Wallace	SD 57272	Wallace Farmers Elevator Company
87	NE	Waubay	SD 57273	South Shore Elevator Co., Inc./ Waubay Branch
88	NE	Webster	SD 57274	Watertown Co-op. Elevator Association
89	EC	White	SD 57276	AgFirst Farmers Co-operative
90	NE	Willow Lake	SD 57278	South Dakota Wheat Growers Assoc.
91	NE	Wilmont	SD 57279	Farmers Co-operative Assoc. of Wilmont
92	EC	Mitchell	SD 57301	Farmers Co-op Elev. - Div. of Cenex Harvest States
93	EC	Forestburg	SD 57314	Farmers Elevator Company
94	SE	Dante	SD 57329	Dante Feed & Grain, L.L.C.
95	SE	Dimock	SD 57331	Dimock Farmers Elevator
96	EC	Emery	SD 57332	Cargill AgHorizons
97	EC	Ethan	SD 57334	Farmers Co-operative Assoc.
98	W. River	Fairfax	SD 57335	Country Pride Cooperative, Inc.
99	EC	Fulton	SD 57340	Fulton Farmers Elevator Co.
100	SE	Geddes	SD 57342	Geddes Farmers Co-operative
101	Cent.	Highmore	SD 57345	Dakota Ag Co-op
102	EC	Howard	SD 57349	Howard Farmers Co-op Assoc.
103	Cent.	Huron	SD 57350	S.D. Wheat Growers Assoc.
104	Cent.	Huron	SD 57350	Sunbird, Inc.
105	SE	Kaylor	SD 57354	Kaylor Grain Co., Inc.
106	Cent.	Kimball	SD 57355	Kimball Grain Co.
107	SE	Lake Andes	SD 57356	Lake Andes Farmers Co-operative Co.
108	Cent.	Lane	SD 57358	The Scoular Company dba: Jensen Grain Co.
109	EC	Letcher	SD 57359	Farmers Co-op Elev. - Div. of Cenex Harvest States
110	Cent.	Miller	SD 57362	Miller Grain/Div. Of Performance Seed
111	EC	Mt. Vernon	SD 57363	Farmers Elevator Company
112	SE	Parkston	SD 57366	Kaylor Grain Co., Inc.
113	SE	Parkston	SD 57366	Dakota Plains Ag Center, LLC
114	Cent.	Plankinton	SD 57368	The Scoular Company dba: Jensen Grain Co.
115	SE	Platte	SD 57369	Farmers Elevator Company of Platte
116	Cent.	St. Lawrence	SD 57373	Dakota Ag Co-op
117	Cent.	Stickney	SD 57375	Stickney Co-op Elevator Assoc.
118	SE	Parkston	SD 57376	Dakota Plains Ag Center, LLC
119	SE	Wagner	SD 57380	Farmers Co-op Association, Inc.
120	SE	Wagner	SD 57380	Sam Fousek, dba: Fousek Grain
121	Cent.	Wessington	SD 57381	Dakota Ag Co-op
122	Cent.	Wessington Springs	SD 57382	Amkota Co-op
123	Cent.	White Lake	SD 57383	Hanten Grain Company
124	Cent.	White Lake	SD 57383	White Lake Grain & Feed, Inc.
125	Cent.	Wolsey	SD 57384	South Dakota Wheat Growers Assoc.
126	EC	Woonsocket	SD 57385	The Scoular Company/dba: Jensen Grain Co.

(Continued)

No.	Region	Town	Zip	Name of Elevator
127	Cent.	Yale	SD 57386	Yale Farmers Co-op
128	NE	Britton	SD 57430	4 Seasons Co-operative
129	NC	Doland	SD 57436	Gutwein & Co. Inc./Morning Song Wild Bird Food
130	NC	Eureka	SD 57437	Northern Plains Co-op./Div. Of Cenex Harvest States
131	NC	Eureka	SD 57437	Eureka Elevator
132	NC	Faulkton	SD 57438	Faulkton Farmers Elevator, Co.
133	NC	Faulkton	SD 57438	Faulkton Grain & Feed
134	NC	Miranda	SD 57438	Dakota Ag Co-op
135	NC	Wecota	SD 57438	North Central Farmers Elevator
136	NC	Frankfort	SD 57440	S.D. Wheat Growers Assoc.
137	NC	Frederick	SD 57441	Frederick Farmers Elevator Co-operative
138	NC	Gettysburg	SD 57442	Northern Plains Co-op./Div. Of Cenex Harvest States
139	NC	Gettysburg	SD 57442	Gettysburg Feed & Grain, Inc.
140	NC	Groton	SD 57445	S.D. Wheat Growers Assoc.
141	NC	Groton	SD 57445	Wheetco, Inc.
142	NC	Hecla	SD 57446	S.D. Wheat Growers Assoc.
143	NC	Hosmer	SD 57448	Hosmer Elevator
144	NC	Hoven	SD 57450	Hoven Equity Exchange
145	NC	Hoven	SD 57450	D M Grain Co.
146	NC	Ipswich	SD 57451	North Central Farmers Elevator
147	NC	Ipswich	SD 57451	North Central Farmers Elevator - L & O Terminal
148	NC	Java	SD 57452	North Central Farmers Elevator
149	NE	Langford	SD 57454	Da-Mar Farmers Elevator
150	NC	Lebanon	SD 57455	Lebanon Equity Exchange
151	NC	Leola	SD 57456	North Central Farmers Elevator
152	NC	Mansfield	SD 57460	S.D. Wheat Growers Assoc.
153	NC	Mellette	SD 57461	S.D. Wheat Growers Assoc.
154	NC	Northville	SD 57465	North Central Farmers Elevator
155	NC	Onaka	SD 57466	North Central Farmers Elevator
156	NC	Orient	SD 57467	Farmers Oil Company
157	NC	Redfield	SD 57469	S.D. Wheat Growers Assoc.
158	NC	Roscoe	SD 57471	S.D. Wheat Growers Assoc.
159	NC	Lowry	SD 57472	Lebanon Equity Exchange
160	NC	Selby	SD 57472	Northern Plains Co-op/Div. of Cenex Harvest States
161	NC	Stratford	SD 57474	S.D. Wheat Growers Assoc.
162	NC	Tulare	SD 57476	S.D. Wheat Growers Assoc.
163	NC	Turton	SD 57477	Turton Elevator
164	NC	Warner	SD 57479	Warner Co-operative Co.
165	NC	Westport	SD 57481	L & O Acres
166	Cent.	Pierre	SD 57501	Midwest Co-operatives
167	W. River	Dallas	SD 57529	Country Pride Cooperative, Inc.
168	W. River	Draper	SD 57531	Midwest Co-operatives
169	W. River	Fort Pierre	SD 57532	Dakota Mill & Grain

(Continued)

No.	Region	Town	Zip	Name of Elevator
170	W. River	Gregory	SD 57533	Gregory Farmers Elevator Company
171	Cent.	Harrold	SD 57536	Harrold Grain Company, LLC
172	W. River	Kadoka	SD 57543	Midwest Co-operatives
173	W. River	Kennebec	SD 57544	Farmers Union Co-op Elevator
174	W. River	Martin	SD 57551	Mueller Feed Mill, Inc.
175	W. River	Midland	SD 57552	Dakota Mill & Grain
176	W. River	Midland	SD 57552	Midland Elevator LLC
177	W. River	Murdo	SD 57559	Dakota Mill & Grain
178	Cent.	Onida	SD 57564	Midwest Co-operatives
179	Cent.	Onida	SD 57564	Oahe Grain Corporation
180	W. River	Philip	SD 57567	Midwest Co-operatives
181	W. River	Philip	SD 57567	Dakota Mill & Grain
182	W. River	Presho	SD 57568	Dakota Mill & Grain
183	W. River	Reliance	SD 57569	Farmers Union Co-op Elevator
184	W. River	Vivian	SD 57576	DakotaLand Bird Seed Co.
185	W. River	Winner	SD 57580	Cenex Harvest States
186	W. River	Winner	SD 57580	Country Pride Co-operative Inc.
187	W. River	Witten	SD 57584	The Scoular Co. dba: Witten Feed & Grain Co., Inc.
188	W. River	Dupree	SD 57623	Northern Plains Co-op./Div. of Cenex Harvest States
189	W. River	Eagle Butte	SD 57625	Eagle Butte Co-operative Assoc.
190	NC	Glenham	SD 57631	North Central Farmers Elevator
191	NC	Herreid	SD 57632	North Central Farmers Elevator
192	W. River	Isabel	SD 57633	Isabel Co-op, Inc.
193	W. River	Lemmon	SD 57638	Southwest Grain/Division of Harvest States
194	W. River	McIntosh	SD 57641	McIntosh-Watauga Equity
195	W. River	McLaughlin	SD 57642	S.D. Wheat Growers Assoc.
196	NC	Pollock	SD 57648	North Central Farmers Elevator
197	W. River	Ridgeview	SD 57652	Ridgeview Grain
198	W. River	Rapid City	SD 57701	Dakota Mill & Grain
199	W. River	New Underwood	SD 57761	New Underwood Grain Co.
200	W. River	Oelrichs	SD 57763	West Plains Grain, Inc.
201	W. River	Sturgis	SD 57785	Dakota Mill & Grain
202	W. River	Sturgis	SD 57785	Foothills Seed Inc.
203	W. River	Wall	SD 57790	Dakota Mill & Grain

VIII. APPENDIX B

Survey Questionnaire

South Dakota Grain Elevators Survey

The Opinions of Elevator Managers, 2002

Please return your completed questionnaire in the enclosed envelope to:

Economics Department
College of Agricultural and Biological Sciences, South Dakota State University
101 Scobey Hall, Box 504A
Brookings, SD 57007-0895

If you have any questions about this survey, please call:
Bashir A. Qasmi at: (605) 688-4870, or
Clayton J. Wilhelm at: (605) 688-4887

INITIAL QUESTIONS

First, we have a few questions that will help determine if you should fill out this survey.

1. **Are you <u>currently</u> engaged in managing the addressed grain elevator in South Dakota (as a manager or assistant manager)?** ***(Please check ✓ the box next to your answer and follow the instructions.)***
   - ☐ NO ➔ ***Please stop here and pass this survey to the person who is currently managing the addressed grain elevator.***
   - ☐ YES *(continue)*

2. **Did your elevator handle at least $10,000 worth of grain during crop year 2000-2001?**
   - ☐ NO ➔ ***Please stop here and return the survey in the enclosed envelope.***
   - ☐ YES *(continue)*

FUTURE DIRECTIONS OF GRAIN INDUSTRY

A1. How much do you agree with the following statements on the future direction of grain elevators?

(For each statement, please circle the number that best reflects your opinion.)

Statement	Strongly disagree	Dis-agree	Not sure	Agree	Strongly agree
1. My elevator will be dedicated to handle strictly Non Genetically Modified (Non-GM) grains within 5 years.	1	2	3	4	5
2. At least one of my competing elevators will be dedicated to handle strictly Non-GM grains within 5 years.	1	2	3	4	5
3. My elevator will be dedicated to handle strictly Identity Preserved (IP) grains within 5 years.	1	2	3	4	5
4. At least one of my competing elevators will be dedicated to handle strictly IP grains within 5 years.	1	2	3	4	5
5. U.S. corn markets will be completely segregated into commodity corn and Non-GM corn over the next 5 years.	1	2	3	4	5
6. U.S. corn markets will be completely segregated into commodity corn and IP corn (including Non-GM IP corn) over the next 5 years.	1	2	3	4	5
7. U.S. soybean markets will be completely segregated into commodity soybeans and Non-GM soybeans over the next 5 years.	1	2	3	4	5
8. U.S. soybean markets will be completely segregated into commodity soybeans and IP soybeans (including Non-GM IP soybeans) over the next 5 years.	1	2	3	4	5
9. U.S. winter wheat markets will be completely segregated into commodity winter wheat and Non-GM winter wheat over the next 5 years.	1	2	3	4	5
10. U.S. winter wheat markets will be completely segregated into commodity winter wheat and IP winter wheat (including Non-GM IP winter wheat) over the next 5 years.	1	2	3	4	5
11. U.S. spring wheat markets will be completely segregated into commodity spring wheat and Non-GM spring wheat over the next 5 years.	1	2	3	4	5
12. U.S. spring wheat markets will be completely segregated into commodity spring wheat and IP spring wheat (including Non-GM IP spring wheat) over the next 5 years.	1	2	3	4	5

CORN (All questions in this section relate to the calendar year 2001.)

B1. During the year 2001, did your elevator handle any corn?

☐ NO ⇒ *Skip to Question C1 on page 5* ☐ YES ⇒ *Please Continue Below*

B2. How many bushels of corn did your elevator handle? _____ thousand bu.

B3. Did your elevator conduct in–house genetic testing of corn?

☐ NO ☐ YES

If YES**, what types of genetic test(s) were performed?** *(Please check <u>all</u> that apply)*

☐ ELISA test for corn.

☐ Other (*please describe*):

_____

B4. Did your elevator engage outside help for genetic testing of corn?

☐ NO ☐ YES

If YES, what types of genetic test(s) were conducted, what was the testing cost per sample, and how many days did it take to get the results? *(Please check <u>all</u> that apply)*

☐ ELISA test for corn at the cost of ___ dollars per sample with a turn around in __ days.

☐ PCR test for corn at the cost of ___ dollars per sample with a turn around in ___ days.

☐ Other (*please describe*):

_____ at

the cost of _____ dollars per sample with a turn around in _____ days.

B5. Have any of your buyers asked for Non-GM corn?

☐ NO ☐ YES

B6. During the year 2001, did your elevator handle Non-GM corn separate from commodity corn?

☐ NO ⇒ *Skip to Question B14* ☐ YES ⇒ *Please Continue Below*

B7. How many bushels of Non-GM corn did your elevator handle? _____ thousand bu.

B8. What steps did you take to make sure that Non-GM corn purchased was actually Non-GM corn? *(Please check <u>all</u> that apply.*)

☐ The grain was tested at the time of purchase.

☐ The producer/seller of the grain provided written assurance.

☐ The grain was produced under a contract with all safeguards specified in the contract.

☐ Other (*please describe*):

_____

B9. Did your elevator pay any premium when purchasing Non-GM corn?

☐ NO ☐ YES

If YES**, what was the average premium paid for Non-GM corn?** _____ cents/ bu.

B10. What steps did you take to keep Non-GM corn separate from commodity corn? *(Please check <u>all</u> that apply.*)

☐ Made sure grain augers and other loading and unloading machinery were fully cleaned before using for Non-GM corn.

☐ Made sure grain bins were fully cleaned before using for Non-GM corn.

☐ Maintained separate storage bins dedicated for Non-GM corn.

☐ Maintained separate elevator facilities dedicated for Non-GM corn.

☐ Other (*please describe*):

_____

B11. What was your elevator's additional cost for purchasing and handling Non-GM corn? _____cents per bu.

B12. What was the additional per bushel premium your elevator received for Non-GM corn? ____cents per bu.

B13. What are the three most important problems faced by your elevator in dealing with Non-GM corn?

1) _____

2) _____

3) _____

If you do handle Non-GM corn, please skip questions B14 and B15.

B14. What are the three most important reasons for your elevator not to handle the Non-GM corn?

1) _____

2) _____

3) _____

B15. Would your elevator consider handling Non-GM corn if the premium for Non-GM corn (over and above the usual gross margin for commodity corn) was higher?

☐ NO ☐ YES

If YES**, how much premium would be necessary?** _____ cents per bu.

B16. Are you familiar with any IP system for corn? ☐ NO ☐ YES

B17. Have any of your buyers asked for IP corn? ☐ NO ☐ YES

B18. During the year 2001, did your elevator handle IP corn?

☐ NO ⇒ *Skip to Question B26* ☐ YES ⇒ *Please Continue Below*

B19. How many bu. of IP corn did your elevator handle? _____ thousand bu.

B20. What steps did you take to make sure that IP corn purchased was actually IP corn? *(Please check <u>all</u> that apply.*)

☐ The grain was tested at the time of purchase.
☐ The producer/seller of the grain provided written assurance.
☐ The grain was produced under a contract with all safeguards specified in the contract.
☐ Other (*please describe*):
_____

B21. Did your elevator pay any premium for IP corn?

☐ NO ☐ YES

If YES**, on an average, what premium did your elevator pay for IP corn?** ___ cents/ bu.

B22. What steps did you take to keep IP corn separate from commodity corn? *(Please check <u>all</u> that apply.*)

☐ Made sure grain augers and other loading and unloading machinery were fully cleaned before using for each lot of IP corn.
☐ Made sure grain bins were fully cleaned before using for IP corn.
☐ Maintained separate storage bins dedicated for different IP corn.
☐ Maintained separate elevator facilities dedicated for IP corn.
☐ Other (*please describe*): _____

B23. What was your elevator's additional cost for purchasing and handling IP corn?
_____cents per bu.

B24. What was the additional per bushel premium that your elevator received for IP corn?
_____cents per bu.

B25. What are the three most important problems faced by your elevator in dealing with IP corn?

1) _____

2) _____

3) _____

If you do handle IP corn, please skip questions B26 and B27.

B26. What are the three most important reasons for your elevator not to handle IP corn?

1) _____

2) _____

3) _____

B27. Would your elevator consider handling IP corn if the premium for IP corn (over and above the usual gross margin for commodity bulk corn) was higher?

☐ NO ☐ YES

If YES**, how much premium would be necessary for you to handle IP corn?**
____ cents per bu.

SOYBEANS (All questions in this section relate to the calendar year 2001.)

C1. During the year 2001, did your elevator handle any Soybeans?

☐ NO ⇒ *Skip to Question D1 on page 8* ☐ YES ⇒ *Please Continue Below*

C2. How many bushels of soybeans did your elevator handle? _____ thousand bu.

C3. Did your elevator conduct in–house genetic testing of soybeans?

☐ NO ☐ YES

If YES**, what types of genetic test(s) were performed?** *(Please check <u>all</u> that apply)*

☐ ELISA for soybeans.

☐ Other (*please describe*):

_____

C4. Did your elevator engage outside help for genetic testing of soybeans?

☐ NO ☐ YES

If YES**, what types of genetic test(s) were conducted, what was the testing cost per sample, and how many days did it take to get the results?** *(Please check <u>all</u> that apply)*

☐ ELISA test for soybeans at ____ dollars per sample with a turn around in _____ days.

☐ PCR test for soybeans at ____ dollars per sample with a turn around in _____ days.

☐ Other (*please describe*):

_____ at
the cost of _____ dollars per sample with a turn around in _____ days.

C5. Have any of your buyers asked for Non-GM soybeans?

☐ NO ☐ YES

C6. During the year 2001, did your elevator handle Non-GM soybeans separated from commodity soybeans ?

☐ NO ⇒ *Skip to Question C14* ☐ YES ⇒ *Please Continue Below*

C7. How many bushels of Non-GM soybeans did your elevator handle? ____ thousand bu.

C8. What steps did you take to make sure that Non-GM soybeans purchased were actually Non-GM soybeans? *(Please check <u>all</u> that apply.*)

☐ The grain was tested at the time of purchase.
☐ The producer/seller of the grain provided written assurance.
☐ The grain was produced under a contract with all safeguards specified in the contract.
☐ Other (*please describe*):

_____

C9. Did your elevator pay any premium for Non-GM soybeans?

☐ NO ☐ YES

If YES**, what was the average premium paid for Non-GM soybeans?** _____ cents/ bu.

C10. What steps did you take to keep Non-GM soybeans separate from commodity soybeans?

(Please check <u>all</u> that apply.)

☐ Made sure grain augers and other loading and unloading machinery were fully cleaned before using for Non-GM soybeans.
☐ Made sure grain bins were fully cleaned before using for Non-GM soybeans.
☐ Maintained separate storage bins dedicated for Non-GM soybeans.
☐ Maintained separate elevator facilities dedicated for Non-GM soybeans.
☐ Other (*please describe*):

_____

C11. What was your elevator's additional cost for purchasing and handling Non-GM soybeans? _____cents per bu.

C12. What was the additional per bushel premium your elevator received for Non-GM soybeans? _____cents per bu.

C13. What are the three most important problems faced by your elevator in dealing with Non-GM soybeans?

1) _____

2) _____

3) _____

If you do handle Non-GM soybeans, please skip questions C14 and C15.

C14. What are the three most important reasons for your elevator not to handle the Non-GM soybeans?

1) _____

2) _____

3) _____

C15. Would your elevator consider handling Non-GM soybeans if the premium for Non-GM soybeans (over and above the usual gross margin for commodity soybeans) was higher?

☐ NO ☐ YES

If YES**, how much premium would be necessary?** _____ cents per bu.

C16. Are you familiar with any IP system for soybeans? ☐ NO ☐ YES

C17. Have any of your buyers asked for IP soybeans? ☐ NO ☐ YES

C18. During the year 2001, did your elevator handle IP soybeans?

☐ NO ⇒ *Skip to Question C26* ☐ YES ⇒ *Please Continue Below*

C19. How many bu. of IP soybeans did your elevator handle? _____ thousand bu.

C20. What steps did you take to make sure that IP soybeans purchased was actually IP soybeans? *(Please check <u>all</u> that apply.*)

☐ The grain was tested at the time of purchase.
☐ The producer/seller of the grain provided written assurance.
☐ The grain was produced under a contract with all safeguards specified in the contract.
☐ Other (*please describe*):

_____

C21. Did your elevator pay any premium for IP soybeans?

☐ NO ☐ YES

If YES**, on an average, what premium did your elevator pay for IP soybeans?**
_____ cents/ bu.

C22. What steps did you take to keep IP soybeans separate from commodity soybeans? *(Please check <u>all</u> that apply.*)

☐ Made sure grain augers and other loading and unloading machinery were fully cleaned before using for each lot of IP soybeans.
☐ Made sure grain bins were fully cleaned before using for IP soybeans.
☐ Maintained separate storage bins dedicated for different IP soybeans.
☐ Maintained separate elevator facilities dedicated for IP soybeans.
☐ Other (*please describe*):

_____

C23. What was your elevator's additional cost for purchasing and handling IP soybeans?
_____cents per/bu.

C24. What was the additional per bushel premium your elevator received for IP soybeans?
_____cents per/bu.

C25. What are the three most important problems faced by your elevator in dealing with IP soybeans?

1) _____
2) _____
3) _____

If you do handle IP soybeans, please skip questions C26 and C27.

C26. What are the three most important reasons for your elevator not to handle the IP soybeans?

1) _____
2) _____
3) _____

C27. Would your elevator consider handling IP soybeans if the premium for IP soybeans (over and above the usual gross margin for commodity bulk soybeans) was higher?

☐ NO ☐ YES

If YES**, how much premium will be necessary to handle IP soybeans?** _ cents per/bu.

WHEAT (All questions in this section relate to the calendar year 2001.)

D1. During the year 2001, did your elevator handle any Wheat?
☐ NO ⇒ *Skip to Question E1 on page 9* ☐ YES ⇒ *Please Continue Below*

D2. How many bushels of <u>spring wheat</u> did your elevator handle? _____ thousand bu.

D3. How many bushels of <u>winter wheat</u> did your elevator handle? _____ thousand bu.

D4. Are you familiar with any IP systems for wheat? ☐ NO ☐ YES

D5. Have any of your buyers asked for IP wheat? ☐ NO ☐ YES

D6. During the year 2001, did your elevator handle IP wheat?
☐ NO ⇒ *Skip to Question D14* ☐ YES ⇒ *Please Continue Below*

D7. How many bu. of IP wheat did you handle? _____ thousand bu.

D8. What steps did you take to make sure that the IP wheat purchased was actually IP wheat? *(Please check <u>all</u> that apply.*)
☐ The grain was tested at the time of purchase.
☐ The producer/seller of the grain provided written assurance.
☐ The grain was produced under a contract with all safeguards specified in the contract.
☐ Other (*please describe*):
_____

D9. Did your elevator pay any premium for purchasing IP wheat? ☐ NO ☐ YES

If YES**, on an average, what premium was paid for IP wheat?** _____ cents/bu.

D10. What steps did you take to keep IP wheat separate from commodity wheat?
(Please check <u>all</u> that apply.)
☐ Made sure grain augers and other loading and unloading machinery were fully cleaned before using for each lot of IP wheat.
☐ Made sure grain bins were fully cleaned before using for IP wheat.
☐ Maintained separate storage bins dedicated for different IP wheat.
☐ Maintained separate facilities dedicated for IP wheat.
☐ Other (*please describe*):
_____

D11. What was your elevator's additional cost for purchasing and handling IP wheat?
_____cents per bu.

D12. What was the additional per bushel premium your elevator received for IP wheat?
_____cents per bu.

D13. What are the three most important problems faced by your elevator in dealing with IP wheat?
1) _____
2) _____
3) _____

If you do handle IP wheat, please skip questions D14 and D15.

D14. What are the three most important reasons for your elevator not to handle the IP wheat?
1) _____
2) _____
3) _____

D15. Would your elevator consider handling IP wheat if the premium for IP wheat (over and above the usual gross margin for commodity wheat) was higher?

☐ NO ☐ YES

If YES**, how much premium will be necessary?** _____ cents per bu.

QUESTIONS ABOUT YOUR ELEVATOR AND YOURSELF

E1. In what county is your elevator located? _____

E2. What is the total storage capacity of your elevator? _____ thousand bu.

E3. Is your elevator along a rail line with service? ☐ NO ☐ YES

If YES**, what is the maximum loading capacity of your elevator.** *(Please check one)*

☐ 24 cars. ☐ 49 cars. ☐ 99 cars. ☐ 100 or more cars.

E4. Can you divide the storage capacity in to a number of units to segregate different types of grains (Commodity and non-commodity grains, i.e. 1) Commodity corn, 2) Non-GM corn, 3) IP corn-1, 4) IP corn-2, 5) Commodity soybeans, 6) Non-GM soybeans, 7) IP soybeans-1, 8) IP soybeans-2, etc. etc).

☐ NO ☐ YES

If YES**, please list the number of bins & total capacity for each unit. (attach additional sheet if needed).**

Unit # 1: _____ **bins**, with a total capacity of _____**th. bu.**

Unit # 2: _____ **bins**, with a total capacity of _____**th. bu.**

Unit # 3: _____ **bins**, with a total capacity of _____**th. bu.**

Unit # 4: _____ **bins**, with a total capacity of _____**th. bu.**

Unit # 5: _____ **bins**, with a total capacity of _____**th. bu.**

E5. Do you (the local elevator manager or assistant manager) make all the strategic and operational decision relating to the types of grain handled and the relevant margins and premiums?

☐ NO ☐ YES

E6. How many years have you been the manager of this elevator?

☐ 0-5 years ☐ 5-10 years ☐ 10-20 years ☐ 20-30 years ☐ 30+ years

E7. How many years of experience do you have as a grain elevator manager?

☐ 0-5 years ☐ 5-10 years ☐ 10-20 years ☐ 20-30 years ☐ 30+ years

E8. How many years of experience do you have in the grain business?

☐ 0-5 years ☐ 5-10 years ☐ 10-20 years ☐ 20-30 years ☐ 30+ years

OTHER COMMENTS

If you have any other comments regarding the future directions of the grain industry that you would like to share at this time, please write them here (or on additional paper) and include them in the mailing envelope provided.

We would like to *thank you* for taking the time to complete this survey. We know that you are busy and appreciate your help. Your responses will be kept confidential and will be combined with those of other elevator managers across the state to draw the conclusions of this survey. A summary of the results of this project will be published in the South Dakota Grain and Feed Association Newsletter, and a complete report will be made available to those interested.

IX. APPENDIX C

Reasons Given by Elevator Managers for Not Participating in a Specialty Segment of the Grain Market, by Elevator Size

Table C-1: Reasons Given for Not Participating in Non-Transgenic Corn Segregation by South Dakota Elevators, by Size

	Small (<400K bu.)		Medium (400-800K bu.)		Large (>800K bu.)		All Elevators	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Number of Respondents[a]	21	-	32	-	20	-	**73**	-
Reasons for not Segregating:								
Bin Space Utilization	6	29	4	13	20	100	**31**	**42**
Lack of Market/Premium	5	24	6	19	17	85	**28**	**38**
Risk of Contamination	3	14	5	16	15	75	**23**	**32**
Testing Inconvenience	4	19	3	9	6	30	**13**	**18**
Availability	3	14	2	6	4	20	**9**	**12**
Time	1	5	3	9	6	30	**10**	**14**
Mainly Sell to Feed/Ethanol	6	29	2	6	3	15	**11**	**15**
Transportation	1	5	0	0	2	10	**3**	**4**

[a]South Dakota elevators handling corn but not segregating non-GM corn.

Table C-2: Reasons Given for Not Handling Identity-Preserved Corn by South Dakota Elevators, by Size

	Small (<400K bu.)		Medium (400-800K bu.)		Large (>800K bu.)		All Elevators	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Number of Respondents[a]	22	-	33	-	20	-	**75**	**-**
Reasons for not Handling IP Corn:								
Bin Space Utilization	6	27	5	15	20	100	**31**	**41**
Lack of Market/Premium	7	32	5	15	1	5	**22**	**29**
Risk of Contamination	3	14	5	15	13	65	**21**	**28**
Testing Inconvenience	3	14	1	3	3	15	**7**	**9**
Availability	3	14	2	6	4	20	**9**	**12**
Time	0	0	4	12	7	35	**11**	**15**
Mainly Sell to Feed/Ethanol	7	32	0	0	1	5	**8**	**11**
Transportation	1	5	0	0	2	10	**3**	**4**

[a]South Dakota elevators handling corn but not IP corn.

Table C-3: Reasons Given for Not Participating in Non-Transgenic Soybean Segregation by South Dakota Elevators, by Size

	Small (<400K bu.)		Medium (400-800K bu.)		Large (>800K bu.)		All Elevators	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Number of Respondents[a]	14	-	32	-	20	-	**66**	-
Reasons for not Segregating:								
Bin Space Utilization	6	43	13	41	8	40	**27**	**41**
Lack of Market/Premium	1	7	8	25	8	40	**17**	**26**
Risk of Contamination	2	14	10	31	1	5	**13**	**20**
Testing Inconvenience	2	14	4	13	0	0	**6**	**9**
Availability	2	14	1	3	2	10	**5**	**8**
Time	0	0	3	9	2	10	**5**	**8**
Mainly Sell to Feed/Ethanol	1	7	0	0	0	0	**1**	**2**
Transportation	1	7	0	0	1	5	**2**	**3**

[a]South Dakota elevators handling soybeans but not segregating non-GM soybeans.

Table C-4: Reasons Given for Not Handling Identity-Preserved Soybeans by South Dakota Elevators, by Size

	Small (<400K bu.)		Medium (400-800K bu.)		Large (>800K bu.)		All Elevators	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Number of Respondents[a]	14	-	33	-	20	-	**67**	**-**
Reasons for not Handling IP Soybeans:								
Bin Space Utilization	6	43	9	27	6	30	**21**	**31**
Lack of Market/Premium	2	14	11	33	10	50	**23**	**34**
Risk of Contamination	3	21	9	27	2	10	**14**	**21**
Testing Inconvenience	1	7	4	12	1	5	**6**	**9**
Availability	1	7	2	6	2	10	**5**	**7**
Time	1	7	3	9	1	5	**5**	**7**
Mainly Sell to Feed/Ethanol	0	0	0	0	0	0	**0**	**0**
Transportation	0	0	2	6	1	5	**3**	**4**

[a]South Dakota elevators handling soybeans but not IP soybeans.

Table C-5: Reasons Given for Not Handling Identity-Preserved Wheat by South Dakota Elevators, by Size

	Small (<400K bu.)		Medium (400-800K bu.)		Large (>800K bu.)		All Elevators	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Number of Respondents[a]	12	-	31	-	14	-	**57**	**-**
Reasons for not Handling IP Wheat:								
Bin Space Utilization	4	33	11	35	7	50	**22**	**39**
Lack of Market/Premium	1	8	7	23	7	50	**15**	**26**
Risk of Contamination	1	8	9	29	1	7	**11**	**19**
Testing Inconvenience	1	8	4	13	0	0	**5**	**9**
Availability	3	25	5	16	2	14	**10**	**18**
Time	0	0	0	0	2	14	**2**	**4**
Mainly Sell to Feed/Ethanol	0	0	0	0	0	0	**0**	**0**
Transportation	0	0	1	3	0	0	**1**	**2**

[a]South Dakota elevators handling wheat but not IP wheat.