INVESTIGATING THE BUSINESS CHARACTERISTICS, PURCHASING AGREEMENTS, AND PERCEPTIONS OF ORGANIC GRAIN BUYERS IN THE MIDWEST

by

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A Thesis

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Master of Science

Department of Agricultural Economics

West Lafayette, Indiana

August 2019

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ACKNOWLEDGMENTS

I would like to thank the Sustainable Agriculture Research and Education-North Central Region for funding this research. I would also like to thank the greater research team involved in other phases of this project for their guidance, feedback, and support during design of the questionnaire, data collection, and writing of results.

Further, I would like to thank my graduate committee for providing insight over the duration of the thesis writing process. Without my committee members, this thesis would not have been possible. Additionally, I would like to thank Dr. Ariana Torres for supporting my graduate studies and helping ease my transition to a new field of study.

Finally, I would like to thank my family and friends for their constant support while I further my education. Without all the love, support, and encouragement extended to me from these individuals, I would certainly not have been able to attain this degree. Thank you for your constant support with everything I attempt to accomplish.

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ABSTRACT

Author: Lancaster, Nicholas A. MS
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Degree Received: August 2019
Title: Investigating the Business Characteristics, Purchasing Agreements, and Perceptions of Organic Grain Buyers in the Midwest
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Demand for organic food products has grown at rates as high as 20% since the 1990s. Organic grains compose 11% of total organic food demand, and are used in livestock production which represents 43% of organic food demand. Though the demand for organic grains is arguably increasing, domestic production of organic grains is lagging. Producers in the U.S. are hesitant to transition to certified organic grain production for a number of reasons. However, a lack of information pertaining to the organic grains market is one of the most prominent barriers to entry. One method that may provide insight into marketing opportunities available to organic grain producers is to create classifications of organic grain buyers. These classifications may allow for the comparison of business demographics, perceptions of the organic grain market, relationship formation and maintenance factors, and characteristics of purchasing agreements across buyer classifications. These comparisons would allow producers to identify potential marketing opportunities by providing insight regarding types of assistance offered by buyers, how to form a relationship with buyers, types of purchasing agreements used, and purchasing agreement characteristics and requirements. Producers would then be able to identify appropriate buyers for their respective situations based on times contracts are signed, payment timing, storage and transportation requirements, and the amount of organic practice documentation buyers require. Similar classifications have been proposed for organic producers, but, to date, no such classification exists for organic buyers. This work proposes two classifications of organic buyers. First, a classification of committed organic buyers versus pragmatic organic/pragmatic conventional buyers is motivated by similar classifications of organic producers found in previous works. Secondly, this work also introduces a classification of buyers that are sellers versus end-users of organic grains. Literature has suggested that the type of organic grain buyer (seller or end-user) gives rise to differences in functionality regarding interacting with producers

and purchasing agreement characteristics. A sample of 45 organic grain buyers in the Midwest was utilized to characterize business demographics, perceptions of the organic grain market, relationship factors, and purchasing agreement characteristics on the two aforementioned categorization of organic grain buyers. A mixed methodology approach was utilized involving data collection via phone interviews and an online questionnaire. Initial data analysis suggests that data from the two data collection methods statistically differed in some measures of business demographics, perceptions of the organic grains market, and types of assistance offered to producers. This suggests that buyers responding to a phone interview may be more willing to assist producers and have more positive perceptions of the organic market. Thus, each analysis separates phone interview and online questionnaire responses. Due to a small sample size, means comparisons were utilized for the proposed categorizations of buyers. Data were found to not adhere to the normality assumption, requiring the use of nonparametric methods. A Chi-square test was conducted for binary variables, while a Wilcoxon-Mann-Whitney test was utilized for continuous and categorical variables. Results suggest that committed organic grain buyers are smaller in terms of gross sales than pragmatic organic/conventional buyers. Fewer committed organic grain buyers require the grain supplier to pay for grain delivery when compared to pragmatic buyers. Both the comparison of committed organic versus pragmatic buyers and the comparison of sellers versus end-users suggest that there is a bifurcation in organic grain buyers, indicating potential conventionalization within the organic grain industry. Additionally, both categorizations also indicate the buyers anticipate future supply and demand to both increase, but do not expect future price to increase. Thus, it can be concluded that buyers believe future supply will increase at a greater rate than demand, decreasing price. Alternatively, buyers may expect future supply and demand to grow proportionally, keeping price constant. Though the sample is representative of the population of buyers present, the small sample size suggests results of this work should be interpreted with caution.

CHAPTER 1: INTRODUCTION

Organic markets in the U.S. have been steadily growing since 1990 with organic sales rising nearly 20 percent annually (Constance and Choi, 2010; Dimitri and Greene, 2002; Oberholtzer et al., 2005). By 2015, organic food sales in the U.S. totaled over $43 billion, a notable increase from the $3.6 billion in 1997 (Organic Trade Association, 2016). More recently, organic demand grew at a rate of 6.4% in 2017, a much higher growth rate than conventional foods of 1.1% for the same year (McNeil, 2017; Oberholtzer et al., 2005; Organic Trade Association, 2016). The aforementioned growth in demand of organic products demonstrates the relevance of the organic products in the U.S. economy. This growth, coupled with organic price premiums (L'Hoir et al., 2002), creates opportunities for organic agricultural operations to respond to a market facing high demand. However, production of organic products has not grown proportionally with demand of organic foods from consumers (Constance and Choi, 2010).

Organic agricultural production is appealing to farmers for a variety of reasons including environmental, philosophical, and financial perspectives (Peterson et al., 2012). Though farm-gate sales of organic products are only around 2% of U.S. farm-gate sales (Greene et al., 2017), this is a growing billion dollar industry that certainly cannot be ignored. Organic farm-gate sales can be separated into the major contributors of milk and eggs at 31%, livestock and poultry at 12% and field crops (grains) at 11% (Greene et al., 2017). The remaining 46% of organic production is composed of fruits, vegetables, and other specialty crops (Greene et al., 2017). The importance of organic grains is notable, as 54% of organic food sales are either from grains themselves (11%), or livestock production systems that require grains as an input (43%).

Although demand of organic grains is experiencing rapid growth, supply of organic grains produced domestically is falling short (Lancaster et al., 2019). While microeconomic theory suggests that if domestically produced organic grains were desired, buyers would pay for domestic producers to convert to certified organic production (Varian, 2014). However, previous works have suggested that microeconomic theory has failed, and there is a indeed supply shortage of domestic organic grains. While factors such as owner demographics, market access, and land tenure impact a producer's decision to enter certified organic production (Carolan, 2005), more significant barriers to entry are present. Barriers to entry for organic grain production have been identified as technical limitations such as lack of information for obtaining

organic certification and organic production practices, financial constraints and lack of financial incentives, lack of compatibility with the current farming system, lack of infrastructure, and lack of information regarding marketing opportunities (Constance and Choi, 2010; Cranfield et al., 2010; L'Hoir et al., 2002; Peterson et al., 2012). Though previous works have identified communication gaps, or areas where information needs expanded or needs to be made more readily available, information pertaining to behaviors, beliefs and requirements of organic grain buyers is not well documented in literature.

A deeper understanding of organic grain buyers would provide vital information that can be used to strengthen the organic grain market in the U.S. Providing information on marketing opportunities may allow producers to feel more at-ease and less hesitant to consider organic production. Information on marketing opportunities available would allow producers to identify potential buyers and forge long-term relationships, encouraging growth of the organic grain industry. With increased entry by producers to organic grain production, domestic supply could increase, potentially reducing the dependence on imported organic grains currently present in the U.S. market. To completely understand marketing opportunities available to organic producers, it is imperative to understand how buyers of organic grains operate. Thus, business demographics of buyers, buyer perceptions of the organic grain market, relationship factors, and characteristics of purchasing agreements are areas which need to be explored in detail to fully understand the functions of organic grain buyers in order to facilitate growth of the organic grain market.

One approach to understanding buyer operations and marketing opportunities available to organic producers is to create defined buyer categories that producers may encounter. The creation of buyer categories allows for pairwise comparisons, assisting producers in identifying potential marketing opportunities available via specific types of buyers by providing information on how businesses with specific demographics perceive the future of the organic grains market, forge relationships with suppliers, and characteristics and requirements of purchasing agreements. Buck et al. (1997) introduced the concepts of conventionalization and bifurcation within the organic industry, leading to future works classifying organic producers. While organic producers have been classified into groups (Clunies-Ross, 1990; Clunies-Ross and Cox, 1994; Constance et al., 2008; Darnhofer et al., 2005; Guthman, 1998; Guthman, 2004), no such classification exists for organic grain buyers. If such a classification were developed, it would

provide potential for producers to identify buyers offering assistance needed and buyers that have attainable production, documentation, and quality requirements for the producer.

The intent of the present work is to propose buyer classifications for producers to identify buyers and gather initial insight into potential marketing opportunities available. Two buyer classifications are proposed to provide a greater understanding of the organic grains market. The first classification leverages the theoretical framework of organic producers by Darnhofer et al. (2005). The second classification proposed relies on potential differences between brokers, traders, exporters (classified as sellers) and livestock producers, bakeries, flour mills (classified as end-users). Sellers and end-users exhibit differences in functionality and requirements regarding organic contracting and grain quality (Born and Sullivan, 2005; Born and Sullivan, 2002).

To create a classification of buyers, a mixed methodology data collection utilized phone interviews and an online questionnaire to gather business demographics, perceptions of the organic grain market, relationship factors, and characteristics of purchasing agreements. A sample of 45 buyers of organic and/or non-GMO grains from the 12 states in the North Central Region of the U.S. was collected. While the sample is representative of the population of buyers, concerns due to sample size are still present. Therefore, results of this work should be interpreted with caution. Buyer classifications presented in this work are intended to provide information on buyer operations and marketing opportunities available to producers of organic grains in the Midwest in an effort to disentangle the organic grain industry and aid in the reduction of communication gaps. In addition to providing information, this work also provides a theoretical foundation for buyer classifications which can be further developed and explored in future works to provide a greater and more comprehensive understanding of the organic grain market to facilitate market growth and long-term stability.

CHAPTER 2: REVIEW OF LITERATURE

2.1 Organic Grain Market

2.1.1 Uses of Organic Grains

Grain demanded by buyers can either be feed-grade grains to meet the demands of livestock, or food-grade grains to meet demands of human nutrition. While many food- and feed-grade grains can provide nutrients for human consumption, there are some key differences between the two classes. In a broad sense, feed-grade grains are used for the purpose of feeding animals due to inability of humans to fully digest and obtain nutrients, sanitary concerns, or cultural acceptability such as taste or texture (Capper et al., 2013). Consequently, food-grade grains are grain products that can be digested by humans to provide nutrients (Capper et al., 2013), or meet sanitation, nutrient availability, and cultural acceptability to be converted into a grain-based value-added product for human consumption (Hofstrand, 2006). While there is some distinction in quality attributes between feed- and food-grade grains, food-grade grains can be used as feed in livestock production as they exhibit higher standards regarding quality attributes. Additionally, the production of value-added products intended for human consumption creates many additional byproducts that are subsequently used in the animal industry as livestock feed, such as corn gluten meal and soybean meal (Hofstrand, 2006).

Looking more closely at properties for specific grains reveals true differences between food- and feed-grade products. For example, food-grade corn encompasses properties desirable for milling, and human digestibility (Hofstrand, 2006). Products from dry corn milling are high in starch and include breakfast cereals, corn snacks, beer, corn chips and tortillas (Hofstrand, 2006). Wet milling of corn produces the food-grade products of high fructose corn syrup and various starches used as binding agents in pie fillings, sauces, and candies (Hofstrand, 2006). Additionally, wet milling of corn produces byproducts such as corn gluten meal and corn gluten feed, which are used as components of livestock rations (Hofstrand, 2006). Food-grade soybeans have traits that are desirable for high-protein and fermented food products such as soy milk, miso, tofu, and edamame (Hofstrand, 2006).

Processing of feed-grade grains is less of a transformation process than what food-grade grains undergo. Feed-grade grains are typically processed to make the nutrients more available, or easily accessible to livestock (Guyer, 1973). Excluding oats, grains used in livestock production are not digested well in the whole grain form, requiring processing that reduces the size of the grain and exposes more surface area to promote digestion (Guyer, 1973). Techniques that are often used in the livestock industry are grinding and rolling (Guyer, 1973). Additionally, feeds may undergo a flaking process that uses either steam or pressure to begin the breakdown of starch molecules before fed to livestock, further enhancing digestibility (Guyer, 1973). Lastly, some grains, such as soybeans, may be roasted to begin starch degradation (Guyer, 1973). The type of feed processing that is chosen is dependent upon the type of grain and the mixture of grains to be fed to livestock (Guyer, 1973).

2.1.2 Domestic Supply, Demand, and Imports of Organic Grains

2.1.2.1 Domestic Demand

While demand for minor organic grains is not yet fully reported, demand of organic corn, soybeans, and wheat is more readily available. Before demand is discussed, an understanding of grain buyers present in the market is necessary. As previously mentioned, food- and feed-grade organic grains have different characteristics, which means buyers of these grains will also possess different attributes. Buyers of food-grade organic grains may be processors, brokers/traders, merchandisers, exporters, or a grain mill or cooperative (Born and Sullivan, 2005; Mercaris, 2018a; The Non-GMO Sourcebook, 2018b). Processors of organic food-grade grains include companies like bakeries, oil extractors, flour mills and other value added food processors. Many of these processors may produce byproducts that can be utilized as a feed-grade product (Hofstrand, 2006), however, in terms of purchases they are strictly considered food-grade buyers.

Feed-grade organic grain buyers include brokers, exporters/traders, merchandisers, cooperatives, grain elevators, feed mills, and livestock producers (Born and Sullivan, 2005; Mercaris, 2018a; The Non-GMO Sourcebook, 2018b). Livestock producers may include cattle feeding operations (beef), dairy producers, swine producers, and poultry producers (Mercaris, 2018b; Mercaris, 2018c; Mercaris, 2018d). Organic grain buyers such as brokers,

exporter/traders, merchandisers, cooperatives and grain-elevators may purchase both feed- and food-grade grains, as demonstrated above. Additionally, many organic grain buyers may also purchase non-GMO/transitioning, and conventional grains (Mercaris, 2018a; The Non-GMO Sourcebook, 2018b) to meet the demand of their customers or individual operations.

While information on participation of specific buyers is not currently present in the literature, information regarding organic acreage planted, and organic prices are available from the USDA (USDA-NASS, 2017; USDA-NASS, 2019). While acreage reports of organic grain production does provide some insight into the growth of the organic grains industry, it does not provide a clear picture of the current supply lag the domestic organic grains industry is facing. To fully understand the current domestic market situation, supply and demand volumes must be interpreted. Additionally, understanding the uses of organic grains (feed versus food-grade) would allow for a more accurate depiction of the organic grains market. Presently, this information is not readily available from the USDA, but is supplied by entities in the private sector. Mercaris, a subscription based service, is one private sector entity that provides market information for organic and non-GMO commodities. Moreover, Mercaris (2019) also provides details regarding feed- and food-grade organic grain demand.

When interpreting organic grain prices and volumes, there are two approaches related to timeframes that can be utilized. First, organic grain volumes and prices can be analyzed on the basis of a calendar year. However, this allows grains from multiple production cycles (years) to be analyzed together. Perhaps the more accurate way to analyze grain prices and volumes is to use a marketing year. Marketing years are adaptations to a calendar year that eliminates variations in prices and production from external forces, such as weather, across multiple production cycles (USDA-ERS, 2017). Therefore, when comparing grains on a basis of marketing year, all grains in the same marketing year are produced during the same production cycle (Mercaris, 2019). The marketing year for corn and soybeans begins September 1 and ends August 31. On the other hand, marketing years for wheat begin on June 1 and end May 31 (Mercaris, 2019).

Reports from Mercaris (2019) indicate organic corn demand has grown from 28.7 million bushels in the 2014/2015 marketing year to 53.8 million bushels (87%) in the 2017/2018 marketing year as demonstrated in Figure 1. This increase in demand of organic corn in the US is largely attributed to growth in demand of the livestock industry. The 2014/2015 marketing year

demand was composed of a demand of 11.8 million bushels of food-grade organic corn and 16.9 million bushels of feed-grade organic corn. In comparison, demand for organic corn for the 2017/2018 marketing year was 13 million bushels of food-grade corn and 40.8 million bushels of feed-grade corn (Mercaris, 2018b). During this period, growth in demand for organic food-grade corn increased by 10%, where growth of feed-grade organic corn increased by 141%. Thereby, livestock production is a vital segment of the organic grain market.

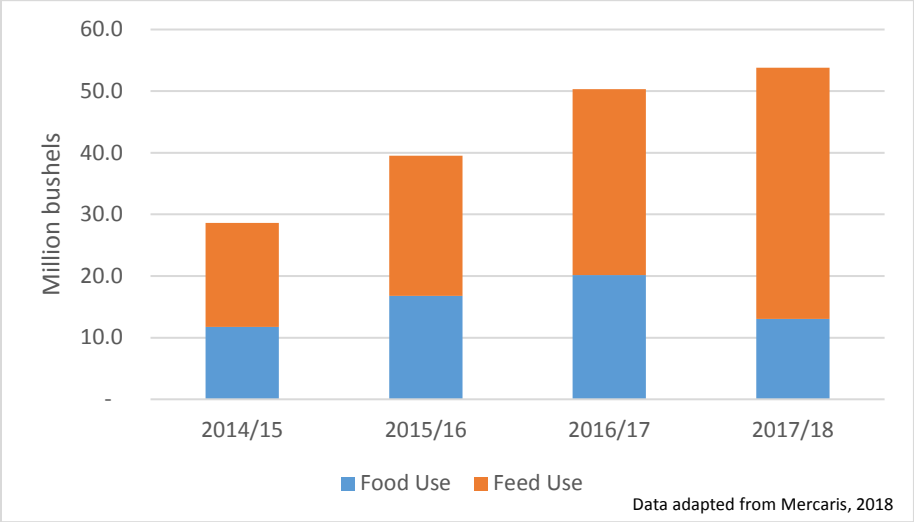

Figure 1. Organic Corn Demand in the U.S. from 2014-2017

Further investigation into livestock production reveals livestock that consume corn increased by an estimated 118% from 2014 to 2017 (Mercaris, 2018b). This growth of livestock production using organic corn is driven by the organic dairy and poultry industries (Mercaris, 2018b). To elaborate, organic dairy production has experienced an estimated 60.4% increase over the 2014/2015 to 2017/2018 corn marketing period, increasing from 235 million head to 377 million head of dairy cattle over the period (Mercaris, 2018b). Similarly, organic poultry increased from 294 million head to 786 million head (167%) during the same period (Mercaris, 2018b).

Utilization of organic soybeans in the U.S. is presented in Figure 2. Overall, demand of organic soybeans has increased from 14.2 million bushels in the 2014/2015 marketing year to 26.3 million bushels (85%) in the 2017/2018 marketing year (Mercaris, 2018c). Similarly to corn, the demand for feed-grade organic soybeans is driven mostly by the livestock sector, which experienced an increased demand of 109% over the same period (Mercaris, 2018c). During this period, food-grade organic soybean demand declined by 20%, decreasing from 2.3 million

bushels to 2.1 million bushels (Mercaris, 2018c). Similarly to organic corn, organic soybean feed demand is primarily composed of the dairy and poultry industries. Dairy cattle consuming high protein feeds, such as soybeans, were estimated to increase from 336 million head to 538 million head (60.1%) from the 2014/2015 marketing year to the 2017/2018 marketing year (Mercaris, 2018c). Poultry consuming soybeans increased from 603 million head to 1722 million head (186%) over the same period (Mercaris, 2018c).

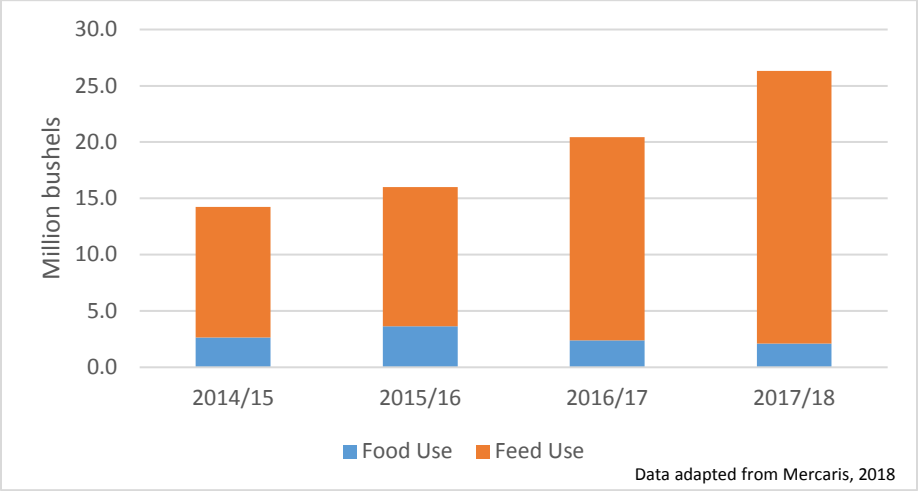

Figure 2. Organic Soybean Demand in the U.S. from 20104-2017

Organic wheat demand in the U.S. is more evenly distributed between food- and feed-grade than organic corn or soybean demand as demonstrated in Figure 3. Organic wheat use has increased by 102%, from 9 million bushels in the 2014/2015 marketing year to 17.8 million bushels in the 2017/2018 marketing year (Mercaris, 2018d). Food-grade organic wheat demand increased from 4.9 million bushels to 8.8 million bushels (80%) over the same period (Mercaris, 2018d). Though supply and demand is more evenly split between food- and feed-grade organic wheat, feed-grade organic wheat experienced greater growth over the 4 year period, growing 120% from a demand of 4.1 million bushels to 9 million bushels (Mercaris, 2018d). Similarly to organic corn demand, growth in feed demand of organic wheat was dominated by the dairy and poultry industries, which experienced growth rates of 60.4% and 167%, respectively (Mercaris, 2018d).

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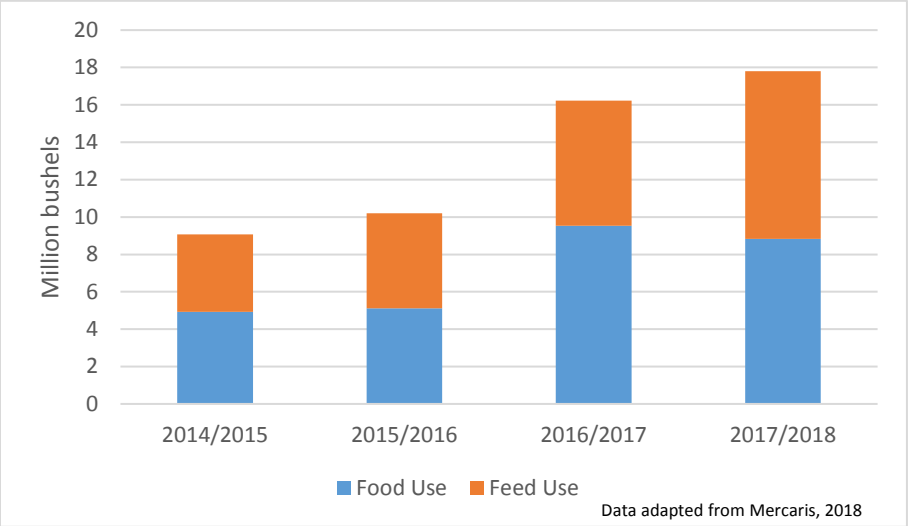

Figure 3. Organic Wheat Demand in the U.S. from 20104-2017

2.1.2.2 Current Domestic Supply

A survey of domestic organic grain producers across the US conducted by Mercaris (2019) revealed feed-grade organic corn is supplied primarily by the Corn Belt (IO, IL, IN, MI, MN, MO, OH, WI), with 71.6% supplied by states located in the region for the 2017/2018 marketing year . Canada, the Eastern US (CT, DE, MA, MD, ME, ND, NH, NJ, NY, PA, RI, VA, VT), the High Plains (CO, KS, MT, ND, NE, OK, SD, TX, WY), and the Western U.S. (AZ, CA, ID, MN, NV, OR, UT, WA) were determined to supply the remaining amounts of domestic feed-grade organic corn (Mercaris, 2019). Due to the Corn Belt serving as the largest domestic supplier of organic feed-grade corn, the price per bushel in this region was the lowest at an average of $9.60 in the 2017/2018 year, while the Western US, the smallest domestic supplier, received the highest price of $11.75 per bushel on average (Mercaris, 2019). Similar to feed-grade trends, the survey revealed that the Corn Belt was the predominant supplier of domestic food-grade organic corn, providing 51.9% of the domestic supply with an average price of $10.00 per bushel in the 2017/2018 year (Mercaris, 2019). However, the only other domestic supplier of food-grade organic corn reported was the High Plains region, providing the remaining 12.6% of domestic food-grade organic corn at a price of $10.79 per bushel in 2018.

The Mercaris (2019) survey also revealed that organic feed-grade soybeans were also primarily produced in the Corn Belt, which is estimated to supply 83.9% of domestic organic

feed grade soybeans at a price of $19.71 per bushel in the 2017/2018 marketing year (Mercaris, 2018a; Mercaris, 2019). The remaining domestic supply was provided by Canada, as well as the Eastern and Western US, with the Eastern US producing the lowest portion of domestic supply with 2.4% at an average price of $20.84 per bushel. Food-grade organic soybeans were also reported to be produced largely in the Central US, providing 47.3% of domestic supply at an average price of $21.35 per bushel in the 2017/2018 year (Mercaris, 2019)

Insights from the Mercaris (2019) survey revealed that feed-grade organic wheat production is more dispersed, with 42.5% of the domestic supply produced in the Western US, 2.47% produced by Canada, 17.1% produced by the Corn Belt, 12.9% by the Eastern US, and 2.8% produced by the High Plains (Mercaris, 2019). This dispersion is likely related to production capabilities and preference in the respective regions. For example, the Corn Belt produces most of the domestic organic corn and soybeans because the climate and soil quality allow for favorable production of these two crops (Hart, 1986). The average price for organic feed-grade wheat ranged from $8.31 per bushel in the Corn Belt to $11.02 per bushel in the Eastern US during the 2017/2018 marketing year (Mercaris, 2019). The Eastern US region did not contribute to the domestic supply of organic food-grade wheat in 2017. Domestic organic food-grade wheat was supplied by the High Plains, Canada, and the Western US at 50.7%, 28.8% and 19.7%, respectively in the 2017/2018 marketing year (Mercaris, 2019). Price averages for food-grade organic wheat ranged from $10.78 per bushel in Canada to $16.89 in the Western US (Mercaris, 2019). Differences in prices for food- and feed-grain in corn, soybean, and wheat may be due to quality characteristics, transportation costs, and market supply and demand.

As organic production systems rely on crop rotations to enhance productivity and stability (Deufour, 2015; Moncada and Sheaffer, 2010; USDA-NOP, 2016), small or minor organic grains have been making an appearance on the grain market (Deufour, 2015; Moncada and Sheaffer, 2010). While small grains are not considered cash crops like corn, soybeans, or wheat, they are still vital to successful organic systems (Organic Trade Association, 2019). Small grains that are used in organic production include sorghum, rice, rye, barley, peas and oats. At present, markets for these products are not readily established like those of typical cash crops and little data is available on organic production of these smaller grains (Organic Trade Association, 2019). Privately-reported data from Mercaris (2018a) highlighted minor organic production has

increased from 115,000 acres planted in 2014 to 357,000 acres planted in 2018. Acreage of the majority of these smaller grains has increased, and while not reported, a portion of the increase in production is likely due to organic production in order to support growths in organic cash crop systems. The USDA reports sorghum production increased from 5.03 million acres in 2017 to 5.29 million acres in 2018 (USDA-NASS, 2018). Similarly, rice production demonstrated an increase from 2.46 million acres over the same time period (USDA-NASS, 2018). Rye production in the US demonstrated a decrease in acres planted from 2017 to 2018 with planted acres totaling 1.97 million and 1.96 million acres, respectively (USDA-NASS, 2018). On the other hand, barley production in the US increased from 2.48 million planted acres in 2018 to 2.55 million acres planted in 2018 (USDA-NASS, 2018). Similar to rye, edible pea production in the US decreased from 1.13 million planted acres in 2017 to only 0.88 million acres planted in 2018 (USDA-NASS, 2018). Finally, oat production in the US increased from 2.59 million planted acres in 2017 to 2.89 million acres in 2018 (USDA-NASS, 2018).

2.1.2.3 Lag in Domestic Supply

Organic grains such as corn, soybeans, and wheat are supplied to the U.S. by both domestic production and imports (Lancaster et al., 2019; Mercaris, 2018a). Imports compose the majority of organic soybean supply, a large portion of organic corn supply, and a small fraction of organic wheat supply for U.S. operations (Lancaster et al., 2019). While import volumes have declined (corn and soybeans) or remained relatively steady (wheat) over the past several years, organic corn was still supplied by 19% imports (Figure 4), while 65% of the organic soybean demand was met with imports (Figure 5), and organic wheat demand was supplied at a rate of 7% by imports (Figure 6) for the 2017/2018 marketing year (Lancaster et al., 2019; Mercaris, 2018a). To contrast, organic grain demand was met with imports as high as 54% for organic corn, 83% for organic soybeans and organic wheat imports of 12% for the 2015/2016 marketing year (Lancaster et al., 2019; Mercaris, 2018a).

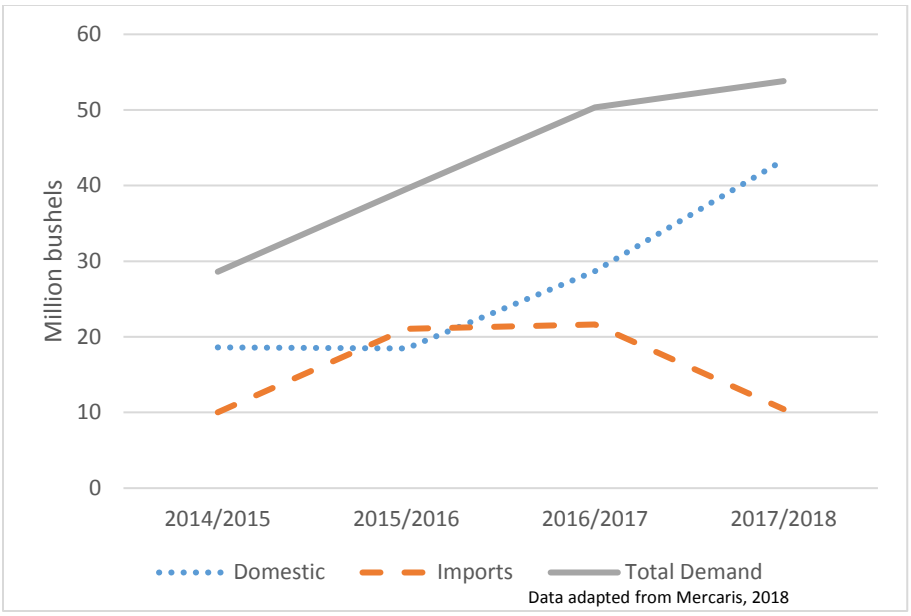

Figure 4. Organic Corn Supply and Demand Volumes

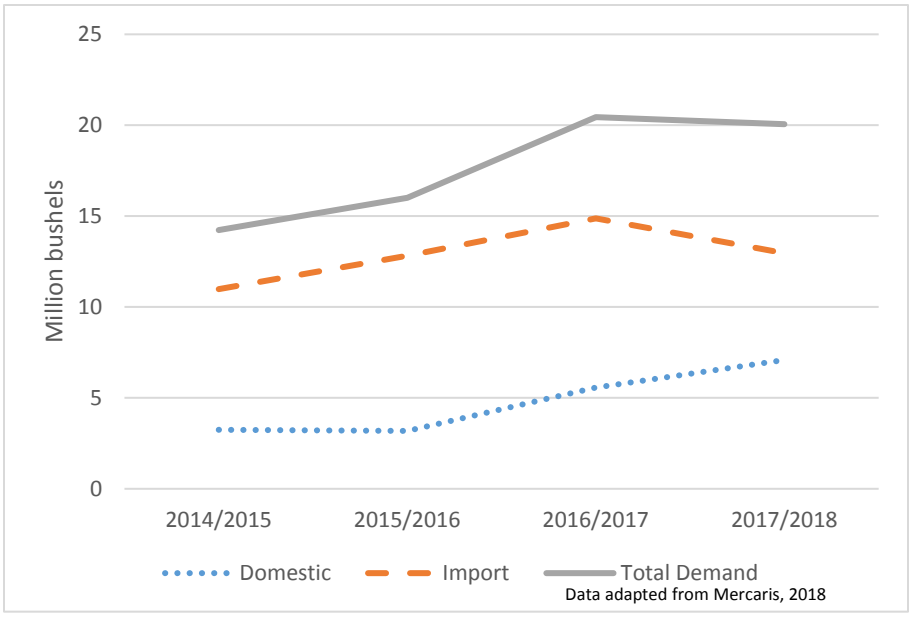

Figure 5. Organic Soybean Supply and Demand Volumes

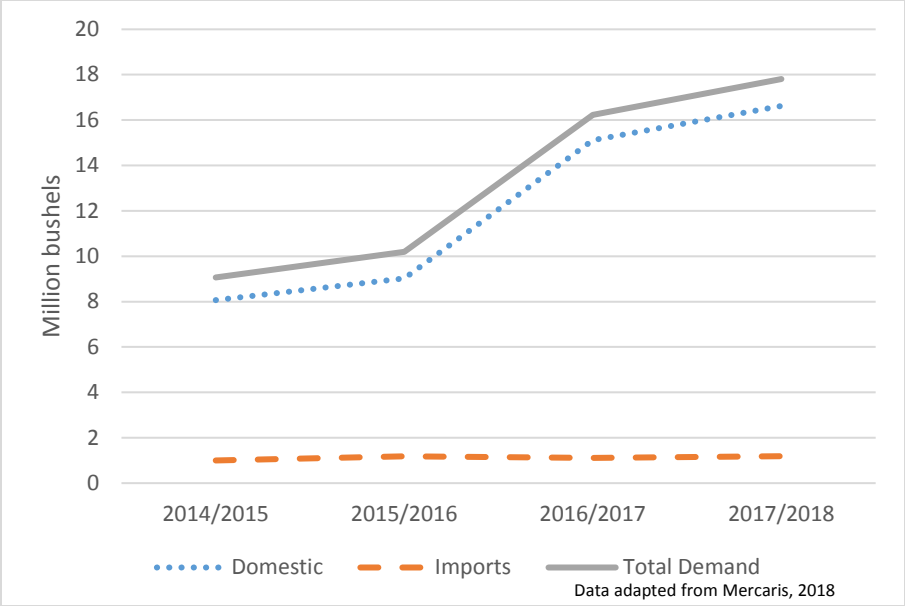

Figure 6. Organic Wheat Supply and Demand Volumes

While buyers are demanding more and more organic grains, domestic supply is not keeping pace with demand. Previous literature extensively describes the lack of information present in the organic grains sector as one of the main drivers to the supply lag. Information gaps include lack of technical information (Cranfield et al., 2010; Strochlic and Sierra, 2007) and market information (Cranfield et al., 2010; Khaledi et al., 2010; L'Hoir et al., 2002; Peterson et al., 2007; Strochlic and Sierra, 2007). From a broad perspective, Strochlic and Sierra (2007) reported that technical assistance, such as agronomic support and production information, is often limited for many organic producers. Additionally, many operators were not aware of how to receive technical assistance when it was available (Cranfield et al., 2010; Strochlic and Sierra, 2007). To complicate matters further, technical assistance, such as university Extension, was reported to often discourage organic agriculture and private technical assistance is typically expensive and financially unattainable for smaller operations (Strochlic and Sierra, 2007; Torres et al., 2016).

Lack of information is also deterring farmers from transitioning into certified organic production. A survey of nearly 1,000 grain producers (conventional and organic) in Texas revealed that 45% of these producers were operating as conventional, but were interested in certified organic grain production (Constance and Choi, 2010). Furthermore, 80% of operators stated that they were not sure how to obtain organic certification (Constance and Choi, 2010),

indicating certification is a severe barrier to entry for the organic grain sector (Constance and Choi, 2010; L'Hoir et al., 2002). However, meeting organic certification is only half the battle for producers. Peterson et al. (2007) indicated that many farmers reported that buyers of organic grains often have more extensive and less forgiving requirements for grain production practices, record keeping, and quality attributes than those necessary for USDA organic certification.

Even once a producer has successfully transitioned to certified organic production and is able to obtain the organic price premiums, marketing grains and matching with a buyer is a challenge in itself. While production of organic grains is more successful using a diverse crop mix, finding buyers for lesser demanded grains in an organic rotation may be challenging (Born and Sullivan, 2002). Thus, organic producers spend more time than conventional counterparts researching grains in demand and planning rotations in which all grains can be sold (Born and Sullivan, 2002). Additionally, organic grains may be sold to different buyers in various locations depending on the grain and the demand for that specific grain (Born and Sullivan, 2002). The need to sell grain to multiple buyers often leads to buyer demands differing in terms of quality requirements such as grain moisture level at harvest, sampling times and methods, and storage requirements (Born and Sullivan, 2002), creating further uncertainty and/or hesitation for the producer.

The organic grain industry currently lacks a developed marketing, transportation, and storage infrastructure, which inhibits marketing and distribution of grains between producers and buyers (Born and Sullivan, 2005; L'Hoir et al., 2002; Strochlic and Sierra, 2007). This lack of infrastructure creates more problems for producers, such as lack of quality standards, access to buyers, and knowing where or how to market their organic grains (Heiman and Peterson, 2008; Khaledi et al., 2010; Strochlic and Sierra, 2007). Additionally, many producers are also unable to access updated real-time price information for the organic grain sector (Heiman and Peterson, 2008; Peterson et al., 2007; Strochlic and Sierra, 2007), creating uncertainty of the ability to obtain an organic price premium (Constance and Choi, 2010). Furthermore, organic grain price premiums can be considered unstable due to the potential to easily oversupply the market (Born and Sullivan, 2002), which can lead to the disappearance of organic premiums altogether (Dobbs et al., 2000). Born and Sullivan (2005) reported that some price premiums among organic grains have fallen as producers have entered organic production. While previous works have clearly demonstrated a lack of marketing information, or lack of communicating market information

between the buyer and the producer, little work has been conducted to bridge this gap between buyers and producers.

2.2 Characteristics of Organic Grain Purchasing Agreements and Buyer Requirements

2.2.1 Purchasing Agreements

Posed with a lack of developed infrastructure, participants within the organic grain market are forced to operate differently than their conventional counterparts when marketing grains. Many buyers may not purchase all grain types that an organic grain producer may use in their rotations, creating need for multiple buyers (Born and Sullivan, 2002). Additionally, buyers may lack the capacity to handle full harvests of organic grains at once, disabling the producer from depositing their full harvest at one time, whereas conventional buyers are typically able to handle an entire harvest (Born and Sullivan, 2005). These differences in grain handling capacity often give rise to the use of different purchasing agreements. Spot purchases, or immediate purchase and delivery of grain (Purcell, 1979), may be more easily utilized by the conventional market than the organic grain market (Born and Sullivan, 2005). However, the organic grain market may rely more heavily on forward contracting due to limitations in grain storage capacity (Born and Sullivan, 2005).

The spot market in organic grain is not as well developed as that of the conventional market, thus organic producers are not able to immediately turn their harvest into cash like their conventional counterparts (Born and Sullivan, 2005). Consequently, while the conventional market can often use spot purchases, pre-harvest forward contracts are of utmost importance in the organic grain industry (Born and Sullivan, 2005). The use of forward contracting allows a buyer to secure a grain supply without receiving the grain at harvest (Mallory et al., 2015; Stringer and Sanders, 2006). Forward contracting passes financial risk from the producer to the grain buyer, but also lowers the price that the buyer pays for the grain to compensate the buyer for assuming the risk (Mallory et al., 2015; Stringer and Sanders, 2006). As forward contracting is typically done before harvest, the supply and correlating price are unknown (Mallory et al., 2015; Stringer and Sanders, 2006). However, prices for grains under contract are determined at contract signing (Mallory et al., 2015; Stringer and Sanders, 2006). Therefore, if actual harvest is lower than the anticipated supply, the price of grain will increase, increasing buyer profitability.

On the other hand, if the price of grain goes down due to excess supply, the buyer can lose money. Though the buyer assumes financial risk, the buyer also benefits from the use of forward contracting by ensuring a predictable supply of grain throughout the year (Mallory et al., 2015; Stringer and Sanders, 2006). Buyers may also use post-harvest forward contracting to manage their grain supply (Mallory et al., 2015; Stringer and Sanders, 2006). Post-harvest forward contracting is typically a result of a producer having excess production, but may be less costly for the buyer due to a decreased price resulting from the excess supply (Mallory et al., 2015; Stringer and Sanders, 2006). Additionally, contracting post-harvest reduces risk assumed by the buyer because the supply is guaranteed and not dependent on favorable production (Mallory et al., 2015; Stringer and Sanders, 2006). Forward contracting is often the only and/or best method used for purchasing organic grains due to the lack of market and storage infrastructure (Born and Sullivan, 2005). However there is potential for excess production to be sold in an open market or spot transaction if organic producers have greater yields than anticipated (Mallory et al., 2015; Stringer and Sanders, 2006).

While conventional grain producers have the ability to take advantage of positive price fluctuations by timing grains sales, the organic market relies more on knowledge and relationships forged between buyers and producers to maximize profits (Born and Sullivan, 2005). The unique functionality of the organic grain market also requires producers to determine what crops buyers are demanding, quality standards buyers seek, and sampling techniques and impacts on perceived grain quality (Born and Sullivan, 2005). In return, some buyers of organic grains will offer technical assistance to the producer in order to obtain desired quality attributes (Born and Sullivan, 2005). Supplying the desired product allows the producer to build a favorable relationship with the buyer which is vital with the current market structure (Born and Sullivan, 2005). Organic grain buyers are more inclined to work with producers that are responsive to the needs of the buyer (Born and Sullivan, 2005). Often, farmers in close proximity that have the infrastructure to store and potentially clean organic grains are highly demanded (Born and Sullivan, 2005). However, buyers want to ensure the preservation of organic integrity of the grain, so will likely request records of cleaning of equipment and storage bins (Born and Sullivan, 2005).

2.2.2 Buyer Requirements of Grain Production and Handling

2.2.2.1 USDA Certified Organic Grains

Buyers purchasing organic grains require, at the very least, grains to be USDA certified by a USDA-NOP accredited third-party agency and grow products according to USDA organic standards outlined by the NOP. By having USDA-NOP certification, buyers can be assured that products have been grown on land that has been free of prohibited substances for a 3-year transition period (USDA-NOP, 2016). Prohibited substances include, but are not limited to, synthetic fertilizers, sewage sludge, irradiation, and genetically modified agricultural technologies. Additionally, organic seeds must be used by an operation, when available. When organic seeds are not available, conventionally produced seeds may be utilized, but must be non-GMO and untreated with prohibited substances (USDA-AMS, 2015).

Organic grain buyers also expect pests, weeds, and diseases must be managed with physical, mechanical, or biological practices such as tillage, soil nutrient composition, and the introduction of physical barriers (Fouche et al., 2000; USDA-NOP, 2016). Often, this strategy is referred to as PAMS, or Prevention, Avoidance, Monitoring, and Suppression (USDA-AMS, 2015). Common practices for pest, weed, and disease control include release of predatory insects to control crop pest populations, or using a layer of mulch to smother and eliminate weeds (USDA-AMS, 2015). In situations where management of crops, pests, and weeds are not able to be adequately controlled through the aforementioned processes, biological, botanical, or synthetic substances that reside on an approved list may be utilized (USDA-NOP, 2016). Organic grain operations should work with their organic certifier or buyer to determine which product should be applied (Born and Sullivan, 2005; USDA-AMS, 2015).

Buyers of organic grains often understand production practices and realize that soil quality is also a vital part of any grain production. Unlike conventional grain buyers, organic buyers expect management of soil fertility and soil nutrient availability to be managed with practices such as tillage and cultivation, use of cover crops, and/or by using supplemental animal and crop wastes (USDA-NOP, 2016). The addition of animal and crop wastes allows organisms in the soil to consume these waste products and excrete bioavailable nutrients for plants (USDA-AMS, 2015). Conservation of built-up soil quality can be maintained through use of cover crops, mulching, and tilling (USDA-AMS, 2015). In addition to preservation of soil nutrient quality, cover crops

also serve as an erosion preventative (USDA-AMS, 2015). Similarly to pest management, some circumstances result in a need for synthetic materials to be utilized for soil nutrient control, but these substances must also reside on an approved list (USDA-NOP, 2016). Currently, the Organic Materials Review Institute (OMRI) is a front runner in information pertaining to guidance regarding approved substances that are appropriate for organic production (OMRI, 2019). The OMRI is an independent, non-profit organization that provides a review of products against current NOP organic standards (OMRI, 2019).

Crop rotation is also an important tool for organic grain producers that provides benefits for pest control, disease prevention, and soil nutrient composition. For example, conventional operations may be able to grow continuous corn and not rotate crops due to the availability of fertilizers, while an organic operation will rely more on crop rotations including a legume, like soybeans, to build soil nitrogen. Adding more crops to the crop rotation mix creates biodiversity of the farm. This biodiversity influences the physical benefits to the production system by interrupting insect lifecycles and suppressing soil borne diseases (USDA-AMS, 2015). Additionally, crop rotation mitigates erosion, creates a more diverse soil nutrient profile, and fixes nitrogen (USDA-AMS, 2015). With an increased number of crops available through rotations in organic production, buyers may be working to strengthen the market for minor grains as organically produced versions become available.

Beyond production of certified organic grains, storage and handling are also vital for preserving the integrity of the organic label. Buyers expect and require that comingling, or contact between organic and conventional grains is non-existent (USDA-AMS, 2015). This also includes carryover of prohibited pesticides, fertilizers, or herbicide from neighboring grain production areas that may reside in conventional production (USDA-AMS, 2015). Segregation and protection of organic crops from conventional chemical carryover can be maintained through the use of buffer rows in the organic field, or physical separation by a roadway (USDA-AMS, 2015). Additionally, equipment used to harvest, handle, or store organic grains must also be free of conventional grains or prohibited substance residues (USDA-AMS, 2015), which necessitates the proper use of records to ensure meticulous cleaning for dual-use equipment.

2.2.2.2 Transitioning, Non-GMO, and Identity Preserved Grains

The decision to enter certified organic grain production is not one which many operators take lightly. Aside from lack of information, one of the larger challenges organic grain producers face is the three-year transitioning period. During the transitioning period, producers are not able to receive the price premium associated with organic grains, though they are still required to follow organic requirements (Strochlic and Sierra, 2007). Combining lower yields during the transitioning period with greater input costs and the inability to access an organic premium for organically produced grains often translates into a financial loss for the producer during this period (Strochlic and Sierra, 2007).

While certified price premiums are not accessible to transitioning producers, the use of organic practices may allow producers to take advantage of additional price premiums. Both organic and transitioning grains are, by requirement, free of genetically modified organisms (GMO) or organisms that have been genetically engineered or modified in a laboratory or by using some technology that may alter genetic material (Born and Sullivan, 2005; The Non-GMO Project, 2018; USDA-NOP, 2019). Thus, transitioning grains provide opportunity to participate in a specialty grain market and obtain a price premium if they are marketed as non-GMO grains (Foster, 2010; Wortmann et al., 2017).

Though non-GMO are not organic themselves, the grain practices employed are closely related to organic grain production. The Non-GMO Project (2018) defines non-GMO as "An organism or derivative of such an organism whose genetic structure has not been altered by biotechnology (The Non-GMO Project, 2018)." Non-GMO grains may be tested for GMO content (Bullock and Desquilbet, 2002), and must not exceed an action threshold defined by The Non-GMO Project (The Non-GMO Project, 2018). Action thresholds for grain production include: 0.25% genetically modified grain seeds, 0.9% genetically modified for grains intended for direct human consumption, and 5% genetically modified for grains entering non-GMO livestock production (The Non-GMO Project, 2018). Buyers of non-GMO grains will test for GMO percentage and often require documentation of non-GMO practices on-farm (Bullock and Desquilbet, 2002; The Non-GMO Project, 2018).

In order to maintain integrity of non-GMO products, Identity Preserved (IP) production practices have been developed (Bullock and Desquilbet, 2002). Buyers of non-GMO grains often require documentation of IP practices that inhibit cross-pollination of non-GMO grains by

neighboring GMO grain fields, this practice is often accomplished by use of a buffer zone that maintains a certain distance or barrier between these differing grain fields (Bullock and Desquilbet, 2002; The Non-GMO Project, 2018). Additionally, buyers of non-GMO grains will require handling, storage, and transportation of non-GMO grains to prevent comingling of these grains with GMO grains, which necessitates thorough cleaning of equipment, grain bins, and trucks that may come into contact with GMO grains and are also used for non-GMO grain products (Bullock and Desquilbet, 2002; The Non-GMO Project, 2018).

2.3 Building a Classification of Organic Grain Buyers

2.3.1 Organic Producer Classifications

As the organic grain industry grows, the market is likely to gain similarities in functionality to the conventional market. Previous works have indicated that creation of organic standards and certification processes has shifted organic production from a social movement to an institutional movement (Buck et al., 1997; Clunies-Ross, 1990; Clunies-Ross and Cox, 1994; Guthman, 1998; Tovey, 1997). The presence of institutionalism indicates that as the industry grows, players in the industry will also grow and shift motivations from environmental sustainability to profitability (Goldberger, 2011).

The concept of conventionalization was introduced by Buck et al. (1997) to characterize the process of organic production and markets taking on characteristics and motivations similar to mainstream conventional agriculture. Conventionalization is reported to rely on the concepts of both appropriation and substitution (Buck et al., 1997). The process of appropriation is identified as a farm moving a process once carried out on the farm to another business (Buck et al., 1997; Constance et al., 2008). For example, in organic grain production, manure is commonly used as a fertilizer and is not produced by many organic grain producers. Thus, these grain producers must source manure from organic livestock operations. Therefore, the manure has been appropriated in organic grain production as grains operations have become more conventionalized. The other aspect of conventionalization is substitution and is more directly related to markets (Buck et al., 1997; Constance et al., 2008). Substitution is defined as the acquisition of a greater amount of the total value of a commodity (Buck et al., 1997; Constance et al., 2008). Substitution is present in the organic grain market as the producer of the organic

grains does not receive as much of the value of the grains as that of broker, livestock producer, or processor. By using appropriation and substitution, organic grain production can be viewed as becoming increasingly conventional (Constance et al., 2008; Guthman, 2004).

Buck et al. (1997) also proposed that bifurcation was a result of conventionalization. Bifurcation develops as larger business enter organic production, they seek substitutions to their input mix and produce high value crops that are targeted to larger markets instead of directly to the consumer (Buck et al., 1997; Constance et al., 2008). On the other hand, smaller producers deeply rooted in the sustainability of organic production still exist and sell in direct to consumer markets (Buck et al., 1997; Constance et al., 2008). This bifurcation in the organic grain industry can be noted by the presence of different grain buyers. Buyers that purchase grain for resale such as brokers, traders and exporters likely diversify the crop mix they purchase. Additionally, buyers that resell grains serve larger markets than buyers that process grains for value-added products. Therefore, buyers that resell grain are arguably more conventionalized due to the increased crop diversity and service of larger markets.

The bifurcation in the organic industry created as a result of conventionalism has been well documented in literature. Studies have described the bifurcation in the organic industry as pragmatic vs pure (Clunies-Ross, 1990; Clunies-Ross and Cox, 1994), agribusiness vs lifestyle (Guthman, 1998), and organic lite/shallow vs organic deep (Guthman, 2004). More recently, Constance et al. (2008) studied the bifurcation in the organic industry as a whole in Texas. The classification reported that organic producers were more profit driven than non-organic producers (Constance et al., 2008). Additionally, organic producers were noted to have been farming longer and have a larger labor force than non-organic producers (Constance et al., 2008), aligning with the conventionalization hypothesis proposed by Buck et al. (1997). However, Constance et al. (2008) reported no significant difference between length of time farming organically, contrary to conventionalization (Buck et al., 1997; Constance et al., 2008).

Darnhofer et al. (2005) proposed a framework of organic producers using the drivers of financial, sustainability and environmental friendliness. To summarize, Darnhofer et al. (2005) characterized the types of organic producers as committed conventional, pragmatic conventional, environmentally-conscious but not organic, pragmatic organic, and committed organic. Committed conventional producers are classified as those that have not considered organic farming due to a lack of interest or motives to enter the organic sector (Darnhofer et al., 2005).

Pragmatic conventional producers are interested in organic production, but still hesitant due to an increased awareness and perception of the risks associated with organic agriculture such as yield reduction, and intensive management systems (Darnhofer et al., 2005). The neutrality point in this producer classification system are the producers that are aware of the environmentally friendly benefits of organic, and may be utilizing these practices, but are not certified organic (Darnhofer et al., 2005). Moving to the organic favoring end of the classification scheme, pragmatic organic producers are those which are more focused on increased income from decreased input costs and/or the organic price premium, but are not driven by sustainability or environmental friendliness (Darnhofer et al., 2005). Finally, committed organic producers, as the name suggests, are operators that are fully committed to organic agriculture and are invested in the foundation of organic practices (Darnhofer et al., 2005).

2.3.2 Need for Buyer Classification

Though demand for organic grains is growing, domestic supply is not keeping pace with demand. Numerous works have identified barriers to entry into the organic industry for grain producers. These barriers include a lack of information, challenges during the transitioning period, lack of infrastructure, disappearing price premiums, identifying appropriate buyers, and understanding buyer requirements (Born and Sullivan, 2005; Constance and Choi, 2010; L'Hoir et al., 2002; Peterson et al., 2007; Strochlic and Sierra, 2007). While work has been done to identify issues present in the organic grain industry and consistently cited marketing opportunities and buyer identification, little work has been conducted to gain an understanding of buyers and marketing opportunities present in the market. Without more information pertaining to marketing opportunities available to producers, growth of the domestic organic grain industry may continue to be lag behind consumer demand. Organic grain buyers may continue to meet large portions of their demand with imported organic grains. In addition to fewer producers entering certified organic grain production, those already participating in the market may not receive the best price possible due to a lack of marketing networks in the organic sector. Furthermore, without a more defined understanding of buyer requirements in terms of storage, transportation, and documentation requirements, producers may also jeopardize increased profitability. Providing insight into marketing opportunities available to organic grain produces may help build the marketing network, improving the overall infrastructure of the organic grain

market. The marketing network, consisting of producers, buyers, extension personnel and researchers, will gain a greater understanding regarding the functionality of the current domestic organic grain market. This increased understanding will give the market more transparency, allowing for easier identification of buyers. Additionally, with increased transparency, future work will be able to identify and propose remedies to potential bottlenecks in the domestic organic grain supply.

One approach that may provide information regarding marketing opportunities is a classification of buyers of organic grains to determine characteristics of different buyers present in the market. Consequently, this work aims to provide a classifications of organic grain buyers present in the Midwest in a similar manor to how producers would identify them. The classifications will analyze differences in demographics, perceptions of the organic market, purchasing agreements, and relationship factors across proposed classifications.

Building from Darnhofer et al., (2005), this work proposes a classification of organic grain buyers that can serve as a foundation for future works an as an identification system for producers. The current study proposes three classifications can be applied to the current sample of grain buyers: pragmatic conventional, pragmatic organic, and committed organic. A summary of this categorization is presented in Figure 7. This work defines pragmatic conventional grain buyers as those that may have interest in purchasing organic grains, but refrain due to perceived barriers or an awareness of increased risk. The pragmatic conventional buyer may purchase non-GMO grains, but will not purchase organic grains. Pragmatic organic grain buyers are classified as those that purchase organic grains, but are mainly financially motivated. Pragmatic organic grain buyers purchase organic grains along with other classes of grains like non-GMO and/or conventional. Lastly, committed organic grain buyers are defined as those that purchase organic grains, but may also purchase non-GMO grains. Committed organic grain buyers are deeply invested in organic grain production and interested in the success of the organic grain industry, thus they may purchase non-GMO grains as a way of assisting producers during the transition to certified organic production as transitional grains can be marketed as non-GMO.

Darnhofer, et al., 2005				
Committed Conventional	Pragmatic Conventional	Environmentally Conscious but not Organic	Pragmatic Organic	Committed Organic
• Have not considered organic due to lack of interest or motives	• Interested in organic • Hesitant to enter organic due to increased perceptions of risks associated with organic	• May be using organic practices • Not certified organic	• More focused on increased income from organic • Not driven by sustainability or environmental friendliness	• Fully committed to organic and invested in the foundation of organic practices

Proposed Organic Grain Buyer Classification		
Pragmatic Conventional	Pragmatic Organic	Committed Organic
• Interest in purchasing organic grains • Refrain from purchasing organic grains due to increased awareness of risk • Purchase conventional and/or non-GMO grains	• Financially motivated • Purchase organic grains along side conventional and/or non-GMO	• Invested in success or organic grain industry • Purchase organic grains • May purchase non-GMO grains since transitional grains are marketed as non-GMO • Do not purchase conventional grains

Figure 7. Derivation of Organic Grain Buyer Classification

The first categorization explored in this work consists of two groups: 1) committed organic buyers and 2) other buyers present in the organic grain industry (pragmatic organic and pragmatic conventional). Committed organic buyers can be viewed as philosophically invested in the success organic agriculture (Constance et al., 2008; L'Hoir et al., 2002; Peterson et al., 2012). Furthermore, building relationships with buyers is an important tool for organic grain producers to succeed (Born and Sullivan, 2005). Committed organic buyers that are deeply rooted in the philosophy of organic likely realize the importance of relationships in the organic grains market. Therefore, committed buyers may work to forge stronger relationships with their respective grain suppliers. Moreover, committed organic buyers may also want to ensure organic integrity more than pragmatic buyers. If organic integrity is compromised, a negative perception of the organic grains market may arise (Hanson et al., 2004), which could further inhibit growth of the market. Consequently, documentation of organic and IP practices may be considered of utmost importance to committed organic buyers. This comparison of committed organic and pragmatic buyers will identify differences in business demographics, perceptions of the organic grain market, characteristics of purchasing agreements, and relationship factors. These characteristics

can serve as a foundation for producers developing an understanding of the organic market and marketing opportunities available.

A second categorization is motivated by Born and Sullivan (2002) and Buck et al. (1997). The conventionalization hypothesis suggests that bifurcation in the organic grain industry could result in some groups of buyers exhibiting behaviors more like the conventional grain market (Buck et al., 1997). A bifurcation among grain buyers often observable to grain suppliers references the business objectives of the grain buyer. As a result of this bifurcation, two broad groups can be created. First, a group of grain buyers labeled as sellers, consisting of brokers, traders, exporter, etc. represents a more conventionalized structure. Secondly, buyers that are end-users, such as livestock producers, bakeries, flour mills, and other processors, may be a less conventionalized buyer, still functioning in manners similar to the organic market. Born and Sullivan (2002) indicates that the group labeled as sellers retain more of the organic premium for themselves as opposed to end-users, further supporting the potential of conventionalization of organic grain buyers. This conventionalization of sellers suggests that purchasing agreement characteristics may resemble those of the conventional grain market. Additionally, as sellers also have customers of their own, it is possible that this group of buyers may leverage relationships more than end-users in order to ensure quality requirements are met. Born and Sullivan (2005) suggests that sellers will give advice to grain producers on how to ensure a high quality yield and harvest. Given potential differences between sellers and end-users, a comparison of these groups is needed to examine business demographics, perceptions of the organic grain market, relationship factors, and purchasing agreement characteristics.

CHAPTER 3: DATA AND METHODOLOGY

3.1 Data Description

This study was conducted in an effort to provide needed information pertaining to potential marketing opportunities for organic grain producers. This study also provides a greater understanding of buyer demographics, market perceptions, purchasing agreements and relationship factors. This project was funded by the North Central Region Sustainable Agriculture Research and Education (NCR-SARE) division of the USDA as a portion of grant LNC17-397. The project is focused on grain buyers that purchase certified organic and/or non-GMO grains. Non-GMO grains were targeted in this study due to the opportunity for producers in the transitioning to organic process to market transitional grains as non-GMO. Buyers were required to reside in one of the 12 states of the North Central Region (IL, IN, IA, KS, MI, MN, MO, ND, NE, OH, SD, and WI).

A list of 255 unique operations was compiled by leveraging personal contacts and networking, as well as online searches and databases such as The Non-GMO Sourcebook (The Non-GMO Sourcebook, 2018a), the USDA Organic Integrity Database (USDA-AMS, 2017) and Mercaris (Mercaris, 2018a). Data collection began May 22, 2018 and ended November 15, 2018. Identification of applicable respondents and solicitation of responses was challenging, leading to a nearly six-month collection window. Of the 255 unique operations identified and contacted, responses were gathered from 45 operations. Respondents identified as business owners, managers, and/or executive board members for smaller operations and grain brokers, traders, and merchandisers for larger operations. Consequently, the response rate for this study was 18%, which is considered to be acceptable for a study of this design (Dillman et al., 2014). However, with a sample size of only 45, statistical limitations allow for mainly mean comparisons between groups. Additionally, with a sample size of only 45, it is necessary to use caution when applying findings of this research.

Data were collected and stored anonymously using a mixed methodology approach including phone interviews and use of an online questionnaire. Potential respondents with connections to extension personnel were personally urged to participate. Initially, potential participants were contacted via phone, if a phone number was available, and emailed otherwise

to schedule a 30 to 45 minute phone interview. Two weeks after initial contact was made, a follow-up communication of phone, email, or both (if possible) was made to schedule a time for a phone interview to those that did not previously respond. A third follow-up was sent to potential participants 3 weeks after the initial invitation. If no response was received one week after the second follow-up communication, an alternate contact within the same company was identified (if possible) and the communication process was repeated.

On September 13, 2018 (16 weeks after data collection started), potential participants that had not completed or scheduled a phone interview were emailed a link to complete the Qualtrics survey anonymously online. The primary contact received the link to the online questionnaire at the initial September 13 release date. If the primary contact had not responded to the survey after one week, the secondary contact (if available) received a link for online participation. The online questionnaire took participants 15 to 30 minutes to complete and was closed at the conclusion of the collection period on November 15, 2018. As an incentive, participants received a $50 Amazon gift card for the completion of the phone interview or online questionnaire. Of the 45 responses, 21 (47%) phone interviews were conducted, with the remaining 24 (53%) responses collected via the online questionnaire. Questions asked to respondents included types of grains purchased, types and characteristics of purchasing agreements used, purchases of imports and minor grains, handling and transportation requirements, relationships with producers, perceptions of the organic grain market, perceptions of the organic market in general, and business demographics.

Initial data cleaning involving a Chi-Square (χ^2) analysis for binary variables and a Wilcoxon-Mann-Whitney test for categorical and continuous variables revealed that data collected from phone interviews and the online questionnaire statistically differed. Consequently, it was determined that data could not be pooled together for the analyses conducted in this work. Therefore, each of the forthcoming analyses will have two results tables, one for the 21 phone interview responses and another for the 24 online questionnaire responses. Descriptive statistics and variable descriptions for responses gathered via phone interview are reported in Table 1, and those for the online questionnaire in Table 2.

3.1.1 Phone Interviews Sample

Table 1 reveals that 86% of the buyers that responded to phone interviews were sellers of organic grains and worked for companies with an average of 49 employees. These buyers purchased an average of 8 types of grains from 6 states, however only 25% of phone interview respondents revealed they had a sufficient supply of domestic organic grains. Additionally, 65% of these buyers indicated they had a sufficient infrastructure to handle grains and 85% indicated they had a sufficient amount of investing capital. The average buyer in this subsample had gross sales between $5 and $10 million and had been purchasing specialty (organic and/or non-GMO) grains for an average of 21 years.

Sixty-seven percent of phone interview respondents stated that organic was compatible with their company's values of sustainability, and 81% agreed that organic allowed for product differentiation. Additionally, 67% of these buyers felt that the organic grain industry relies heavily on imports, and 65% agreed that imported organic grains are cheaper than domestically produced organic grains, while only 47% agreed that the quality between imported and domestic organic grains is similar. Ninety-five percent of these buyers agreed that customer demand for organic is increasing, and 95% also feel that the future demand of organic grains will increase. However, only 86% of phone interview respondents feel that the future domestic supply of organic grains will increase, and only 40% believe that future price of organic grains will increase. This indicates that the majority of phone interview respondents expect domestic supply to meet a larger percentage of demand in the future, suggesting a larger growth in supply than demand (Varian, 2014). Alternatively, buyers could also expect future prices to stay the same, suggesting equivalent growth in supply and demand (Varian, 2014).

Factors measuring relationship formation and maintenance in this study included association membership and forms of support offered to grain suppliers. Twenty-four percent of phone interview respondents were a part of a buyer/broker/handlers association, 29% were members of a farmer/grower/producer association, and only 14% were a part of a feed association. Fifty-seven percent of these buyers offered agronomic support to their grain suppliers, 33% offered financial support and 100% offered marketing support. Further, 62% of these buyers offered additional assistance to grain suppliers during the transitional period, including certification assistance, additional information, and special contracting. Seventy-one

percent of buyers that responded to phone interviews indicated that the length of the relationship with the grain supplier is an important part of relationship maintenance.

Sixty-seven percent of phone interview respondents purchased grains mostly on forward contracts signed an average of 7 months before grain delivery. Thirty-five percent of these buyers contracted non-GMO grains before planting, while 50% contracted organic grains before planting. Only 24% of phone interview respondents required farm visits, while 81% required a clean truck affidavit and 52% required the use of security tags or seals for storage and transportation. In terms of cleaning, storage and delivery, 10% required the supplier to clean grains, 48% required the grain supplier to store grains, while 19% required the grain supplier to pay for delivery. Phone interview respondents took an average of 16 days after grain delivery to pay for gains, while 33% sampled grains at multiple times to ensure proper quality.

3.1.2 Online Survey Sample

Online questionnaire respondents were also primarily (71%) sellers with an average of 23 employees purchasing 7 grains. Online questionnaire respondents purchase grains from an average of 4 states, 2 states less than phone interview respondents ($P = 0.06$). Similarly to phone interview respondents, online questionnaire respondents averaged gross sales between $5 and $10 million. These buyers have been purchasing specialty grains for an average of 19 years. Only 13% of online respondents had a sufficient supply of domestic organic grains, while 78% had sufficient infrastructure to handle grains. Only 43% had a sufficient amount of investment capital, significantly smaller than the 80% of phone interview respondents with sufficient investment capital ($P = 0.01$). Forty-six percent of online respondents agreed that organic is compatible with their company's values of sustainability, notably lower than the 95% of phone interview respondents ($P = 0.06$). However, 65% agree that organic allows for product differentiation.

Fifty-seven percent of online respondents agreed that there is a shortage of domestic organic grains and 46% believe that the organic grain industry relies heavily on imported organic grains. However, only 25% feel that the quality between domestic and imported organic grains is similar, while 54% of online respondents agree that imported organic grains are cheaper. Seventy-four percent of online respondents agreed that their customer demand for organic is increasing, which is significantly lower than the 95% of phone interview respondents indicating

the same ($P = 0.05$). Further, 75% expect the future demand of organic grains to increase. Moreover, 79% of these buyers expect future domestic supply of organic grains to increase, while only 33% expect the future price of organic grains to increase. Similarly to phone interview respondents, this indicates that buyers either expect future supply of organic grains to increase more than demand, decreasing price, or for price to remain constant with supply and demand growing at equivalent rates (Varian, 2014).

Seventy percent of online respondents agree that the length of the purchasing relationship with the grain supplier is important in maintaining relationship with suppliers. Furthermore, 46% of online respondents are members of a buyer/broker/handlers association, 42% are members of a farmer/grower/producers association and 13% are members of feed associations. Fifty-percent of online respondents offer agronomic support to grain suppliers. Only 8% of online questionnaire respondents offer financial support to grain suppliers, compared to the 33% of phone interview respondents that offer financial support ($P = 0.04$). In contrast to the 100% of phone interview respondents, only 71% of online respondents offer marketing and pricing information to grain suppliers ($P = 0.01$). Forty-six percent of the online respondents offer additional support to grain suppliers during the transitional period in the form of special contracting, certification assistance, and additional information.

Sixty-three percent of online respondents purchase grains mainly through forward contracting and contracts last an average of 7 months from signing until grain delivery. Additionally, 64% of online respondents sign non-GMO contracts before planting and 67% sign organic contracts before planting. On average, online respondents reported taking 22 days after grain delivery to pay for grains. Only 8% of online respondents require farm visits, while 46% require the use of security tags or seals during storage and transportation, and 79% require a clean truck affidavit. Twenty-five percent of these buyers require the grain supplier to clean grains, while 17% require the supplier to pay for delivery and 33% require suppliers to store grains. Similarly to phone interview respondents, 33% of online respondents sample grains at multiple time points to ensure quality.

3.2 Methodology

The first analysis in the present study is a comparison of committed organic buyers vs pragmatic organic and conventional buyers. Previous literature suggests buyers that are more

committed to the success of the organic grain industry will be more philosophically and environmentally driven than pragmatic organic buyers (Constance et al., 2008; L'Hoir et al., 2002; Peterson et al., 2012). Having more of a philosophical interest in the organic grain industry likely drives the committed organic buyer to ensure the growth and success of the industry. Committed buyers may do this by forging stronger relationships with grain suppliers than pragmatic buyers. Therefore, it is hypothesized that committed organic buyers will build stronger relationships by offering more assistance to producers than pragmatic buyers in order to ensure the future success of the organic industry. Additionally, it is hypothesized that the committed organic buyer will also require more documentation of organic practices than pragmatic buyers (i.e. truck affidavit) but will not require the producer to clean grains or pay for grain delivery. As committed organic buyers are invested in the growth and success of the organic grain market, they will likely be more concerned about organic integrity than pragmatic buyers. Providing documentation of proper organic and IP practices ensures that organic integrity is not compromised and does not hinder growth of the organic grain industry (Hanson et al., 2004).

Secondly, bifurcation of buyers that are sellers of grain (brokers, traders, exporters, etc.) and end-users (livestock producers, bakeries, flour mills, other processors) suggests differences in purchasing agreement characteristics. Sellers often purchase a larger variety of grains to serve larger markets than end-users, suggesting sellers are more conventionalized (Buck et al., 1997). Sellers, therefore, would likely have purchasing agreements closer to those of the conventional market, relying more on spot purchases than forward contracts (Born and Sullivan, 2005) when compared to end-users. Furthermore, purchasing agreement characteristics have also been shown to differ in terms of payment issuance. Sellers can take longer to pay for grains (Born and Sullivan, 2002). Therefore, it is hypothesized that sellers will rely more on spot contracts, but have a longer payment issuance delay when compared to end-users. Additionally, relationships are vital to the current success of the organic grain industry. As buyers of organic grains that resell the grain (sellers) also have grain customers themselves, the relationships with grain producers may be stronger for this group (Born and Sullivan, 2005). Sellers may be more invested in ensuring the quality of grains in order to accommodate their respective buyers. In support, Born and Sullivan (2005) reported that sellers often give advice regarding production practices to grain producers. Therefore, it is hypothesized that sellers will offer assistance to grain suppliers than end-users.

Variables included in the comparisons of committed organic vs pragmatic and sellers vs end-users are outline in Table 1 for phone interview responses and Table 2 for online questionnaire responses. Results from a Shapiro-Wilk Test indicate variables are not normally distributed, thus giving the need for non-parametric methodologies. Consequently, a test of proportions via a Chi-Square (χ^2) analysis was used for binary variables and a Wilcoxon-Mann-Whitney Test was applied to continuous and categorical variables.

Table 1. Descriptive statistics of variables for responses gathered via phone interview

	Obs	Mean	Std. Dev.	Min	Max	Description
Business Demographics						
dsup	20	0.25	0.44	0	1	1=Buyer had sufficient amount of domestic organic grains, 0=otherwise
infra	20	0.65	0.49	0	1	1=Buyer had sufficient infrastructure to handle grains, 0=otherwise
invcap	20	0.80	0.41	0	1	1=Buyer had sufficient amount of investing capital, 0=otherwise
labor	21	48.76	42.91	1	100	Total number of employees
ngrain	21	7.86	5.91	1	22	Number of grains of all classes purchased
nstate	21	6.05	3.53	1	12	Number of states from which grains are purchased
sales	19	3.58	1.39	2	5	Gross sales classes 1=less than $500,000 2= 500,000 - $5,000,000 3=$5,000,000 - $10,000,000 4=$10,000,000 – $20,000,000 5= $20,000,000+
seller	21	0.86	0.36	0	1	1=Buyer is a seller of grains, 0=otherwise
tyspec	21	20.67	31.75	2	150	Number of years (maximum) buyer has been purchasing specialty grains
Buyer Perceptions of Organic Grain Market						
cheap	20	0.65	0.49	0	1	1=Agree imported organic grains are cheaper, 0=otherwise
compat	21	0.67	0.48	0	1	1=Organic compatible with company values of sustainability, 0=otherwise
custdem	21	0.95	0.22	0	1	1=Buyer agrees customer demand for organic is increasing, 0=otherwise
dem	21	0.95	0.22	0	1	1=Buyer expects future demand for organic grains to increase
differ	21	0.81	0.40	0	1	1=Buyer agrees organic is form of product differentiation, 0=otherwise

dsupply	21	0.86	0.36	0	1	1=Buyer expects future domestic supply of organic grains to increase
fprice	20	0.40	0.50	0	1	1=Buyer expects future price of domestic organic grains to increase, 0=otherwise
import	21	0.67	0.48	0	1	1=Organic grain industry relies on imports, 0=otherwise
quality	19	0.47	0.51	0	1	1=Agree quality between imported and domestic organic grains are comparable
short	20	0.70	0.47	0	1	1= Agree that shortage of domestic organic grain supply, 0=otherwise
Relationship Factors						
agro	21	0.57	0.51	0	1	1= Buyer offers agronomic support to producer, 0=otherwise
buyassoc	21	0.24	0.44	0	1	1=Buyer is a member of a buyer/broker/handler association, 0=otherwise
farmassoc	21	0.29	0.46	0	1	1=Buyer is a member of a farmers/growers/producers association, 0=otherwise
feedassoc	21	0.14	0.36	0	1	1=Buyer is a member of a feed association, 0=otherwise
finsup	21	0.33	0.48	0	1	1=Buyer offers financial support to producer, 0=otherwise
mktsup	21	1.00	0.00	1	1	1=Buyer offers market and pricing information to producer, 0=otherwise
relationship	21	0.71	0.46	0	1	1=Buyer feels length of purchasing relationship important in maintaining relationship, 0=otherwise
transsup	21	0.62	0.50	0	1	1=Buyer offers special support in transitional period, 0=otherwise
Purchasing Agreement Characteristics						
avgdtp	21	15.87	11.79	1	35	Average days to payment among all grains purchased
conlength	21	6.95	4.95	0	18	Length of contracts in months
farm	21	0.24	0.44	0	1	1=Buyer requires farm visits, 0=otherwise
mforward	21	0.67	0.48	0	1	1=Buyer purchases mostly on forward contracts, 0=buyer purchases mostly spot purchases

multsamp	21	0.33	0.48	0	1	1=Buyer samples grain more than once, 0=otherwise
ngcontime	17	0.35	0.49	0	1	1=Contracting of non-GMO grains done before planting, 0=otherwise
ocontime	14	0.50	0.52	0	1	1=Contracting of organic grains done before planting, 0=otherwise
supclean	21	0.10	0.30	0	1	1=Buyer requires supplier to clean grains, 0=otherwise
suppay	21	0.19	0.40	0	1	1=Buyer requires supplier to pay delivery, 0=otherwise
supstore	21	0.48	0.51	0	1	1=Buyer requires supplier to store grains, 0=otherwise
tags	21	0.52	0.51	0	1	1=Buyer requires the use of security tags or seals, 0=otherwise
truck	21	0.81	0.40	0	1	1=Buyer requires a clean truck affidavit, 0=otherwise

Table 2. Descriptive statistics of variables for responses gathered via online questionnaire

	Obs	Mean	Std. Dev.	Min	Max	Description
Business Demographics						
dsup	23	0.13	0.34	0	1	1=Buyer had sufficient amount of domestic organic grains, 0=otherwise
infra	23	0.78	0.42	0	1	1=Buyer had sufficient infrastructure to handle grains, 0=otherwise
invcap	23	0.43	0.51	0	1	1=Buyer had sufficient amount of investing capital, 0=otherwise
labor	24	22.96	29.28	0	100	Total number of employees
ngrain	24	7.04	4.69	1	15	Number of grains of all classes purchased
nstate	24	4.17	2.94	0	12	Number of states from which grains are purchased
sales	23	3.22	1.51	1	5	Gross sales classes 1=less than $500,000 2= 500,000 - $5,000,000 3=$5,000,000 - $10,000,000 4=$10,000,000 – $20,000,000 5= $20,000,000+
seller	24	0.71	0.46	0	1	1=Buyer is a seller of grains, 0=otherwise
tyspec	23	19.09	12.44	2	45	Number of years (maximum) buyer has been purchasing specialty grains
Buyer Perceptions of Organic Grain Market						
cheap	24	0.54	0.51	0	1	1=Agree imported organic grains are cheaper, 0=otherwise
compat	24	0.46	0.51	0	1	1=Organic compatible with company values of sustainability, 0=otherwise
custdem	23	0.74	0.45	0	1	1=Buyer agrees customer demand for organic is increasing, 0=otherwise
dem	24	0.75	0.44	0	1	1=Buyer expects future demand for organic grains to increase
differ	23	0.65	0.49	0	1	1=Buyer agrees organic is form of product differentiation, 0=otherwise
dsupply	24	0.79	0.41	0	1	1=Buyer expects future domestic supply of organic grains to increase

fprice	24	0.33	0.48	0	1	1=Buyer expects future price of domestic organic grains to increase, 0=otherwise
import	24	0.46	0.51	0	1	1=Organic grain industry relies on imports, 0=otherwise
quality	24	0.25	0.44	0	1	1=Agree quality between imported and domestic organic grains are comparable
short	23	0.57	0.51	0	1	1= Agree that shortage of domestic organic grain supply, 0=otherwise
Relationship Factors						
agro	24	0.50	0.51	0	1	1= Buyer offers agronomic support to producer, 0=otherwise
buyassoc	24	0.46	0.51	0	1	1=Buyer is a member of a buyer/broker/handler association, 0=otherwise
farmassoc	24	0.42	0.50	0	1	1=Buyer is a member of a farmers/growers/producers association, 0=otherwise
feedassoc	24	0.13	0.34	0	1	1=Buyer is a member of a feed association, 0=otherwise
finsup	24	0.08	0.28	0	1	1=Buyer offers financial support to producer, 0=otherwise
mktsup	24	0.71	0.46	0	1	1=Buyer offers market and pricing information to producer, 0=otherwise
relationship	23	0.70	0.47	0	1	1=Buyer feels length of purchasing relationship important in maintaining relationship, 0=otherwise
transsup	24	0.46	0.51	0	1	1=Buyer offers special support in transitional period, 0=otherwise
Purchasing Agreement Characteristics						
avgdtp	24	21.78	14.56	1	60	Average days to payment among all grains purchased
conlength	24	6.67	4.70	0	12	Length of contracts in months
farm	24	0.08	0.28	0	1	1=Buyer requires farm visits, 0=otherwise
mforward	24	0.63	0.49	0	1	1=Buyer purchases mostly on forward contracts, 0=buyer purchases mostly spot purchases
multsamp	24	0.33	0.48	0	1	1=Buyer samples grain more than once, 0=otherwise

ngcontime	11	0.64	0.50	0	1	1=Contracting of non-GMO grains done before planting, 0=otherwise
ocontime	12	0.67	0.49	0	1	1=Contracting of organic grains done before planting, 0=otherwise
supclean	24	0.25	0.44	0	1	1=Buyer requires supplier to clean grains, 0=otherwise
suppay	24	0.17	0.38	0	1	1=Buyer requires supplier to pay delivery, 0=otherwise
supstore	24	0.33	0.48	0	1	1=Buyer requires supplier to store grains, 0=otherwise
tags	24	0.46	0.51	0	1	1=Buyer requires the use of security tags or seals, 0=otherwise
truck	24	0.79	0.41	0	1	1=Buyer requires a clean truck affidavit, 0=otherwise

CHAPTER 4: RESULTS

4.1 Committed Organic Buyers vs. Pragmatic Organic and Pragmatic Conventional Buyers

4.1.1 Phone Interview Results

Comparison of committed organic grain buyers (N=13) versus pragmatic organic/conventional buyers (N=8) for phone interview respondents are presented in Table 3. Results from phone interview respondents indicate that committed organic and pragmatic buyers have similar in business characteristics ($P \geq 0.16$), except for labor ($P = 0.06$) and sales ($P = 0.02$). Both committed organic and pragmatic buyers that completed a phone interview were predominantly sellers with sufficient amounts of infrastructure to handle grains and sufficient amounts of investment capital to meet their current business needs. Committed organic and pragmatic buyers also experienced a shortage of domestic organic grains. However, in measurements of business size, committed organic buyers tend to be smaller by an average of 35 employees ($P = 0.06$) and have gross sales totaling $5 to $15 million less than those of pragmatic organic/conventional buyers ($P = 0.02$). This finding supports the conventionalization and bifurcation hypothesis of Buck et al. (1997). Bifurcation is observed with larger pragmatic grain buyers purchasing more types of grains (organic, non-GMO, and/or conventional) to supply larger markets (Buck et al., 1997; Constance et al., 2008), which is a result of conventionalization (Buck et al., 1997). This conventionalization suggests that the organic grain market is establishing a more reliable infrastructure for buying and selling grains. This would suggest that marketing opportunities will become more easily identifiable and transparent. Grain suppliers will benefit from this conventionalization as the purchasing agreements, quality standards, and storage and transportation requirements become more uniform across the industry.

Perceptions of the organic grain market are similar among committed and pragmatic buyers for phone interview respondents ($P \geq 0.13$). Most respondents indicated that organic is compatible with their company's values of sustainability (63%) and organic allows for product differentiation (75%). These similarities indicate that both committed and pragmatic buyers are conscious of sustainability practices that are associated with organic grain production. However, similarities in perceptions of organic offering product differentiation also suggest that both

committed and pragmatic buyers are also financially motivated as differentiation gives rise to an advantage in the market (Porter, 1985).

Most phone interview respondents (63%) believe that the organic grain industry relies heavily on imported organic grains. However, roughly 50% of these buyers feel that imported organic grains do not have similar quality to domestically produced organic grains. This finding aligns with the current supply shortage experienced in the domestic organic grain market (Lancaster et al., 2019; Mercaris, 2019). However, with imported quality perceived comparable to domestic grain quality by roughly half of these buyers, imported grains may continue to meet a significant portion of domestic demand (Lancaster et al., 2019; Mercaris, 2019).

Most of phone interview respondents (88%) indicated that customer demand for organic grains is increasing and that future demand of organic grains will also increase. The majority of both committed organic and pragmatic buyers (75%) believe that the domestic supply of organic grains will increase. However, the majority (60%) of committed and pragmatic buyers do not believe that future price will increase. Following economic theory, these findings suggest that either supply and demand grow proportionally, or demand will grow slower than supply (Varian, 2014). This could potentially motivate producers to expand crop diversity so that the market does not become oversaturated and lead to the decline of the organic price premium (Born and Sullivan, 2002).

Interestingly, while the majority of buyers believe the organic grain industry relies heavily on imports, only the committed organic buyers believe that there is a shortage of domestic organic grains ($P = 0.05$). This may be related to pragmatic buyers having nearly twice the number of employees of committed buyers in the present subsample. With more employees, pragmatic buyers have the ability to have more employees working to purchase grains. Thus, pragmatic buyers could be more accessible to grain suppliers, allowing these buyers to source grains more easily than committed buyers. Alternatively, with committed organic buyers philosophically invested into the success of organic grains, the perceived shortage of domestic organic grains may be a reflection of their desire for the organic grain industry to grow.

Relationship factors regarding support offered by committed organic and pragmatic buyers were hypothesized to differ. Committed organic buyers were hypothesized offer more financial, agronomic, market, and transitioning support to grain suppliers than pragmatic buyers. Results indicate that there are no differences among committed and pragmatic buyers in offering

of agronomic, financial, or market support between these buyers ($P \geq 0.15$). However, committed organic buyers tended to offer more transitional support to grain suppliers than pragmatic buyers ($P = 0.07$). This finding would suggest that committed organic buyers are more invested in the future success of the organic market, aligning with the committed organic producer classifications outline by Darnhofer et al. (2005) and Constance et al. (2008). Additionally, committed organic buyers can be viewed as more invested in organic success as they have only half the employees of pragmatic operations, but offer more transitional support. However, placing more effort in transitional support seems to result in committed organic buyers having less involvement in farmer/grower/producer associations ($P = 0.01$) and feed associations ($P = 0.02$) than pragmatic buyers due to decreased labor capacity. This may be an indication that committed buyers are prioritizing building long-term relationships with their current grain suppliers, rather than searching for new grain suppliers.

Purchasing agreements of committed organic vs. pragmatic phone interview respondents do not differ in terms of contract length, time of contract signing, use of forward contracts, and requirements of farm visits, cleaning and storage of grains ($P \geq 0.24$). The majority of committed and pragmatic buyers (63%) use forward contracting. This may indicate that the buyer wants to secure grain supply (Stringer and Sanders, 2006) in order to meet increasing demand (L'Hoir et al., 2002) as they are experiencing a shortage of organic grain supply (Lancaster et al., 2019).

Committed organic buyers in the present sample are shown to be more concerned with organic integrity than pragmatic buyers. More committed buyers sample grains multiple times, require the use of security tags, and require a clean truck affidavit than pragmatic buyers ($P \leq 0.09$). This finding aligns with Born and Sullivan (2005) and Peterson et al. (2007) who reported organic grain buyers may have additional requirements beyond NOP standards (USDA-NOP, 2019). Grain suppliers intending to contact or work with committed organic buyers should ensure that records of organic production practices are meticulously maintained. Additionally, grain suppliers working with committed organic buyers must be open to the buyers sampling grain sometime before delivery, which may or may not involve the buyer visiting the farm. This finding suggests the acceptance of the hypothesis that committed organic buyers require more documentation than pragmatic buyers. Additionally, more committed organic buyers require the supplier to pay for delivery than pragmatic buyers ($P = 0.09$), suggesting increased support of organic buyers.

Finally, committed organic buyers have a delay in payment issuance after delivery when compared to pragmatic buyers ($P \leq 0.01$). Previous work has demonstrated delays in payments for organic grains among wheat and other small grains typically range from 30 to 60 days (Stearns and Watt, 1993). However, Born and Sullivan (2002) stated that while payment delays still exist in the organic market, they have been greatly reduced compared to the early 1990s, only being delayed by around two weeks. In the present sample, payment delays are slightly larger than three-weeks. This extended delay in payment could be attributed to other business demographics. Committed organic buyers in the present sample are smaller in terms of labor and gross sales when compared to pragmatic buyers. Smaller operations purchasing organic grains have been shown to experience slower payment issuance (Born and Sullivan, 2005). Additionally a smaller labor force could indicate lower administration capacity, delaying chain of custody paperwork and delaying payment times (Born and Sullivan, 2005; Born and Sullivan, 2002). Aside from business demographics, delay in payment could be dependent on when the grain is delivered. To elaborate, if a grain buyer receives grains from many suppliers at once, this could delay payment further. Therefore, if grains are delivered at harvest, when supply is high, grain suppliers may experience an increased waiting time for payment.

4.1.2 Online Questionnaire Results

Online questionnaire results of committed organic buyers versus pragmatic buyers are presented in Table 4. Results suggest no differences in most business demographics ($P \geq 0.11$). Similarly to phone interview respondents, the majority of both committed and pragmatic buyers (80%) experienced a shortage of domestic organic grains, aligning with current market trends (Lancaster et al., 2019; Mercaris, 2019). A larger proportion of pragmatic buyers (87%) in this comparison identify as sellers when compared to committed buyers (44%; $P = 0.03$). Sellers typically serve larger markets and purchase a greater diversity of grains. Therefore, pragmatic buyers having a greater proportion of sellers than committed buyers indicates that the bifurcation in the subsample of online respondents is leaning more towards the conventionalized market structure (Buck et al., 1997). Similarly to phone interview results, committed organic buyers are smaller in terms of gross sales ($P = 0.03$). Further, online questionnaire respondents also represent bifurcation in regards to pragmatic buyers being larger than committed buyers. Thus, online respondents may also suggest bifurcation based on the presence of more sellers in the

pragmatic classification. Sellers of grain are classified as brokers, traders, exporters, etc. which purchase grains to sell to another operation and tend to serve larger markets (Born and Sullivan, 2002).

Buyer perceptions of the organic grain market did not differ ($P \geq 0.31$), with the exception of all committed organic buyers stating that customer demand for organic is increasing, while only 51% of pragmatic buyers reporting the same ($P = 0.02$). This may also add to the idea that the organic industry is going through a potential bifurcation. No differences in relationship factors were observed ($P \geq 0.11$), leading to the rejection of the null hypothesis that committed organic buyers offer more assistance than pragmatic buyers. This contrasts the findings from phone interview respondents, where committed organic buyers offered more transitional support than pragmatic buyers. This difference may be related to the sampling methodology of the online questionnaire causing respondents to perceive the question differently than the phone interview respondents.

Purchasing agreement characteristics did not differ among committed and pragmatic buyers for online respondents ($P \geq 0.11$), with one exception. Committed organic buyers did not require the supplier to pay delivery, while 27% of pragmatic buyers required delivery be paid by the supplier ($P = 0.09$). This could suggest increased support by committed organic buyers. Similarly to phone interview respondents, the majority of both committed and pragmatic buyers (56%) purchase grains mostly with forward contracts which are methods used to secure an adequate supply (Stringer and Sanders, 2006). Lack of statistical differences in other purchasing agreements measurements suggest that committed organic and pragmatic buyers have similar contract requirements in terms of storing, handling and transporting grains among online questionnaire respondents. Therefore, producers working with committed or pragmatic buyers can expect similar requirements in contract terms. Therefore, the hypothesis that pragmatic buyers will require more documentation of organic practices is rejected for online questionnaire respondents. This differs from phone interview respondents, where committed organic buyers were found to require more documentation than pragmatic buyers. The difference between phone and online responses may be explained by the number of employees. In the phone interview responses, committed buyers were found to have only half the employees of pragmatic buyers, while the number of employees in online responses were similar between committed and pragmatic. Therefore, is possible that when employee numbers are similar, requirements of

organic practices may be similar between committed and pragmatic buyers. However, in the phone interview sample, both committed and pragmatic buyers identified as sellers of grain, while online responses statistically indicated that more pragmatic buyers are sellers than committed buyers. Therefore, lack of statistical differences in requirements of organic documentation may be a result of pragmatic buyers being composed of more sellers than committed buyers. As a seller, the buyer also has customers of their own to satisfy and must meet their respective buyer's requirements on quality and organic integrity (Born and Sullivan, 2005). Therefore, pragmatic buyers that responded to the online questionnaire may have similar requirements for organic production documentation in order to retain their respective customers.

4.2 Comparison of Seller vs End-User

4.2.1 Phone Interview Results

Results of phone interview responses for the seller versus end-user classification are presented in Table 5. Business demographics for sellers (N=18) and end-users (N=3) for phone interview respondents did not differ ($P \geq 0.11$), with the exception of number of employees and number of states from which grains were purchased. End-users have a larger number of employees, over twice that of sellers ($P = 0.02$). This could be a result of end-users producing value-added products, requiring a larger labor force than a seller. For example, flour production requires employees to not only purchase grains, but clean, transport, mill and package the final product, increasing the employees needed. Furthermore, sellers purchase from an average of three more states than end users ($P = 0.05$). This may be indicative of sellers working to fulfill needs of their respective buyers (Born and Sullivan, 2005), working with a larger number of states to acquire a more diverse source of grains to meet demand. While number of grains purchased is not statistically different, sellers purchase on average 5 more grains than end-users in the present subsample. Similarly to the first classification of organic grain buyers discussed, this finding may suggest bifurcation in the organic grain industry with sellers purchasing a larger number of grains from a wider region to serve a greater market, which is a result of conventionalization (Buck et al., 1997).

Perceptions of sellers and end-users did not differ among phone interview respondents ($P \geq 0.27$). In this categorization, all of the end-users and 94% of sellers reported that customer

demand for organic is increasing. This would imply that both sellers and end-users will increase future organic grain purchases to continue to meet customer demand. Relationship factors did not statistically differ among sellers and end-users responding to phone interviews ($P \geq 0.12$). However, though not statistically significant, the present comparison of sellers and end-users reports that 67% of sellers offer transitional support to grain suppliers, while only 33% of end-users offer transitional assistance. The majority (56%) of sellers and end-users offer agronomic support to grain suppliers, and 33% of both sellers and end-users offer financial support. These findings seem to suggest that there are no differences among assistance types offered, leading to a rejection of the hypothesis that sellers are more relationship oriented than end-users. This contradicts the suggestion of Born and Sullivan (2005) that sellers of organic grains more actively maintain relationships in order to maintain their respective customers. Lack of statistical differences in association membership and assistance offered may be a result of end-users having a statistically larger number of employees than sellers in the current subsample. Therefore, this suggests that when end-users have greater number of employees than sellers, end-users may equally offer assistance to grain suppliers relative to sellers.

Purchasing agreement characteristics of sellers and end-users responding via phone interviews did not differ ($P \geq 0.19$), with the exception of the requirement of a clean truck affidavit. Nearly all (94%) of sellers required a clean truck affidavit, while no end-users required an affidavit ($P < 0.01$). This could be a result of sellers wanting to ensure organic integrity and having proper documentation to maintain trust with their respective buyers (Born and Sullivan, 2005). As the seller's only function in the market is to serve as a "middleman" and sources grains for end-users, sellers likely require this documentation to ensure that they are supplying quality of grains expected by their customers. If sellers were not able to ensure IP and organic production practices have been used, then their respective customers may find another way of sourcing grains, putting the seller out of business. On the other hand, end-users not requiring this documentation could be a result of where they are sourcing grains. To elaborate, if an end-user is sourcing grains from a seller, the seller may have already acquired this documentation. Thus, the end user may not request documentation of organic and IP practices.

It was surprising that the average days to payment after grain delivery did not differ in among sellers and end-users. Born and Sullivan (2002) indicated that sellers (brokers, traders and exporters) regularly experienced payment delays due to increased administrative time for chain

of custody paperwork. Additionally, Born and Sullivan (2002) reported smaller operations also experience delays, which would suggest sellers in the present sample should have an increased delay in payment issuance. The lack of significant difference in average days to payment could be due to sampling bias from unevenly sized samples of sellers and end-users. Further, it was hypothesized that sellers would operate more like the buyers present in the conventional market and purchase more on spot contracts. While there is no statistical difference, 100% of the end-users operate on forward contracts, while only 61% of sellers do the same. Consequently, this suggests a greater presence of spot purchases among sellers, indicating more conventionalized behavior (Buck et al., 1997).

4.2.2 Online Questionnaire Results

Results from the online questionnaire regarding the comparison of sellers versus end users are presented in Table 6. No end-users in the subsample agreed that quality between domestic and imported organic grains is the same, while 35% of sellers agreed quality is the same ($P = 0.07$). Though there is a statistical difference, the majority of sellers and end-users responding to the online questionnaire do not feel that imported quality is the same as domestically produced organic grains. Thus, there is opportunity for domestic organic grain production to be accelerated in order to supply grains meeting quality requirements of buyers. There were no differences in business demographics among sellers (N=17) and end-users (N=7; $P \geq 0.22$). Buyer perceptions of the organic grain market did not differ among sellers and end-users ($P \geq 0.11$), with the exception of perceived quality of imported organic grains. Similarly to phone interview respondents, sellers and users that responded to the online questionnaire predominantly (71%) expect future demand of organic grains to increase.

As anticipated, sellers in the sample were also more active in some type of buyer/broker/handler association when compared to end-users ($P = 0.05$). More sellers also offered marketing and transitional support than end users in the present subsample ($P = 0.05$). This may be indicative of sellers working to ensure future supply of grains to meet their customer demands (Born and Sullivan, 2005). These results suggest the hypothesis that sellers are more relationship oriented than end-users should not be rejected for buyers answering the online questionnaire. No other relationship factors were statistically different between sellers and end-users that answered the online questionnaire ($P \geq 0.27$).

Average days to payment after delivery was larger for end-users than for sellers (P = 0.02), which is contradictory to Born and Sullivan (2002). This finding could support the conventionalization hypothesis (Buck et al., 1997), where sellers are more conventionalized than end-users. Thus, the more conventionalized seller more closely resembles grain buyers in the conventional grain market in terms of contracting ability and administration, reducing payment issuance time. Additionally, smaller, less conventionalized operations, would have a lower number of employees to process payments, further delaying payment issuance. This finding also differs from phone interview responses where payment issuance timing was similar between sellers and end-users. The difference in the online questionnaire responses may be related to the number of employees present in a company. In the phone interview responses, end-users were found to have more employees than sellers, but no differences in payment issuance. However, in the online questionnaire responses, operations had similar numbers of employees, but end-users had a statistically larger delay in payment issuance. This suggests that when employee numbers are similar between sellers and end-users, grain suppliers can expect a longer delay in payment from end-users. However, when end-users are larger than sellers, payment delays may be similar among sellers and end-users. Other purchasing agreement characteristics did not differ in this subsample comparing sellers versus end users ($P \geq 0.11$). It was anticipated that sellers would be more conventionalized than end-users and would, therefore, rely more on spot purchases than forward contracts when compared to end-users. While there is no statistical difference, only 59% of sellers used mostly forward contracts, while 71% of end-users used mostly forward contracts in the present subsample. Lack of statistical difference is likely due to small sample size. However, lack of significance may also suggest that the supply of organic grains lags behind demand enough for buyers to want to engage in forward contracting in order to ensure an adequate supply (Stringer and Sanders, 2006).

Table 3. Comparison of committed organic buyers and pragmatic organic/conventional buyers for phone interview respondents

	N=13 Committed Organic		N=8 Pragmatic Organic and Pragmatic Conventional				
	Mean	Stdev	Mean	Stdev	|z|, $\chi 2^a$	*P*-value	
Business Demographics							
dsup	0.17	0.39	0.38	0.52	1.11	0.29	
infra	0.58	0.51	0.75	0.46	0.59	0.44	
invcap	0.75	0.45	0.88	0.35	0.47	0.49	
labor	35.38	39.88	70.50	40.77	1.87	0.06	*
ngrain	8.77	5.42	6.38	6.74	1.42	0.16	
nstate	6.69	3.57	5.00	3.42	1.29	0.20	
sales	3.00	1.26	4.38	1.19	2.25	0.02	**
seller	0.92	0.28	0.75	0.46	1.21	0.27	
tyspec	15.85	13.31	28.50	49.64	0.00	1.00	
Buyer Perceptions of Organic Grain Market							
cheap	0.77	0.44	0.43	0.53	2.32	0.13	
compat	0.69	0.48	0.63	0.52	0.10	0.75	
custdem	1.00	0.00	0.88	0.35	1.71	0.19	
dem	1.00	0.00	0.88	0.35	1.71	0.19	
differ	0.85	0.38	0.75	0.46	0.30	0.59	
dsupply	0.92	0.28	0.75	0.46	1.21	0.27	
fprice	0.50	0.52	0.25	0.46	1.25	0.26	
import	0.69	0.48	0.63	0.52	0.10	0.75	
quality	0.46	0.52	0.50	0.55	0.02	0.88	
short	0.85	0.38	0.43	0.53	3.78	0.05	**
Relationship Factors							
agro	0.69	0.48	0.38	0.52	2.04	0.15	
buyassoc	0.15	0.38	0.38	0.52	1.34	0.25	
farmassoc	0.08	0.28	0.63	0.52	7.29	0.01	***
feedassoc	0.00	0.00	0.38	0.52	5.69	0.02	**
finsup	0.31	0.48	0.38	0.52	0.10	0.75	
mktsup	1.00	0.00	1.00	0.00			
relationship	0.69	0.48	0.75	0.46	0.08	0.78	
transsup	0.77	0.44	0.38	0.52	3.26	0.07	*

Purchasing Agreement Characteristics							
avgdtp	21.50	10.65	6.71	6.94	2.93	0.00	***
conlength	6.62	4.31	7.50	6.14	0.29	0.77	
farm	0.31	0.48	0.13	0.35	0.91	0.34	
mforward	0.69	0.48	0.63	0.52	0.10	0.75	
multsamp	0.54	0.52	0.00	0.00	6.46	0.01	***
ngcontime	0.44	0.53	0.25	0.46	0.70	0.40	
ocontime	0.55	0.52	0.33	0.58	0.42	0.52	
supclean	0.15	0.38	0.00	0.00	1.36	0.24	
suppay	0.08	0.28	0.38	0.52	2.85	0.09	*
supstore	0.38	0.51	0.63	0.52	1.15	0.28	
tags	0.69	0.48	0.25	0.46	3.88	0.05	**
truck	0.92	0.28	0.63	0.52	2.85	0.09	*

[a] Categorical and continuous variables have reported |z| values. Binary variables have reported $\chi 2$ values

Table 4. Comparison of committed organic buyers and pragmatic organic/conventional buyers for online questionnaire respondents

	N=9 Committed Organic		N=15 Pragmatic Organic and Pragmatic conventional				
	Mean	Stdev	Mean	Stdev	|z|, $\chi 2^a$	*P*-value	
Business Demographics							
dsup	0.00	0.00	0.20	0.41	1.84	0.18	
infra	0.63	0.52	0.87	0.35	1.79	0.18	
invcap	0.50	0.53	0.40	0.51	0.21	0.65	
labor	9.67	8.93	30.93	34.37	1.58	0.11	
ngrain	6.44	4.61	7.40	4.87	0.48	0.63	
nstate	3.33	2.65	4.67	3.09	1.02	0.31	
sales	2.38	1.41	3.67	1.40	2.17	0.03	**
seller	0.44	0.53	0.87	0.35	4.85	0.03	**
tyspec	21.89	14.39	17.29	11.20	0.60	0.55	
Buyer Perceptions of Organic Grain Market							
cheap	0.44	0.53	0.60	0.51	0.55	0.46	
compat	0.56	0.53	0.40	0.51	0.55	0.46	
custdem	1.00	0.00	0.57	0.51	5.22	0.02	**
dem	0.78	0.44	0.73	0.46	0.06	0.81	
differ	0.78	0.44	0.57	0.51	1.03	0.31	
dsupply	0.89	0.33	0.73	0.46	0.83	0.36	
fprice	0.22	0.44	0.40	0.51	0.80	0.37	
import	0.56	0.53	0.40	0.51	0.55	0.46	
quality	0.22	0.44	0.27	0.46	0.06	0.81	
short	0.67	0.50	0.50	0.52	0.62	0.43	
Relationship Factors							
agro	0.56	0.53	0.47	0.52	0.18	0.67	
buyassoc	0.33	0.50	0.53	0.52	0.91	0.34	
farmassoc	0.44	0.53	0.40	0.51	0.05	0.83	
feedassoc	0.11	0.33	0.13	0.35	0.03	0.87	
finsup	0.00	0.00	0.13	0.35	1.31	0.25	
mktsup	0.56	0.53	0.80	0.41	1.63	0.20	
relationship	0.89	0.33	0.57	0.51	2.61	0.11	
transsup	0.33	0.50	0.53	0.52	0.91	0.34	

Purchasing Agreement Characteristics							
avgdtp	24.44	18.19	20.18	12.33	0.67	0.51	
conlength	6.78	5.83	6.60	4.10	0.55	0.59	
farm	0.11	0.33	0.07	0.26	0.15	0.70	
mforward	0.56	0.53	0.67	0.49	0.30	0.59	
multsamp	0.33	0.50	0.33	0.49	0.00	1.00	
ngcontime	1.00	0.00	0.50	0.53	2.36	0.13	
ocontime	1.00	0.00	0.43	0.53	4.29	0.04	
supclean	0.33	0.50	0.20	0.41	0.53	0.47	
suppay	0.00	0.00	0.27	0.46	2.88	0.09	*
supstore	0.33	0.50	0.33	0.49	0.00	1.00	
tags	0.67	0.50	0.33	0.49	2.52	0.11	
truck	0.89	0.33	0.73	0.46	0.83	0.36	

[a] Categorical and continuous variables have reported |z| values. Binary variables have reported $\chi 2$ values

Table 5. Comparison of sellers and end-users for phone interview respondents

	N=18 Seller		N=3 End-User				
	Mean	Stdev	Mean	Stdev	|z|, $\chi 2^a$	*P*-value	
Business Demographics							
dsup	0.24	0.44	0.33	0.58	0.13	0.72	
infra	0.65	0.49	0.67	0.58	0.00	0.95	
invcap	0.76	0.44	1.00	0.00	0.88	0.35	
labor	40.22	40.33	100.00	0.00	2.29	0.02	**
ngrain	8.61	5.97	3.33	3.21	1.61	0.11	
nstate	6.56	3.55	3.00	1.00	1.94	0.05	**
sales	3.50	1.37	4.00	1.73	0.60	0.55	
tyspec	12.83	8.27	67.67	75.08	1.16	0.25	
Buyer Perceptions of Organic Grain Market							
cheap	0.61	0.50	1.00	0.00	1.20	0.27	
compat	0.67	0.49	0.67	0.58	0.00	1.00	
custdem	0.94	0.24	1.00	0.00	0.18	0.68	
dem	0.94	0.24	1.00	0.00	0.18	0.68	
differ	0.83	0.38	0.67	0.58	0.46	0.50	
dsupply	0.89	0.32	0.67	0.58	1.04	0.31	
fprice	0.41	0.51	0.33	0.58	0.07	0.80	
import	0.67	0.49	0.67	0.58	0.00	1.00	
quality	0.44	0.51	1.00	.	1.17	0.28	
short	0.72	0.46	0.50	0.71	0.42	0.52	
Relationship Factors							
agro	0.56	0.51	0.67	0.58	0.13	0.72	
buyassoc	0.22	0.43	0.33	0.58	0.18	0.68	
farmassoc	0.22	0.43	0.67	0.58	2.49	0.12	
feedassoc	0.17	0.38	0.00	0.00	0.58	0.45	
finsup	0.33	0.49	0.33	0.58	0.00	1.00	
mktsup	1.00	0.00	1.00	0.00	.	.	
relationship	0.67	0.49	0.00	1.00	1.40	0.24	
transsup	0.67	0.49	0.33	0.58	1.21	0.27	
Purchasing Agreement Characteristics							
avgdtp	16.62	11.34	11.33	16.20	1.12	0.26	
conlength	6.83	4.85	7.67	6.66	0.25	0.80	

farm	0.22	0.43	0.33	0.58	0.18	0.68	
mforward	0.61	0.50	1.00	0.00	1.75	0.19	
multsamp	0.33	0.49	0.33	0.58	0.00	1.00	
ngcontime	0.33	0.49	0.50	0.71	0.21	0.64	
ocontime	0.46	0.52	1.00	.	1.08	0.30	
supclean	0.11	0.32	0.00	0.00	0.37	0.54	
suppay	0.17	0.38	0.33	0.58	0.46	0.50	
supstore	0.44	0.51	0.67	0.58	0.51	0.48	
tags	0.56	0.51	0.33	0.58	0.51	0.48	
truck	0.94	0.24	0.00	0.00	14.88	0.00	***

[a] Categorical and continuous variables have reported |z| values. Binary variables have reported $\chi 2$ values

Table 6. Comparison of sellers and end-users for online questionnaire respondents

	N=17 Seller		N=7 End-User				
	Mean	Stdev	Mean	Stdev	|z|, $\chi 2^a$	*P*-value	
Business Demographics							
dsup	0.19	0.40	0.00	0.00	1.51	0.22	
infra	0.75	0.45	0.86	0.38	0.33	0.57	
invcap	0.44	0.51	0.43	0.53	0.00	0.97	
labor	24.12	30.99	20.14	26.69	0.70	0.48	
ngrain	7.29	4.63	6.43	5.16	0.54	0.59	
nstate	4.24	2.84	4.00	3.42	0.29	0.77	
sales	3.41	1.46	2.67	1.63	1.09	0.28	
tyspec	19.06	12.49	19.14	13.32	0.03	0.97	
Buyer Perceptions of Organic Grain Market							
cheap	0.65	0.49	0.29	0.49	2.61	0.11	
compat	0.41	0.51	0.57	0.53	0.51	0.48	
custdem	0.75	0.45	0.71	0.49	0.03	0.86	
dem	0.71	0.47	0.86	0.38	0.61	0.44	
differ	0.56	0.51	0.86	0.38	1.86	0.17	
dsupply	0.76	0.44	0.86	0.38	0.26	0.61	
fprice	0.35	0.49	0.29	0.49	0.10	0.75	
import	0.41	0.51	0.57	0.53	0.51	0.48	
quality	0.35	0.49	0.00	0.00	3.29	0.07	*
short	0.56	0.51	0.57	0.53	0.00	0.97	
Relationship Factors							
agro	0.53	0.51	0.43	0.53	0.20	0.65	
buyassoc	0.59	0.51	0.14	0.38	3.96	0.05	**
farmassoc	0.41	0.51	0.43	0.53	0.01	0.94	
feedassoc	0.18	0.39	0.00	0.00	1.41	0.24	
finsup	0.12	0.33	0.00	0.00	0.90	0.34	
mktsup	0.82	0.39	0.43	0.53	3.74	0.05	**
relationship	0.63	0.50	0.86	0.38	1.24	0.27	
transsup	0.59	0.51	0.14	0.38	3.96	0.05	**
Purchasing Agreement Characteristics							
avgdtp	17.29	11.20	32.67	16.83	2.35	0.02	**
conlength	6.24	4.82	7.71	4.57	0.74	0.46	

farm	0.06	0.24	0.14	0.38	0.46	0.50
mforward	0.59	0.51	0.71	0.49	0.34	0.56
multsamp	0.29	0.47	0.43	0.53	0.40	0.53
ngcontime	0.57	0.53	0.75	0.50	0.35	0.55
ocontime	0.63	0.52	0.75	0.50	0.19	0.67
supclean	0.24	0.44	0.29	0.49	0.07	0.80
suppay	0.18	0.39	0.14	0.38	0.04	0.84
supstore	0.29	0.47	0.43	0.53	0.40	0.53
tags	0.35	0.49	0.71	0.49	2.61	0.11
truck	0.71	0.47	1.00	0.00	2.60	0.11

[a] Categorical and continuous variables have reported |z| values. Binary variables have reported $\chi 2$ values

CHAPTER 5: CONCLUSION

Domestic production of organic grains continues to fall short of meeting demand (Lancaster et al., 2019; Mercaris, 2019). Even with increased profit potential through organic price premiums, many producers are still hesitant to enter the organic market. One of the major barriers to entry in the organic grain market for producers is the inability to identify an appropriate buyer, as well as an understanding of buyer perceptions, assistance offered, contracting strategy, and business functionality (Born and Sullivan, 2005; Constance and Choi, 2010; L'Hoir et al., 2002; Peterson et al., 2007). While a classification of organic producers (Buck et al., 1997; Constance et al., 2008; Dimitri and Greene, 2002) and factors motivating organic grain production (Cranfield et al., 2010; Farmer et al., 2014; L'Hoir et al., 2002; Peterson et al., 2012) are available, no such classification exists for organic grain buyers. Development of a classification of organic grain buyers would allow producers insight into perspectives and requirements that the buyer holds. Additionally, this classification of buyers would allow buyers themselves to assess shortcomings relative to competitors, potentially initiating an improvement in their respective business operations. In an attempt to disentangle the organic grain industry, this work suggests classifications of organic grain buyers, based on relationships and purchasing agreement characteristics, as suggested by the literature. Furthermore, this work outlines business demographics, buyer perceptions of the organic grain industry, relationship factors and characteristics of purchasing agreements among the proposed classifications.

In the comparison of committed organic buyers versus pragmatic organic/conventinal buyers it was hypothesized that committed buyers would be more focused on forging relationships with grain suppliers. Thus, it was expected that committed organic buyers would offer more financial, marketing, agronomic and/or transitional assistance to grain suppliers than pragmatic buyers. While this hypothesis is rejected for online questionnaire respondents, committed organic buyers responding to phone interviews offered more transitional support than pragmatic buyers. Additionally, phone interview results suggest that committed organic buyers are smaller in both labor and gross sales and are less involved in farmers or feed associations than pragmatic buyers. Consequently, this may be driving committed buyers in the phone interview subsample to maintain equivalent levels of assistance for their current grian suppliers when compared to pragmatic buyers, but not seek new grain suppliers thorugh associations as

actively as pragmatic buyers. However, when employee numbers are equivalent between committed and pragmatic buyers, as in the online questionnarire subsample, no differences in assistance or association memberships are noted. Thus, it seems that when employee numbers are similar between committed and pragmatic buyers, grain suppliers can expect buyers to be equally willing to offer assistance and equally active in associations.

It was also hypothesized that committed organic buyers would be more concerned with IP and organic production documentation than pragmatic buyers. This hypothesis was found true for phone interview respondents, where significantly more committed buyers require a clean truck affadavit than pragmatic buyers. However, no significant difference was found for additional documentation in the online questionnaire responses though 89% of committed organic buyers required a clean truck affadavit while only 46% of pragmatic buyers required this documentation. Consequently, grain suppliers should expect committed buyers to require more documentation of organic practices. However, as the market grows and becomes more conventinalized, shifiting more towards financially driven pragmatic buyers, the requiremnts of organic production documentation may shrink.

To provide a classification more apparent to the grain supplier, a comparison of sellers and end-users was conducted. Furthermore, this classification may be perceived to fit into the committed and pragmatic classification, as sellers are more conventionalized and purchase a more diverse grain mix than end-users (Buck et al., 1997). The more conventionalized seller may be a visual representation of the pragmatic buyer, while the end-users may be representative of committed buyers. The classification of sellers versus end-users hypothesized that sellers would function more like a conventional grain buyer and purchase grains mostly via spot purchases. Additionally, sellers were anticipated to experience longer delays in payment issuance, as suggested by Born and Sullivan (2002). In phone interview and online questionnaire responses, no significant differences were found between sellers and end-users in terms of spot purchases. In fact, the majority of sellers and end-users rely on forward contracting to purchase organic grains. This aligns with Born and Sullivan (2005) who stated that contracting is sometimes “the only or best way” to market organic grains. Days to payment was not found to differ among phone interview respondents. However, days to payment was found to be larger for end-users than for sellers in the online questionnaire. This difference could be related to labor force size, where end-users had a significantly larger labor force in phone interview responses, but had a

similar number of employees in the online questionnaire response. Thereby, suggesting that when the number of employees is equivalent between sellers and end-users, end-users will have a delayed payment issuance in comparison to sellers. It was also hypothesized that sellers would provide more assistance to grain suppliers than end-users. While this hypothesis was rejected for the phone interview respondents, sellers responding to the online questionnaire were found to offer more marketing and transitioning support to grain suppliers than the group of end-users. Lack of differences in assistance for phone interview respondents may be due to end-users having a larger labor force than sellers. This can be further supported by the online questionnaire respondents having a similar number of employees between sellers and end-users, but end-users offer less assistance to grain suppliers. Thus, it seems that when number of employees are the same, sellers offer more assistance than end-users. Therefore, when buyers are similar in size, it is plausible that sellers will be more relationship driven than end-users.

While significant differences were not detected among some variables in the categorizations of buyers, this study does present some issues relevant to organic grain suppliers in the Midwest. Buyers in the Midwest operate mostly on forward contracts that are drafted either before or after planting for non-GMO and organic grains. These contracts last roughly 6 months from signing until grain delivery. After grain delivery, Midwestern grain suppliers should plan for a delay of payment, which may be as large as 3 weeks. Buyers categorized as sellers will have reduced payment when compared to end-users when business sizes are the same. Buyers in the Midwest typically do not require farm visits, grain cleaning, or grain storage by the producer. However, though not statistically different, more end-users may require the grain supplier to store grains than sellers. Additionally, it is not typically required that the seller pays delivery costs. This suggests that delivery costs may be one of the factors in the contract that help determine the price the grain supplier receives. In other words, while the grain supplier may not directly pay for delivery, the price the supplier receives may be lower if the supplier does not pay for delivery so that the buyer may recover the delivery fee. While the use of security tags and seals can help ensure organic integrity, the majority of buyers do not require these to be used in the Midwest. However, more committed organic buyers may require security tags and seals to be used, as suggest by phone interview responses, although this was not statistically different. Additionally, the majority of buyers sample grains once, upon grain delivery to ensure quality requirements are met. Both committed and pragmatic buyers of

organic grains offer assistance to grain suppliers, however more sellers offer assistance than end-users. Furthermore, committed organic grain buyers in the Midwest were found to require more documentation of IP practices than pragmatic buyers.

Moreover, this study does suggest some factors in terms of growth and development of the organic grain industry. First, the results suggest that there is evidence of conventionalization in the organic grain market. The committed and pragmatic buyer classification model suggests that pragmatic buyers responding to the phone interview are larger. The size of these pragmatic buyers, coupled with the fact that they purchase multiple classes of grains (organic, non-GMO, and/or conventional) suggests that there is bifurcation in the industry with larger operations being more diversified. Furthermore, pragmatic buyers responding to the online questionnaire are composed of more sellers when compared to committed buyers. Buyers that resell (sellers) organic grains are thought to serve larger markets, giving rise to purchasing from multiple grain classes. Additionally, phone interview results from the comparison of sellers and end-users reveal that sellers purchase from a larger region than end-users. Though not statistically significant, sellers also purchase on average 5 more grains (corn, soybeans, wheat, etc.) than end-users. Thus, sellers are shown to purchase a more diverse mixture of grains from a larger region than end-users, likely to serve their respective customer demands. Consequently, it can be concluded that the seller and end-user classification of buyers also suggests bifurcation among organic grain buyers. As bifurcation is a production of conventionalization (Buck et al., 1997), these findings suggest that the organic grain industry is adopting a structure similar to the conventional market.

With the suggestion of bifurcation and conventionalization found among these buyer classifications, it seems that the classifications proposed by this work are appropriate for the organic grain industry. However, future work should expand the sampling region of buyers to increase the population and sample size. With more statistical power, a more thorough categorization of organic grain buyers can be developed. Future work should either use a single methodology for data collection, or ensure a large enough sample size for a mixed methodology approach to interpret any statistical implications. It is recommended that future works utilize interviews as opposed to online questionnaires as phone interviews ensure that respondents fully understand the question being asked. Additionally, future work should expand relationship factors included in interviews. However, a case study approach may be more useful, allowing

relationship factors to be assessed through a more open-ended conversation style. Moreover, the list of organic production practices should be expanded to include more than security tags/seals and a clean truck affidavit. Recommendations of production records for future research to include are: field production history, weed and pest management practices, manure applications, harvesting equipment cleaning records, storage records, buffer zone documentation and seed records (USDA-AMS, 2011). Furthermore, the present work utilized a comparison of committed versus pragmatic buyers, with only two classifications due to sample size limitations. However, this work theoretically introduces a three classification system which should be further explored in future works.

This work provides a foundation for future work to explore categorization of organic grain buyers. The response rate of this study was acceptable at 18%, however the small sample size of 45 buyers poses some statistical challenges. Additionally, the mixed methodology of phone interviews and online responses were analyzed and indicated that results of these analyses could not be pooled, further reducing sample size used in the presented analyses. Therefore, caution should be used when interpreting the suggestions of statistical differences presented in this work. Nonetheless, this work provides information pertaining to business demographics, buyer perceptions of the organic grain market, relationship factors, and characteristics of purchasing agreements commonly used among buyers in the current landscape of the organic grain industry. The information presented in this work will allow producers to understand buyer perceptions and requirements, and for buyers to analyze their operations compared to their competitors. Information in this work will allow producers to determine communication methods to meet buyers and how buyers maintain relationships with their grain suppliers. Thus, information provided in this work will allow for the growth and further development of the organic grain market infrastructure by providing more details on current operations of organic grain buyers. Theoretically, there is evidence that the organic grain industry is experiencing conventionalization. However, due to inconsistent statistical results between collection methods and a small sample size, conventionalization in the organic grain industry cannot be confirmed by this work.

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