

ADOPTION OF ORGANIC FARMING SYSTEMS IN MISSOURI

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ADOPTION OF ORGANIC FARMING SYSTEMS IN MISSOURI

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ABSTRACT

Organic agricultural production in Missouri has grown since the inception of national organic production and labeling standards in 2002. Underlying the growth of certified organic operations and land area in Missouri are producers' motivations and perceptions regarding organic conversion. The main objective of this research is to compare organic farmers' perceptions and motives by the type of agricultural products produced on their farms. Using a multiple case study methodology, this study compares the elements of the organic adoption decision among Missouri's organic produce, row crop, livestock, and dairy farmers. In order to make comparisons between the farmer types, the study employs the concept of *adoption* from *diffusion of innovations theory* as a framework for understanding the elements of the farmers' organic adoption decisions. Five attributes of innovations are used as a foundation for a comparative analysis of farmers' perceptions regarding organic farming—*relative advantage*, *compatibility*, *complexity*, *trialability*, and *observability*. Comparing interview responses from organic farmers reveals that motivational and perceptual differences exist between farming sectors. In general, farmers from the organic produce, row crop, and dairy farming categories have more positive views of the attributes of organic farming than livestock farmers do.

CHAPTER 1: INTRODUCTION

1.1 Background

Over the past 30 years, public interest in organic food and organic farming has been increasing in the United States. This fact is evident by the increases observed in consumer demand for organically produced food and the number of publicly funded research and policy projects pertaining to organic food production. Consumer demand for organic products has shown exceptional growth in the United States. According to the Organic Trade Association (OTA), organic food sales have averaged 20% growth per year since 1990. This growth is remarkable considering that total food sales averaged about 3% growth over the same period (OTA, 2008). The United States Department of Agriculture Economic Research Service (ERS-USDA) assents with the OTA's figures, and further claims that organic food sales are becoming increasingly important in the U.S. food market with a current share of 2.5% of total U.S. food sales (ERS-USDA, 2007).

Coupled to growing consumer attention for organic food and farming has been the increase in recognition and involvement from governmental entities in the organic movement. Prior to 1980, the United States Federal Government exhibited little interest in organic food or organic farming. However, due to increasing public interest in organics, USDA created and published a report in 1980 entitled, "Report and Recommendations on Organic Farming." This report is widely recognized as USDA's first recognition of the viability of organic farming and need for research support (Baker, 2005). Over the next decade, consumer and public interest in organic food production continued to increase. Because of increasing consumer demand for organic food and the

apparent lack of standardization in organic production methods and labeling, the United States Congress passed the Federal Organic Foods Production Act (OFPA) as part of the 1990 Farm Bill. The OFPA charged USDA with the task of creating national standards for organically produced agricultural products to assure consumers that agricultural products marketed as “organic” met consistent, uniform standards (USDA-AMS, 2008). As a result of this legislation, USDA established the National Organic Program (NOP) as a branch of its Agricultural Marketing Service (AMS) division. Twelve years after the OFPA was approved, standards for organically produced agricultural products were adopted. After much debate and unrest, USDA finally implemented national organic production standards known as the National Organic Program Rule on October 22, 2002 (Baker, 2005).

The growth in consumer demand for organically produced food and the standardization of organic farming methods have created a distinguished marketing opportunity for agricultural producers who obtain organic certification. Standardization and growing consumer demand has seemingly encouraged greater participation in the NOP from U.S. and Missouri agricultural producers. Since 2002, the numbers of U.S. certified organic operations and acres under organic management have increased substantially. According to the 2007 Census of Agriculture, there are 10,159 certified organic operations and over four million acres of certified organic land in the United States. These numbers represent a 111% percent increase in the amount of land under organic management and a 38% increase in the number of certified organic operations since 2002 (ERS-USDA, 2008). The total U.S. growth in organic operations and land area differ somewhat from the organic growth trend in Missouri. Since 2002, Missouri’s

organic land area has increased by 40% (15,574 to 21,738 acres) while the number of certified organic operations has increased by 73% (60 to 104). The differences observed between the total U.S. and Missouri growth percentages are likely due to the recent certification of vast areas of rangeland in the western part of the United States (NASS-USDA, 2008).

Despite the growth in the number of organic operations and organic land area, organic agriculture still represents a small proportion of all agricultural producers and land area in the United States and Missouri. According to USDA's Economic Research Service, United States producers currently only manage about 0.5% of all U.S. agricultural land organically. Furthermore, only about 0.4% of all agricultural operations are certified organic (ERS-USDA, 2008). Missouri percentages of organic operations and land area are even lower than the national numbers. In 2007, less than 0.1% of both Missouri's agricultural land and number of agricultural operations were certified organic (NASS-USDA, 2008).

1.2 Organic Agriculture in Missouri

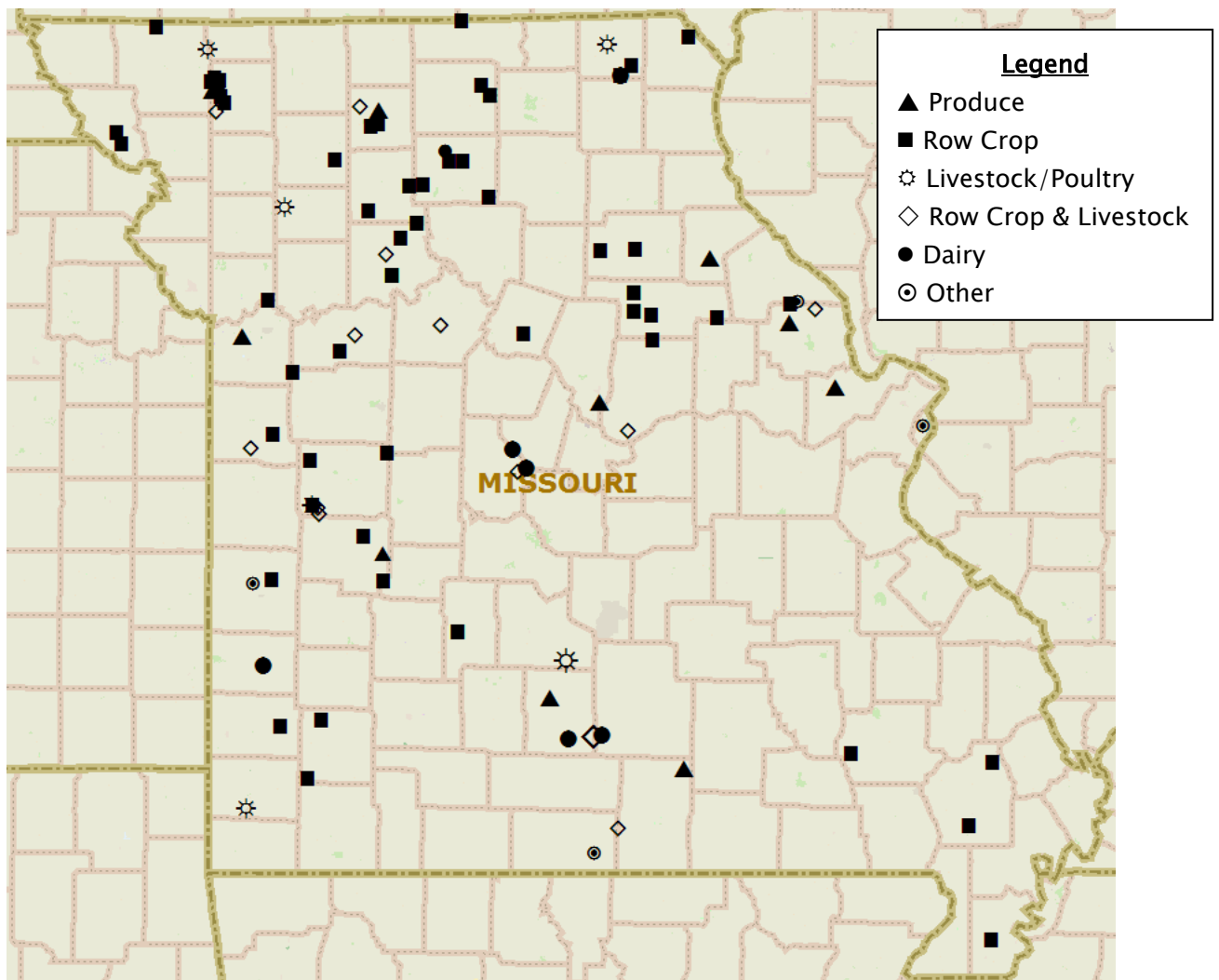
In 2007, 223 Missouri farms sold organic products. However, not all of these farms were certified under the USDA's National Organic Program.¹ The total number of certified organic operations in Missouri in 2007 was 104 (NASS-USDA, 2008).

However, in addition to farming operations, this number includes organic processing and handling operations in the state. The lists of certified organic operations available from the USDA reveal that there were approximately 97 certified organic farming operations

¹ According to the National Organic Program, operations that sell less than \$5,000 in organic agricultural products per year are exempt from certification (USDA-AMS, 2008).

in Missouri in 2007. Of the 97 farming operations, 73 operations were certified in organic crop production, which included horticultural as well as grain and oilseed crops, and 5 farms were certified in organic livestock production. Nineteen farms were certified in both organic crop and livestock production (USDA-AMS, 2009).² The map below shows the location of Missouri's organic farming operations as of July 2009.

Figure 1: Map of Organic Farming Operations in Missouri



² More details about organic agriculture in Missouri can be obtained from the 2007 Census of Agriculture. See Table 48 from the Missouri report.

1.3 Specific Problem Addressed by the Proposed Study and Objectives

Underlying the growth of certified organic operations and land area in the U.S. and Missouri are producers' motivations and perceptions regarding organic conversion. Previous studies have shown that agricultural producers' organic conversion decisions are diverse with respect to farm characteristics (age & education of farmer, farm size, sales, etc.), producer attitudes and management styles, and marketing opportunities (e.g., Darnhofer, et al, 2005; Fairweather, 1999; Howlett, et al, 2002; Padel, 2001; Padel, 1999). The same studies also indicate that the institutional and physical environments of farms affect producers' decisions regarding organic conversion. Little research has been done, however, on the perceptual and motivational differences between farmers of different product sectors in pursuing organic conversion. Farmers who align with differing categories of production—produce, row-crop, livestock, and dairy—may in fact have differing perceptions of and motivations for conversion. While previous research has tended to lump all producer types together when analyzing the conversion decision, there may be considerable differences in perceptions and motives between farmer types. The main objective of this research is to compare organic farmers' perceptions and motives by the type of agricultural products produced on their farms. Specifically, this study compares the elements of the organic conversion decision among Missouri's organic produce, row-crop, livestock, and dairy farmers. In order to make comparisons between the farmer types, the study employs the concept of *adoption* from *diffusion of innovations theory* as a framework for understanding the elements of the farmers' adoption decisions regarding organic farming.

1.4 Research Questions

In analyzing the differences in organic farmers' perceptions and motives, this research addresses the following research questions.

- How do organic farmers of differing product sectors perceive the attributes of organic farming?
- How do farmers' perceptions of organic farming relate to their motives in adopting organic production systems?

1.5 Significance of the Study

Determining differences among differing types of farmers' perceptions and motives in converting to organic production is important for a variety of reasons. The most pressing of these reasons relates to effective organic agricultural policy development and implementation. Understanding differences in farmers' decision-making processes and the factors that motivate them is essential to the development of effective policies aimed at organic conversion, especially if an objective of a policy or program is to encourage a certain type of organic production—e.g. fruit & vegetable, grain & oilseeds, dairy, and/or livestock.

Policies and programs aimed at aiding farmers in organic conversion and production have been increasing in number and scope over the past several years. For example, the 2008 United States Farm Bill allocates a greater amount of federal funding than any previous Farm Bill to organic conversion cost-share programs and organic research initiatives (Organic Farmers Action Network, 2009). These policies and programs are the result of a growing acceptance for organic producers in the United

States, which may partly be due to favorable perceptions of organic agriculture with regard to the environment. Previous studies show that organic production methods have positive environmental benefits (e.g., Pimental, et al, 2005; Feber, et al, 1997). While there is currently debate among agriculture industry professionals, scholars, and institutional leaders about the effects and benefits of organic agriculture, the significance of this study does not regard the correctness of organic policy creation but does regard the appropriateness of the policies in their focus on agricultural producers.

The results of this study provide policy makers with important information regarding the motives and perceptions of differing types of organic farmers in Missouri. The results of this study can aid policy makers in enacting policies that are appropriate for their target population and provides public program administrators with valuable information in understanding their clientele. As demand for organic products and the number of organic producers increases, organic agricultural policy will become increasingly important to the sustainability of the organic industry. Assessing the perceptions and motivational forces that underlie producers' decision-making processes is a worthwhile study in this sense, as it contributes to effective organic agricultural policy development and implementation, which will enable the organic industry to grow while adding value to both the Missouri and United States economies.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Studies focused on agricultural producers' decisions to convert to organic production have included many types of agricultural producers—from horticultural and produce farmers to row crop farmers to dairy and livestock farmers. In general, previous studies have grouped all types of organic farmers together when examining the producers' organic conversion decisions. Very little research exists that examines potential differences in farmers' motives and perceptions based on farmers' production type—i.e. produce vs. row-crop vs. livestock vs. dairy. Furthermore, previous studies that examine organic producers' motives for conversion have been carried out in many different countries around the world that have diverse institutional and physical environments. While previous studies exhibit some commonalities in identifying the key elements of a producer's organic conversion decision, results from previous studies also indicate that local and regional climatic, soil, market, and policy characteristics play a major role in a producer's decision to convert to organic production.

The purposes of this literature review are (1) to provide background information regarding the development of organic agriculture and (2) summarize and evaluate the most significant literature on the motives and perceptions of agricultural producers regarding organic conversion. In addition to summarizing and evaluating previous studies that focus on farmers' perceptions and motives for conversion, this review describes similarities and differences among the pieces of literature and identifies existing gaps to understanding producers' conversion decisions. At the conclusion of the

literature review, the importance of the study's contribution to the existing body of knowledge is described.

2.2 The Development of Organic Agriculture

The organic movement has its roots in early 20th century Europe. Although traces of an alternative movement in agricultural production methods reach further back into history, the British organic movement of the 1920s-1940s is generally recognized as the context for the first pioneers in organic agriculture (Fromartz, 2006). This was the era of Sir Albert Howard, Lord Northbourne, and Lady Eve Balfour—early organic pioneers who dedicated themselves to research and promotion of organic ideals. Sir Albert Howard, an agricultural scientist, who served in Great Britain's Imperial Department of Agriculture during the early 1900s, is widely recognized as the most influential organic agriculturalist in the history of the organic movement. His pioneering work on the importance of organic matter in soil is foundational to all succeeding notions of organic agriculture. Indeed, during Howard's time, the use of newly discovered chemical fertilizers as replacements for organic wastes in the production of food was the main point of contention between the early pioneers of the organic movement and conventional agriculturalists. In 1939, influenced by Howard's research and writings, Lady Eve Balfour, an English farmer and educator, set out to conduct a side-by-side comparison of organic and conventional farming. Balfour published the findings of her comparison—known as the “Haughley Experiment”—in a book entitled, *The Living Soil and The Haughley Experiment* in 1943 and again in 1974. Balfour's work helped pave the way for adoption of organic production methods in Europe by providing farmers with a

comparison between organic and conventional farming methods (Conford, 2002). In conjunction with Howard and Balfour, Lord Northbourne (born Walter Ernest Christopher James—the 4th Baron Northbourne of Kent, England), an English agriculturalist and educator, refuted the use of synthetic chemicals on the farm. In his 1940 book *Look to the Land*, Northbourne coined the term “organic farming” to describe a “living” system of agriculture that focused on the interrelationships between all organisms on the farm (Northbourne, 1940). Through their research and writings, Howard, Balfour, Northbourne, and other early European organic agriculturalists established the foundations for the development of organic agriculture in Europe and the rest of the world.

The scientific principles, theories, and ideals described by Europe’s early organic pioneers set the stage for a schism to arise in the practice of agriculture during the mid 20th century. During the 1940s through the 1970s, as more synthetic chemicals were introduced to farmers, the ideological differences between organic and conventional agricultural production became pronounced. Because organic agriculturists opposed manufactured fertilizers and pesticides, the widespread use of such chemicals caused friction between organic and conventional agriculturists.

Tension between organic and conventional agriculturalists also increased during this time period because of zealous support for organic ideals from influential characters like J.I. Rodale. Rodale (1898-1971), an American publisher, was fascinated and inspired by the work of Sir Albert Howard and other early organic pioneers. The son of a New York City grocer, Rodale had a passion for promoting healthy lifestyles through organic agriculture. In 1942, Rodale published *Organic Farming and Gardening*

magazine, a widely read publication that promoted and popularized organic production techniques in the United States. In addition to *Organic Farming and Gardening*, Rodale also published several books that campaigned for organic ideals and refuted conventional agriculture's adoption of synthetic chemicals (Fromartz, 2006).

Besides farmers' increased adoption of chemical fertilizers and pesticides and Rodale's crusade for organic agriculture, other factors of the time deepened the rift between organic and conventional agriculture. Spurred by Rachel Carson's *Silent Spring*, the environmental movement of the 1960s and 1970s called people's attention to the negative effects of excessive chemical usage in agriculture (Carson, 1962). Furthermore, the 1960s and 1970s "back-to-the-land" movement and anti-establishment social revolution helped to widen the divide between organic and conventional agriculture (Conford, 2002).

Despite organic agriculture's growth in popularity in both Europe and the United States during the 1960s, 70s, and 80s, the market for organic agricultural products remained a miniscule part of total food sales in both regions. However, by the late 1980s and early 1990s, organic agriculture in both regions had attracted such an influential support network of farmers, consumers, and activists that, during this time period, governments in both Europe and the U.S. began sanctioning the development of national organic production standards. In 1990, the United States Congress passed its first legislation regarding organic agriculture. This legislation, known as the Federal Organic Foods Production Act (OFPA), was aimed at establishing national standards for governing the marketing of organically produced products. Goals of the legislation included facilitating interstate commerce of organic foods and creating assurance for

consumers that organically produced products met a consistent standard (Dimitri and Oberholtzer, 2005). The European Union adopted similar legislation in 1991 called Council Regulation (EEC) 2092/91 (Sylvander, and Floc'h-Wadel, 2000). Since the early 1990s, the governments of both regions have amended and added more policies aimed at promoting organic agriculture production and developing markets for organic products (Willer and Yussefi, 2007).

Today, Europe and the United States represent the two most mature and largest markets for organic-labeled products in the world. Although certified organic farmland area and sales of organic-labeled products have increased worldwide, the United States and European Union represent 95 percent of the estimated world retail sales of organic food products (Willer and Geier, 2005). The amount of certified organic agricultural land and the number of organic producers in these two regions have also increased substantially. From 1995 to 2005, the amount certified organic land quadrupled and the number of certified organic producers tripled in the EU-15 (Lampkin and Olmos, 2007). The U.S. experienced similar growth in the same period. U.S. organic land area quadrupled and the number of organic producers doubled from 1995 to 2005 (ERS-USDA, 2008).

2.3 Farmers' Motives and Perceptions

Underlying the development of organic agriculture in the U.S. are consumers' preferences and producers' decisions to farm organically. Because the focus of this study is to identify differences in farmers' motives and perceptions regarding the adoption of organic systems among differing producer types—produce, row-crop, livestock, and

dairy—this literature review emphasizes research regarding the supply-side of organic market development. Previous studies oriented with the supply-side of organic market development have examined factors influencing producers' adoption of organic systems through a variety of quantitative and qualitative methods. These studies exhibit a broad range of perspectives in assessing organic adoption. Some studies focus on farm and farmer characteristics (such as farm size, farmers' level of education, gender, and age) (Molder, et al, 1991; Burton, et al, 1999; Canavari, et al, 2007). Other studies stress farmer's perceptions of organic farming and farmers' motivations in converting (Wernick & Lockeretz, 1977; Conacher & Conacher, 1982; Lockeretz & Madden, 1987; Vogtmann, et al, 1993; Sullivan, et al, 1996; Fairweather, 1999; Kaltoft, 1999; Midmore, et al, 2001; Tress, 2001; Howlett, et al, 2002; Lauwere de, et al, 2004; Darnhofer, et al, 2005a; Koesling, et al, 2009). Still additional studies examine other relevant factors of consideration in farmers' conversion such as institutional and informational support (Henning, et al, 1991; Svensson, 1991; Duram 1999; Padel, et al, 1999; Lohr & Salomonsson, 2000; Niemeyer & Lombard, 2003; Kroma, 2004; Musshoff & Hirschauer, 2008). The diversity of studies regarding organic conversion exhibit the complexity of considerations in producers' adoption of organic farming practices.

While none of the studies previously cited in this review actively draws comparisons between the adoption decisions among producers of different product sectors, many are useful in providing a context for the research conducted in this study. Previous studies provide important information about the elements of farmers' conversion decisions and offer a foundation for comparing those decisions. The following paragraphs describe the most applicable research on which the research is built.

In 2002, The National Food Centre of the Irish Agriculture and Food Development Authority published a report that summarized organic agriculture in Ireland during the early 2000s. In addition to providing a description of Irish organic agriculture, the report entitled, “Conversion to Organic Farming: Case Study Report Ireland,” examined the financial characteristics, operators’ attributes, and operators’ attitudes of 27 Irish farms that at the time of the study were considering conversion to organic production (Howlett, et al, 2002). The researchers who instigated the study especially analyzed the views of farm operators with regard to their perceptions of the organic conversion process and their motives for conversion. The two most notable farmer motives for conversion identified in the case study were producers’ attitudes toward finances and the environment. When the 27 farmers included in the study were asked about the benefits of organic farming, their most common responses were, “better prices,” and, “greater income.” Additionally, environmental concerns about pollution were also frequently cited as motives for conversion.

Besides identifying profitability and environmental motives, the study also identified the importance of government subsidies and investment considerations in farmers’ conversion. As part of the European Union (EU), Irish farmers received direct monetary assistance from the government under the Rural Environmental Protection Scheme (REPS). Under this support program, certified organic producers and producers in the organic conversion process received greater subsidies than conventional producers with equivalently sized farms did. The subsidy was based solely on farm size and had a limit to the amount of payment to which any one producer was eligible. From their analysis, the researchers involved in the study found that the financial incentives from the

REPS program increased producers' perceptions of the financial viability of organic agriculture. The study failed to address, however, the impact of the subsidy on farms of different sizes and the way in which farm size may have correlated with production type. For example, an organic pasture-based livestock farm may have been 100 hectares in size while an organic produce farm may have been 5 hectares in size. Logically, as the subsidy was based on farm size (land area), the subsidy incentive for the 100 hectare farm was larger than for the 5 hectare farm. The differences in subsidy payments, therefore, may in fact have had different influences on the conversion decisions of each type of farmer.

The researchers of the Irish case study also briefly addressed the impact of investment considerations on farmers' conversion to organic agriculture. Through their financial analysis, the researchers found that there were differences in the amount of investment required to convert to organic among the different cases in the study. For instance, the researchers found that because of differences in organic production standards among the livestock and grain product sectors, the investment requirement for organic livestock production was generally higher than the investment requirement for organic grain production. Conversion to organic livestock production from conventional livestock production generally required investment in new farm buildings or modifications to existing buildings, while conversion to organic grain production from conventional grain production generally required less expensive investments such as improvements to grain handling and storage systems. Overall, the study found that the average extra investment required for organic conversion among livestock, dairy, and row-crop farms per hectare was €357, €949, and €253 respectively. While the study

identified differences in investment among farms by production type, the study failed to compare the impact of the differences on farmers' motives for conversion. The researchers did not describe the organic conversion implications of varying investment requirements with respect to producers' production types.

In addition to the 2002 case study from Ireland, other qualitative studies that focus on farmers' organic conversion motivations exist. Two similar qualitative studies that originate from New Zealand and Austria utilized ethnographic decision tree modeling in their assessment of farmers' organic conversion decisions. Fairweather (1999) examined the perceptions, motivations, and constraints of 83 New Zealand farmers (both organic and conventional) in their consideration of organic conversion. In the study, 39 organic and 44 conventional farmers' were interviewed using an approach that explored the farmers' thinking toward organic conversion and resulted in a record of farmers' rationales described in their own terms (Fairweather, 1999). Darnhofer et al (2005) from Austria utilized a similar ethnographic decision modeling approach in assessing farmers' decision-making regarding organic or conventional farm management. In the study from Austria, 21 farmers' (9 organic and 12 conventional) were interviewed using the ethnographic approach to identify farmers' decision criteria regarding organic conversion. Although both studies utilized similar methods in assessing farmers' rationale toward conversion, the results of the two studies varied considerably. While the decision trees constructed from the interviews in the two studies showed some similarities in producers' organic conversion motivations with respect to producers' perceptions of the relationship between organic farming and environmental welfare, differences in the two groups of farmers' rationales were marked. The study from New

Zealand, Fairweather (1999), depicted a decision tree that mainly emphasized producers' philosophical, health, financial, and farm management motivations. Similar to the decision tree from Fairweather (1999), the decision tree from Darnhofer et al (2005) emphasized farmers' financial motivations, however, the decision tree from the Austria study also stressed the importance of farmers' finances with respect to their product sector. That is to say, in the study from Austria, a farmer's product sector was observed to be an important consideration in his or her organic conversion decision. While Fairweather (1999) observed decision criterion that were neutral to farmers' product sector, Darnhofer et al (2005) found that product sector characteristics were important considerations in farmers' conversion to organic agriculture. Darnhofer et al (2005) showed that (for the 21 cases in the study) farmers without livestock and farmers that engage in sugar beet production were less likely to convert to organic farm management. Darnhofer et al (2005) explained the importance of these considerations by alluding to governmental policies associated with sugar beet production and livestock market factors present in Austria. The differences observed in Fairweather (1999) and Darnhofer et al (2005) point to the importance of regional policy and market factors in influencing a farmer's organic conversion decision, especially with respect to the farmer's product sector.

The importance of regional market characteristics on farmers' motivations to convert to organic production were also echoed in Midmore et al (2001). This comprehensive study from England analyzed three groups of farmers—certified organic, transitional, and conventional—to determine each type of farmer's views regarding organic production and their motivations in choosing their respective production

methods. Results from the telephone survey used in the study indicated that organic and transitional farmers mainly made their decisions to convert based on their perceptions of the financial viability of organic production and concerns for the environment.

Additionally, however, many conventional farmers in the study perceived large financial risks associated with organic conversion due to unavailability of markets for organic farm products. Conventional farmers were especially concerned over the marketing viability of organic eggs, grain, and meat. Supporting some of the conventional farmers' concerns, the study cited differences in the market development of differing organic products. For example, at the time of the study, organic vegetable and milk marketing channels were more developed than marketing channels for organic eggs, grain, and meat. Findings from the study clearly indicate that differences in organic marketing opportunities for different types of agricultural products can play a significant role in influencing farmers' organic conversion decisions.

The marketing and financial viability of organic food production and farmers' concerns for the environment seem to be the most notable motivations in farmers' conversion to organic agriculture. There are, however, many other motives cited in the literature. Lauwere et al (2004) identified four different categories of motives for organic conversion among Dutch farmers. The categories identified by Lauwere et al (2004) included idealistic, technical, institutional, and economic motives. In contrast to the previous studies cited in this literature review, Lauwere et al (2004) found economic motives to be the least important among all categories of motives in the organic conversion of 36 Dutch farmers. Instead of economic motives, idealistic motives for conversion were cited most frequently among the farmers in the study. According to

Lauwere et al (2004) idealistic motives included farmers' pursuit of a challenge, better personal or family health, sustainable farming ideology, and relationships with consumers. Technical motives were cited second most frequently in the study. These included greater cooperation with nature, less chemical use, and better soil health. Furthermore, institutional motives, such as farmers' concern for a positive image and social acceptance, were cited third most frequently among the Dutch farmers. In addition to Lauwere et al (2004), Tress (2001) also identified several other farmer motivations for organic conversion. These included farmers' desires to improve animal welfare, provide better quality products to consumers, improve the work environment on farms, and defy the production practices of conventional agriculture. Findings from Lauwere et al (2004) and Tress (2001) are comparable with Padel (2001), which presented a summary of farmer motivations for organic conversion from studies performed during the last 30 years of the 20th century (see Table 1).

Table 1: Motivations to Convert to Organic Production

| <i>Farming related motives</i> | <i>Personal motives</i> |
|--|--|
| <u>Husbandry and technical reasons</u> Animal health problems Soil fertility and erosion problems | <u>Personal health</u> Own and family health problems Ergonomic reasons |
| <u>Financial motives</u> Solve existing financial problems Secure future of the farm Cost saving Premium marketing | <u>General concerns</u> Stewardship Food quality Conservation Environmental Rural development |
| Source: Padel (2001) | |

In addition to identifying farmers' motives, it is also interesting to note that the literature on organic adoption may also reveal changes over time in farmers' motives in converting to organic production. Vine and Bateman (1981) and Wernick and Lockeretz

(1977), two of the earliest studies focusing on farmers' motivations in adopting organic production methods, found that farmers included in each study mainly adopted organic practices because of problems with conventional farming. These difficulties experienced by farmers through conventional farming included soil erosion and animal health problems. Later studies of the 20th century, including Svensson (1991) and Vogtmann et al (1993) found that farmers mainly converted to organic in order to secure better prices for farm products. Padel (2001) observed that over time farmers motives in conversion seemed to have shifted from husbandry and technical motives to financial motives. This observation implies that differences in organic conversion motives may be observed between experienced or older organic farmers and inexperienced or younger organic farmers. However, it is difficult to determine through the literature whether such a shift in farmers' motives from husbandry and technical to financial motives has occurred due to differences in definitions between studies, variances in sampling techniques, and a general lack of early studies.

2.4 Summary

Previous studies indicate that there are many possible motives among farmers for conversion to organic production. Researchers have classified these farmer motives in a variety of ways including financial/economic, environmental, health/safety, and ideological motives. While numerous potential motives for conversion have been identified through previous studies, there is little research that clarifies how farmers' motives and perceptions may be linked with product sector. While differences in marketing opportunities, differences in institutional support, and differences in

investment considerations for different types of organic products have been identified, little research has been done to show how these differences compare with farmers' motives and perceptions regarding organic conversion. This study sheds light on how farmers' motives for converting and their perceptions of organic agriculture vary with respect to the farmers' organic product sector(s)—(i.e. produce, row-crop, livestock, and dairy). This examination of the connection between farmers' motives/perceptions regarding organic conversion and farmers' production type may lead to an improved understanding of farmers' rationale in adopting organic production methods, which may in turn lead to improved effectiveness in establishing policies and programs directed toward organic producers.

CHAPTER 3: CONCEPTUAL FRAMEWORK

3.1 Diffusion of Innovations Theory & Adoption

Diffusion of innovations theory can be used to frame the relationship between farmers' motives and perceptions and their adoption of organic farming methods.

According to Rogers (1983, p.10), "diffusion is the process by which an innovation is communicated through channels over time among the members of a social system."

Stoneman (2002) also offers an alternative definition for diffusion that is phrased in more economic terms. According to Stoneman (2002, p.3), "diffusion is the process by which new technologies spread across their potential markets over time." Under either definition, the process of diffusion is an accumulative product of individuals' decision-making regarding the adoption of an innovation. That is, adoption is the acceptance or use of an innovation by an individual (or firm) whereas diffusion is the wide spread adoption of the innovation by many individuals (or firms) (Feder and Umali, 1993).

Diffusion is a macro-level concept that focuses on factors that affect the spread of innovations across particular populations through time, while adoption is a micro-level concept that considers factors that affect an individual's decision to adopt or use an innovation at a particular point in time (Sunding and Zilberman, 2001). Therefore, in order to examine and compare individual farmers' adoption of organic production methods, diffusion of innovations theory must be narrowed to the level of the individual, which is the level of adoption.

Adoption of an innovation is affected by several variables including potential adopters' perceptions of the innovation, the social system (which includes market and institutional conditions for the innovation), and time. An innovation is any idea, practice,

or object that is perceived as new to a potential adopter (Rogers, 1983). In the case of organic production, farmers perceive organic farming as new if they have had limited experience with organic production practices and/or have never in the past possessed organic certification. Although many of the practices involved in organic farming—manure application, crop rotation, and cultural control of insects—are not new to agriculture, organic farming is an innovation because it represents a complex system change for many conventional agricultural producers (Padel, 2001). Because organic farming entails implementing and committing to certain production standards that may be new to potential adopters, farmers' conversion to organic farming represents a process that can be described using the concept of adoption. Furthermore, while organic farming may be described as an innovation in the practice of food production, it can also be described as an innovation in product marketing because of the certification requirement and labeling scheme of organic products in the United States.

Besides their perceptions of the newness of organic practices and organic marketing scheme, farmers' other perceptions of organic farming are also important in the framework of adoption theory. According to Rogers (1983), potential adopters evaluate an innovation based on the innovation's attributes relative to the potential adopters' existing practices or technologies. How farmers (potential adopters) perceive the attributes of organic farming (the innovation) relative to conventional farming (existing practice) greatly affects their decision to adopt or not adopt organic production. If a conventional farmer perceives that the attributes of organic farming are better able to fulfill his or her goals (i.e. maximize his or her utility), then the farmer will convert to organic production. In this manner, farmers' perceptions of the attributes of organic

farming are directly linked with farmers' goals or motives. Since farmers' motives are the basis for their perceptions of organic farming, the attributes of innovations from adoption theory can be used as a framework for understanding perceptual and motivational differences among farmers of different product sectors.

3.2 Attributes of Innovations as Variables for Conversion

Rogers (1983) describes five main attributes on which potential adopters evaluate innovations—relative advantage, compatibility, complexity, trialability, and observability.

3.2.1 Relative Advantage

Relative advantage is the extent to which an innovation is perceived as being better than the existing or previous practice or technology. The concept of relative advantage can be segmented into several sub-criteria on which to evaluate an innovation. These include economic factors, status aspects, comfort and time issues, incentive payments, and the immediacy of reward. Potential adopters' perceptions of the economic factors of an innovation, such as profitability, reduced cost of production, higher rate of return, and low initial cost, all serve to influence adoption. In the case of organic production, farmers evaluate the economic factors of organic conversion relative to conventional methods of production and marketing. In economic terms, this process of evaluation based on the monetary aspects of adoption corresponds with cost-benefit analysis. Considering cost-benefit analysis, the likelihood of a farmer adopting organic production is increased when the farmer perceives the innovation as having high

profitability, low costs of production, high rates of return, and/or low initial costs.

Farmers may also perceive relative advantage in organic farming if they believe an improvement in their social status may result from conversion. Previous literature, however, suggests that conversion to organic farming may actually imply a relative disadvantage in the area of social status (Padel, 2001; Lockeretz & Madden, 1987).

Relative advantage of an innovation may also be evaluated based on potential adopters' perceptions of reductions in discomfort and time that may result from adoption. Under this criterion, farmers would adopt organic production if they perceived organic farming as involving less discomfort and/or taking less time relative to conventional farming.

Incentive payments may also influence farmers' adoption by either decreasing the costs of conversion or increasing income from organic farming. Finally, the length of time to which the rewards of adoption are realized affects potential adopters' perceptions of the innovation's relative advantage. Because organic farming involves extra investment in certification costs and possibly in farm infrastructure and management, potential adopters assess organic farming based on the length of time to which the benefits of conversion become greater than the costs of conversion on their farms.

3.2.2 Compatibility

Compatibility is another attribute of an innovation that affects adoption. Rogers (1983) defines compatibility as, "...the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters." In terms of agricultural innovations, a farmer's adoption of an innovation is more likely when the innovation is compatible with the farmer's objectives (Pannel, 1999). Because

farmers' objectives reflect farmers' values, past experiences and needs, there is a relationship between farmers' objectives and farmers' views of the innovation. In the case of organic farming, previous literature calls attention to farmers' values for increasing farm profitability, environmental welfare, health, and animal welfare (e.g. Padel, 2001; Howelett et al, 2002; Kaltoft, 1999). Farmers who have cited these values as motivations for organic conversion must have perceived organic farming as a means for achieving their objectives. For these farmers, adoption of organic farming implied a step toward meeting their financial, environmental, health, and animal welfare objectives. In addition to farmers' values, farmers' perceptions of organic farming in relation to previously introduced ideas and past experiences are also an important factor in the evaluation of the innovation. Previous ideas and farmers' past experiences represent a standard from which farmers' make decisions. If adoption of an innovation, like organic farming, represents a considerable change in the way a farmer thinks or operates his or her business, then adoption is less likely than if the innovation represents little change in a farmer's manner of thinking or farm management (Rogers, 1983). Furthermore, farmers evaluate the innovation of organic farming based on their needs. According to Rogers (1983), potential adopters' needs in relation to the adoption of an innovation may vary with the individual and the specific innovation. In view of organic farming, several studies indicate that some farmers have adopted organic production as a means to meet their needs of preserving the viability of their farms (Tress, 2001; Padel, 2001; Koesling et al, 2009; Lauwere et al, 2004).

3.2.3 Complexity

In addition to an innovation's perceived relative advantage and compatibility, an innovation's perceived **complexity** is also an important aspect of adoption. Generally speaking, adoption and diffusion occur more rapidly with innovations that are easily understood and used. Because information about simple innovations is obtained more easily and/or inexpensively than information regarding complex innovations, adoption rates for simple innovations are generally faster than for complex innovations. Furthermore, complex innovations require more advanced management skills than do simple innovations. In the case of organic farming, farmers who adopt organic management often undergo a complex system change in their operations (Padel, 2001). Because organic farming is largely an information-based innovation, most potential adopters face a steep learning curve upon conversion from modern conventional agriculture. How farmers perceive the complexity of the production practices, certification requirements, and marketing considerations of organic farming affects their decisions of whether or not to farm organically.

3.2.4 Trialability

Trialability is another aspect of an innovation that affects adoption. Rogers (1983) defines trialability as, "...the degree to which an innovation may be experimented with on a limited basis." In general the possibility of running trials increases the likelihood of adoption. By running trials the potential adopter can gather more information about the innovation, and can thus reduce his or her uncertainty concerning large-scale implementation of the innovation (Pannel, 1999). In the case of organic

production, a farmer may choose to experiment with organic production by designating only a portion of his or her farm for certified organic production. Alternatively, a farmer could also experiment with organic production practices while not pursuing organic certification.

3.2.5 Observability

Observability is the final attribute of an innovation discussed by Rogers (1983). Observability refers to the visibility of an innovation and its results. Higher levels of observability decrease uncertainty about an innovation. Like trialability, observability enables a potential adopter to gather information about an innovation, which can be used to make a more informed decision about adoption. For example, if potential converters to organic can observe organic farming practices and results on neighboring farms, then they can make more informed decisions about whether or not to adopt organic production on their own farms. Table 2 below presents a summary of the attributes of innovations described by Rogers (1983).

Table 2: Attributes of Innovations

| | |
|--------------------|----------------------------|
| Relative Advantage | Economic Factors |
| | Status Aspects |
| | Comfort and Time Issues |
| | Incentive Payments |
| | Immediacy of Reward |
| Compatibility | Values |
| | Previous ideas/experiences |
| | Needs |
| Complexity | Understanding |
| | Use |
| Trialability | |
| Observability | |

3.3 Propositions Arising From the Literature and Theory

The purpose of this study is to compare the motives and perceptions of organic farmers of differing product sectors. Farmers' motives and perceptions with respect to the five attributes of innovations—relative advantage, compatibility, complexity, trialability, and observability—are compared across organic farmers of different product sectors. In light of previous literature on organic farming and in conjunction with the attributes of innovations from adoption theory, this study presents the following propositions:

1. Organic farmers' views of the relative advantage of organic farming are more positive among organic produce, row-crop, and dairy farmers than among livestock farmers.
2. Organic produce farmers view organic farming as more compatible with their personal values, beliefs, and needs than row-crop, livestock, or dairy farmers do.
3. Organic farmers' views of the complexity of organic farming are greatest among livestock farmers.
4. The trialability of organic production is lowest among livestock farmers.
5. The observability of organic farming is lowest among livestock farmers.

Previous studies suggest that markets for organic produce, row-crops, and dairy are more developed than for organic meat (Stevens-Garmon et al, 2007; Dimitri & Greene, 2002). The presence of developed markets for organic produce, row-crops, and dairy suggest that producers of these products may receive organic premiums more consistently than other types of organic producers (e.g. livestock producers). Therefore,

organic farmers in the product sectors of produce, row-crops, and dairy may view the relative advantage of organic farming more positively than livestock farmers who may not consistently receive an organic premium. Furthermore, Howelett (2002) suggested that the investment required to convert from conventional livestock production to organic livestock production is relatively higher than organic conversion in other product sectors. Higher investment costs for organic livestock producers relative to other types of organic production, may increase the time it takes for organic livestock producers to recoup the costs of conversion, which decreases the level of relative advantage in adopting organic production practices.

Compatibility between a potential adopter and an innovation is influenced by the potential adopter's beliefs, values, previous knowledge, and needs. Because organic farming is more established in the produce sector than in any other agricultural sector (Stevens-Garmon, 2007; Fromartz 2006), information and knowledge regarding organic agricultural practices may be more prevalent among organic produce farmers than among other types of organic farmers. Furthermore, farmers in this sector may view organic production as more compatible with their level of previous knowledge than farmers of other product sectors do.

Organic livestock farmers likely view the complexity, trialability, and observability of organic farming with greater aversion than produce, row-crop, or dairy farmers do. Because the National Organic Program's standards for organic livestock production are newer than the standards for organic produce, row-crop, and dairy production (Gold, 2004), organic livestock farmers likely have less experience with organic practices than produce, row-crop, and dairy farmers do. Because organic

livestock farmers may be inexperienced with the production standards specific to their product sector, they may view organic farming with greater complexity than produce, row-crop, or dairy farmers. Furthermore, because of potentially greater complexity, livestock farmers may have less favorable views of the trialability of organic farming relative to farmers of the other product sectors. Finally, because there are fewer organic livestock producers than there are organic produce, row-crop, or dairy producers (ERS-USDA, 2008), organic livestock farmers' views of the observability of organic livestock farming may be relatively low compared to the farmers of the other sectors.

3.4 Summary

The concept of adoption from diffusion of innovations theory helps to frame the problem of organic conversion among farmers of different product sectors. An innovation, like organic farming, is an idea, practice, or object that is perceived as new to potential adopters. The attributes of an innovation—its relative advantage, compatibility, complexity, trialability, and observability—greatly affect its adoption. Organic farmers of differing product sectors may perceive the attributes of organic farming in diverse ways, which may in turn reflect differences in organic farmers' motives relative to their respective product sector. Through the framework afforded by adoption theory, farmers' perceptions of organic farming and their motives in conversion can be compared.

CHAPTER 4: METHODS & PROCEDURES

4.1 Introduction

This study employed a multiple case study research design whereby farmers from each of the identified farming categories (i.e. produce, row-crop, livestock, and dairy) were identified, contacted, and interviewed. The farmers included in the study represented individualized cases that when compared offered a source of analysis in identifying potential differences between farmers' motives and perceptions based on farmers' product sectors. After securing interview responses from each of the farmers involved in this research, the study used content analysis to examine the interview responses for similarities and differences among farmers of a similar product sector and across product sectors. The interview responses served as data in this study and were compared using the attributes of innovations from adoption theory. Emphasis of the analysis was placed on how the interview responses varied with regard to the attributes of innovations and on how responses varied across production categories. Through this process of farmer identification, interviewing, and interview response analysis, the researcher identified the motivational and perceptual differences between organic farmers of differing product sectors with regard to organic adoption.

4.2 Multiple Case Study Research Design

This study used a multiple case study research design. According to Yin (2003) the use of case study research designs are most appropriate in addressing research questions that examine contemporary events over which an investigator has little or no

control. This sort of research design is especially relevant when studies emphasize exploratory research questions that begin with the question word, “what,” and/or explanatory research questions that begin with, “how” or “why” (Yin, 2003 p.9) In this study, the research questions use “what” in an exploratory manner that intends to address the contemporary event of farmers’ conversion to organic farming. Furthermore, because farmers’ are independent decision makers, the investigator in this study has no control over farmers’ thinking or their behavior in choosing organic production methods.³

Yin (2003) describes two main types of case study designs. These two types are single-case and multiple-case designs. Whereas single-case designs are appropriate in situations where critical, unique, typical, revelatory, or longitudinal cases are the focus of research questions, multiple-case designs are appropriate when an investigator wishes to analyze the specific characteristics of two or more cases and/or the similarities and differences between cases. Because of the comparative nature of the research questions in this study, a multiple-case research design is used. In the study, individual organic farmers represent individual cases of organic adoption. Additionally, each organic farmer is categorized as part of a sub-group of organic farmers according to his or her product sector.

4.3 Recruitment of Farmer Participants

In order to obtain relevant data for analysis, farmer participants for the multiple case study were identified and recruited. The Agricultural Marketing Service of USDA,

³ The multiple case study method was chosen over an ethnographic approach because the intentions of the study more closely relate to case study methodology. Ethnographies tend to be inward looking and focus on culture, where as case studies tend to be outward looking and focus on specific units of analysis. The case study method is more appropriate where specific comparative analysis between research participants is the purpose of the research (Court, 2003).

maintains a library of accredited certifying agents and their respective certified operations in Portable Document Format (PDF) files on the internet. These PDF files contain the name, address, and often a phone number of each certified organic producer in the United States. These PDF files were used by the investigator to identify certified organic producers in the state of Missouri by searching each of the certifiers' files for producers with Missouri addresses. After aggregating the contact information for all organic producers from Missouri into one spreadsheet file, the investigator possessed a means to contact any certified organic operation in the state.

Instead of using the contact information spreadsheet file to contact each organic producer in the state, the investigator counseled with faculty at the University of Missouri who are familiar with several of Missouri's organic producers to identify farmers who would likely be willing to participate in the study. Having the contact information already compiled upon meeting with the faculty, the investigator was able to present a comprehensive list of Missouri's organic farmers to the faculty members who were then able to advise the investigator as to which producers would be the most likely to agree to participate in the study. After identifying likely participants, the investigator contacted each potential participant by phone to inform them of the study and ask for their participation. Farmers who agreed to participate were asked to schedule an interview with the investigator to be conducted sometime during July or August of 2009.

4.4 Pilot Case

Before conducting interviews with the cases to be included in the analysis, the investigator conducted a pilot case study. Yin (2003) strongly recommends that

researchers using a case study methodology conduct a pilot case study as a tool to refine data collection plans. For this research, the investigator selected a pilot case as a tool in developing relevant questions for use in the interviews with the study's informants. The pilot case study used in this research consisted of a meeting and interview session with a Missouri organic farmer who is also an organic inspector for one of the most popular certifying agencies in the state. The selection of the pilot case was based on the recommendation of University faculty for the case's involvement and knowledge of Missouri's organic agricultural network of producers. During the pilot case study, the investigator explained the background and purpose of the research. The informant at the pilot site offered recommendations and suggestions to refine the investigator's data collection plans. In addition, the informant also provided the investigator with names of potential participants for the study.

4.5 Farmer Interviews

During the months of July and August, the researcher interviewed informants from 11 different farming operations. During that time, the investigator also interviewed three organic marketing specialists employed by the Missouri Department of Agriculture. The interviews with the cases were semi-structured and consisted of questions that focus on the attributes of innovations from adoption theory. The investigator's interview questions for the case informants are outlined in Table 3 on the following page.

Table 3: Outline of Interview Questions

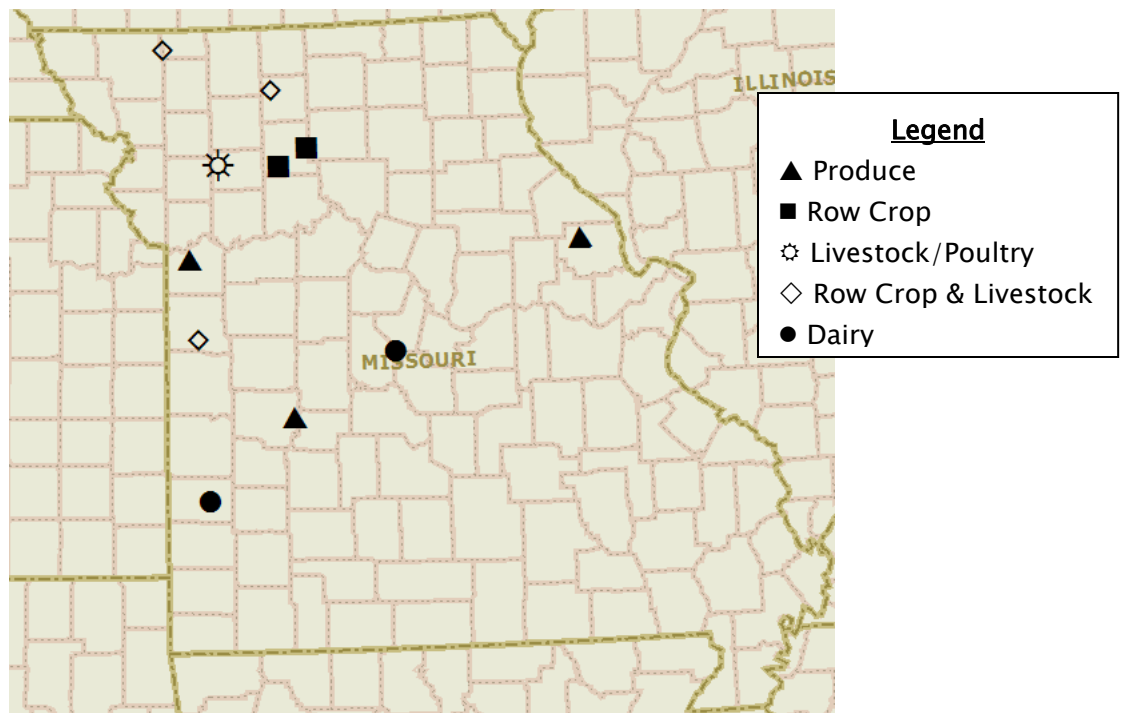
| <u>Attribute</u> | <u>Questions</u> |
|------------------------|--|
| 'Background Questions' | <ul style="list-style-type: none"> - What products do you produce on your farm? - What is the size of your farm in acres and/or animal numbers? - How did you get started with organic production? - When did you first get certified? / What dates were you certified? - Where/how do you market your farm products? - Where do you get information regarding organic farming practices and markets? |
| Relative Advantage | <ul style="list-style-type: none"> - Considering your personal farm, what are the benefits of organic farming compared to conventional farming? - What were the challenges to getting into organic farming for you and your farm? - How has organic farming changed the profitability of your farm? - How has organic farming changed your costs of production? - How has organic conversion changed the way other farmers look at you? - How has conversion to organic affected the time you spend farming? - How has organic farming changed your level of comfort in farming? - Have you received financial assistance for certification? Follow-up (if yes): Do you think you would be an organic farmer even without financial assistance? - How long did(will) it take before your farm recouped(s) the costs of organic conversion? - What problems did organic conversion solve for you (if any)? (e.g. profitability, soil health, erosion, etc.) |
| Compatability | <ul style="list-style-type: none"> - What first got you interested in organic farming? - What were your experiences in farming before obtaining organic certification? - How does organic farming relate to your personal beliefs and/or values? |
| Complexity | <ul style="list-style-type: none"> - What did the change to organic production involve on your farm? - How would you describe your understanding of organic farming practices? - How difficult has the transition to organic farming been for you in terms of the complexity of farm management? |
| Trialability | <ul style="list-style-type: none"> - How did you test whether or not organic farming was going to work for you? - Did you first try organic practices on a small scale before using them farm-wide? - Do you find it easy to experiment with new organic techniques? Why or why not? - Did you have experience with organic farming methods before conversion? If so, can you please describe that experience? |
| Observability | <ul style="list-style-type: none"> - Were you able to observe organic farming practices on other farmers' land before you converted to organic? - Do you have friends or neighbors who are involved in organic farming? |

The duration of the interviews with the cases ranged from one to two hours. The interviews were recorded using a digital voice recorder. Farmers who participated in the study were compensated with a \$50 gift-card to Orscheln Farm & Home. After all the interviews were completed, the interview recordings were transcribed into typed documents.

4.6 Case Descriptions

During the course of data collection, the investigator collected interview responses from 11 different farming operations in Missouri. The map below shows the locations of the farming operations.

Figure 2: Map of Case Locations



The respondent farmers interviewed operated in the produce, row crop, dairy, and livestock/poultry farming sectors. Seven of the eleven producers interviewed operated in

more than one of the farming sectors. For these cases, care was taken during the analysis of the interview responses to keep informants' comments regarding each type of production separate but also to note the importance of the relationship between the types of production on the farm. It should also be noted that four of the respondents' had dropped organic certification for at least one of their farming enterprises—these include case numbers 6, 7, 10, & 11. Table 4 on the following two pages summarizes some of the most relevant characteristics of the cases included in the study. For a more thorough description of the cases, please refer to Appendix A, which contains more elaborate descriptions of each of the cases included in the study.

Table 4: Case Characteristics

| Case # | Products & Scale of Operation | Dates of Organic Certification | Market Outlets for Certified Organic Products | Number of Operators and Farm Employment Status |
|--------|---|---|---|---|
| 1 | Row crops: soybeans, black beans, popcorn, wheat, barley, field corn, forage (500 acres) Livestock: 1. hogs (farrow-to-finish) (110 sows) 2. beef cattle (28 cows) | Row crops: 1994-present Hogs: 2006-present Cattle: 2008-present | Row Crops: contract buyers Hogs: contract buyers and local direct sales Cattle: local direct sales and conventional markets | One full-time farmer |
| 2 | Produce: vegetables & transplants (8 acres including 2 covered-hoop structures) Livestock: beef cattle (150 cows) (conventional) | 1999-present | Wholesale buyer and farmers' markets | Two full-time farmers—husband and wife |
| 3 | Row crops: soybeans, field corn, wheat, sorghum, dry peas (1400 acres in Missouri; 1000 acres in Colorado; 3800 acres in Nebraska) | 1995-present | Contracts with end users | Two full-time farmers (Partnership); Land outside Missouri is farmed through contractual arrangements |
| 4 | Row crops: soybeans, wheat, forage (300 acres) Livestock: beef cattle (100 cows) (conventional) | 2001-present | Contract buyers | One operator who also has an additional full-time job |
| 5 | Produce: vegetables (3 acres) | 2003-present | Wholesale buyers, farmers' markets, and farmstand | Two part-time operators (Partnership) |
| 6 | Milk: 500 acres of pasture; 90 dairy cows | June 2007 – June 2008; still uses organic practices | Wholesale milk buyer | One full-time farmer with children who work on the farm |

**Table 4: Case Characteristics
(Continued from previous page)**

| Case # | Products & Scale of Operation | Dates of Organic Certification | Market Outlets for Certified Organic Products | Number of Operators and Farm Employment Status |
|--------|---|---|--|--|
| 7 | Milk: 160 acres of pasture; 30 dairy cows Livestock: hogs (5 sows)(not certified) Poultry: (600 fryer chickens) | Milk: 2007-2008 Poultry: 2007-2008 | Farmers' markets, a CSA, on-farm sales | One full-time farmer with a son who also lives and works on the farm |
| 8 | Milk: 186 acres of pasture; 64 dairy cows | 2007-present | Wholesale milk buyer | One full-time farmer with two teenage children who work on the farm |
| 9 | Row crops: soybeans, field corn, wheat, forage (1050 acres) Livestock: beef cattle (160 cows) | Row crops: 2000-present Livestock: 2004-present | Row crops: organic grain marketing cooperative Livestock: Wholesale buyer, direct sales | Two full-time farmers—father and son |
| 10 | Row crops: soybeans, field corn, wheat, forage (600 acres) Livestock: beef cattle (80 cows) | Row crops: 1992-present Livestock: 2006-2008 (still uses organic practices) | Row crops: organic grain marketing cooperative Livestock: direct sales, conventional market | One full-time farmer |
| 11 | Produce: vegetables and herbs (<1 acre) Eggs: laying hens (50 hens) | Produce: 2005-2007 Chickens: 2006-2007 | Two CSAs, three restaurants | Two part-time farmers—husband and wife |

4.7 Interview Analysis

After the interviews were transcribed, the interview transcripts were analyzed using qualitative research software—XSight from QSR International. The software aided the researcher in examining the transcribed interview responses. Using the software, the investigator was able to identify and categorize themes in farmers' responses. Each interview transcription was examined using the software such that farmers' comments regarding the attributes of innovations were extracted, summarized, and compared across farming sectors. Because the interview questions were written and asked in a manner that emphasized the attributes of innovations from adoption theory, farmers' responses were relatively easy to dissect on the basis of the theoretical elements of adoption. Farmers' responses were analyzed in relation to the concepts of relative advantage, compatibility, complexity, trialability, and observability from adoption theory.

CHAPTER 5: RESULTS & DISCUSSION

5.1 Introduction

This chapter summarizes and analyzes the respondents' statements regarding each of the five previously described attributes of innovations—relative advantage, compatibility, complexity, trialability, and observability. The farmers' responses are organized first according to the relevant attribute and second by the type of operation—produce, row crop, livestock, and dairy. Several cases in the study involve more than one type of production. For example, the operation in Case 1 produces both organic row crops and organic livestock. In these cases, the respondents' comments may pertain to multiple types of production. As such, comments made by a producer may appear in more than one of the four production categories.

It is important to distinguish between organic farming as a set of production practices and organic farming as a marketing tool. Some operations in the study had adhered to 'organic' practices on their farms before obtaining organic certification. In these cases, the organic farming practices are not new or innovative and, therefore, should not be considered under the framework of 'adoption of innovations'. However, the process of obtaining organic certification can be viewed as the adoption of a marketing and/or farm management innovation (record keeping and the possible use of new practices). Farmers evaluate the adoption of organic certification using the same general criteria as for other innovations. While organic farming practices may not have been innovative to all the respondents in the study, the adoption of organic marketing/certification has been innovative for each of the operations.

5.2 Summaries of Respondents' Statements

5.2.1 Relative Advantage

Relative advantage is the extent to which an innovation is perceived as being better than the existing or previous practice or technology. The concept of relative advantage can be segmented into several sub-criteria on which to evaluate an innovation. These include economic factors, status aspects, comfort and time issues, incentive payments, and the immediacy of reward. The interview questions dealing with the concept of relative advantage (outlined in Table 3) focused on these sub-criteria of the attribute. The following sections summarize the case study respondents' comments with regard to the relative advantage of organic farming. Summaries of the respondents' comments are primarily organized according to the cases' product sector(s).

5.2.1.1 Produce

Table 5 (next page) outlines some of the most relevant comments obtained from cases 2, 5 and 11 regarding the relative advantage of organic produce farming/certification. Statements in the chart represent outcomes and/or events that the cases have experienced as a result of obtaining organic certification.

Table 5: Relative Advantage of Organic Farming/Certification Among Organic Produce Farmers

| | Outcome/Event/Situation after Organic Certification | <u>Case 2</u> | <u>Case 5</u> | <u>Case 11</u> |
|---|---|---------------|---------------|----------------|
| <u>Economic Factors</u> | Ability to secure a premium price for products | Yes | Yes | Yes |
| | Profitability of farm increased | Yes | Yes | No |
| | Gained exposure to new markets | Yes | Yes | Yes |
| | Decrease in input costs | No | No | No |
| | Increase in yields | No | No | N/C |
| <u>Status Aspects</u> | Increase in credibility with buyers | Yes | Yes | No |
| | Other farmers' viewed producer more positively | No Change | No Change | No Change |
| <u>Comfort & Time Issues</u> | Decrease in the amount of time spent performing farming activities | No | No | No |
| | Increase in comfort level | No | No | No |
| <u>Incentive Payments</u> | Received organic certification cost-share assistance | Yes | Yes | Yes |
| <u>Immediacy of Reward</u> | Recuperated the cost of organic certification for each year of organic status | Yes | Yes | No |
| Note: N/C denotes that the producer(s) did not comment on the issue | | | | |

The organic produce growers described several advantages of organic production over conventional practices, the most common of which was the presence of price premiums for organic produce. While price premiums for organic produce could be as high as 300% for high-margin vegetable crops like tomatoes, growers reported that premiums vary widely based on species of vegetable or fruit and the physical location of the market. For example, the respondents from Case 5 stated that they typically receive a 25% price premium for their organic produce; however, they also stated that some of their market outlets (especially their wholesale buyers—local grocery stores) do not pay any premium for the organic status of their produce. Price premiums for organic produce are not assured, but are most obtainable in organic-only farmers markets, CSAs, and restaurants.

Another economic advantage of organic certification that was referenced by the organic produce farmers was the potential for increased profitability through the production of organically-labeled produce. While the producers cited that input costs are generally higher in organic production than conventional production, they also stated that the organic price premiums have the potential to offset the higher costs of organic production. The respondents from all three of the cases stated that organic farming has greater potential for profitability than conventional farming because of the high-value of certified organic crops. Case 11 was especially adamant about this characteristic of organic farming as the respondents from the case were beginning farmers who were attempting to produce enough income from organic farming to support themselves and re-pay a loan they received for the purchase of their farmland. Respondents from two of the three farms (Cases 2 & 5) indicated that the decision to obtain/maintain organic certification had been a good investment decision for their operations, meaning that each year the farms had recouped the cost of organic certification by generating enough increased revenue from farm sales to cover the extra costs of certification. However, the respondents from Case 11, who no longer possess organic certification, indicated that they never recouped their certification costs. The respondents from Case 11 attributed this fact to the small scale of their farm and their view of the relatively high cost of organic certification.

Respondents also commented on some of the negative economic aspects of organic farming. All three of the cases reported having some input costs that they believed would be reduced if they were conventional producers. Cases 2 and 5 emphasized the high costs of organic seed and fertilizers. Case 11 mentioned higher

organic seed costs relative to conventional seed cost, but also noted that some other costs that may be present on a conventional farm (like insecticide and herbicide costs) are not part of their farming operation. One of the respondents from Case 2 estimated that input costs on his farm are 50% higher than they would be on a conventional farm of similar size and scope.

Status aspects of obtaining organic certification appeared less important than economic considerations. Overall, these growers seemed mostly indifferent to the opinions of other farmers and other people in their social networks. The respondents from Case 2 noted that they had not noticed much if any change in the way their neighbors or other farmers viewed them. However, the Case 2 respondents did mention that many people have been curious about their farming and marketing practices. The main comment provided by Case 5 in terms of the status aspects of organic farming related to consumers' views of their farming operation. When asked about how customers view the organic status of their farm, one of the respondents said, "When customers are grateful for our organic status, we feel good about being certified—that is why we farm organically. It's not the money. I mean the money is fine, but we could make a lot more money if we were conventional market gardeners." The Case 5 respondents suggested that obtaining organic certification increased the producers' credibility with their buyers. Being able to refer to their farm's organic status has provided Case 5 respondents with some validation for asking higher prices for their products. The respondents from Case 11 mentioned that several of their family members have made comments that were unsupportive of their decision to pursue organic farming

as a career, but those comments did not discourage them from pursuing their objectives in organic farming.

Another aspect of relative advantage that case respondents were asked about was their outlook on the amount of time they spend farming and the level of physical comfort they experience in farming. Respondents from two of the three cases involved in organic produce farming stated that they felt that they spend more time and experience less comfort in organic farming than they would as conventional farmers. The respondents of Case 11 only mentioned a greater time requirement in organic farming—there was no mention of physical comfort for this case. All three cases suggested that they experience less comfort in organic farming because greater labor is required in organic produce farming than in conventional produce farming.

Incentive payments (in the form of certification cost-share assistance from the USDA) has been received by all three cases. However, the respondents suggested that receiving the cost-share money was not a pivotal factor in their decisions to obtain or maintain organic certification.

5.2.1.2 Row Crops

Table 6 (next page) outlines some of the most relevant comments obtained from cases 1, 3, 4, 9, and 10 regarding the relative advantage of organic row crop farming/certification. Statements in the chart represent outcomes and/or events that the cases have experienced as a result of converting to organic production and/or obtaining organic certification.

Table 6: Relative Advantage of Organic Farming/Certification Among Organic Row Crop Farmers

| | Outcome/Event/Situation after organic conversion | <u>Case 1</u> | <u>Case 3</u> | <u>Case 4</u> | <u>Case 9</u> | <u>Case 10</u> |
|---|---|---------------|---------------|----------------------|---------------|----------------|
| <u>Economic Factors</u> | Ability to secure a premium price for products | Yes | Yes | Yes | Yes | Yes |
| | Profitability of farm increased | Yes | Yes | Yes | Yes | Yes |
| | Decrease in input costs | Yes | No | No | No | No |
| | Ability to obtain financing did not change or increased | No | No | No | N/C | N/C |
| | Reduction in marketing uncertainty | No | N/C | No | N/C | N/C |
| | Increase in diversification of income sources | N/C | N/C | Yes | Yes | N/C |
| | Increase in yields | No | No | No | No | No |
| <u>Status Aspects</u> | Other farmers' viewed producer more positively | No | No | No | No | No |
| <u>Comfort & Time Issues</u> | Decrease in the amount of time spent performing farming activities | No | No | No | No | No |
| | Increase in comfort level | Yes | N/C | Yes | Yes | Yes |
| <u>Incentive Payments</u> | Received organic certification cost-share assistance | Yes | No | No | Yes | No |
| <u>Immediacy of Reward</u> | Recuperated the cost of organic certification for each year of organic status | Yes | Yes | No *6 of 7 yrs | Yes | Yes |
| Note: N/C denotes that the producer(s) did not comment on the issue | | | | | | |

Five cases included in the study raise organic row crops—cases 1, 3, 4, 9, and 10. Four of these five also raise livestock; however, only three of those operations have ever had their livestock certified as organic. Unlike the produce growers, all of the row crop farmers in the study had previous experience in conventional farming and four actually converted their operations from conventional to organic. The exception is Case 3; this farmer was raised on his parents' conventional row crop operation, but he started his current farming operation with the intention of obtaining organic certification.

Like the respondents from the produce farms, the respondents from the row crop farms expressed their views of both the advantages and disadvantages of organic versus

conventional row crop farming. The advantages most consistently mentioned by the row crop farmers were the price premiums for organic crops and the potential for greater profitability in organic farming. All five row crop farmers referred to price premiums at least 100% greater than conventional prices. Three mentioned that organic soybeans typically capture the highest price premium of any of the crops produced on their farms. Furthermore, because of the higher prices for their organic crops, all of the respondents suggested that organic row crop farming is more profitable than conventional row crop farming. Despite the presence of higher input costs, which was mentioned as a disadvantage by three of the five case respondents, the prices received by the organic row crop farmers have been more than enough to offset higher input costs and the situation common among the cases of relatively lower yields with organic versus conventional production. The case respondents mentioned that frequently the cause of lower yields on their organic farms versus conventional farms is due to weed pressure. The respondents said that weeds are more difficult to control in organic versus conventional production because of the lack of chemical controls for weeds in organic systems. Field cultivation is the primary method of weed control. According to several of the respondents, field conditions must be adequately dry to perform mechanical weed control in order to avoid soil compaction and other detrimental effects; therefore, during years when the weather does not permit field cultivation, weed control is especially difficult, which often has the effect of reducing yields.

The respondents also mentioned that yields in organic production are greatly influenced by the quality of land being farmed. The respondent from Case 3 described the comparison of conventional and organic yields this way—

“When we started out (in organic production), our yields were not comparable (to conventional yields), and that’s the downfall of a lot of organic producers too. They have their own minds set on cash flow at a 40 or 50 bushel bean yield, and it turns out being 20... not because they are bad farmers and not because organically they did something wrong... it’s just the soil produces certain yields. It varies dramatically on our good soils. I’d say on our good ground, we going to yield just as well as the conventional guys. Now our inputs will be quite a bit higher, but our yields will be very close. Now, on the poor ground, yeah... If I was comparing poor ground organic versus poor ground conventional, there’s more difference... just because you can’t make the soil much different. On poor ground there is probably a 25% yield drop. On good ground, maybe 5%, or if you do a bad job, maybe 10% yield drop, but that’s the most.”

Other disadvantages related to the economic factors of organic versus conventional production mentioned by the respondents included challenges in obtaining financing, greater uncertainty due to a lack of market and production information, and issues relating to the USDA’s commodity assistance programs. Three of the five cases involved in organic row crop production mentioned that they had had trouble in approaching agricultural lenders because of their organic status. The respondents from cases 1 and 3 said that agricultural lenders seem to be more uncomfortable in providing loans to organic producers. Case 4 said that he did not notify his banker when he converted to organic production because he was afraid that notifying his banker might have resulted in increased financial difficulty for his operation. In addition to struggles with financing, respondents from two of the five row crop cases mentioned greater uncertainty as a disadvantage to organic production. The respondents from cases 1 and 4 stated that because of a relative lack in organic price information, fewer buyers in the organic market, and less availability of organic production information, organic row crop production is more risky than conventional row crop production. Furthermore, one farmer (Case 1) expressed his disdain for the USDA’s commodity assistance programs.

The local USDA office informed him that he would not qualify for commodity assistance payments because he had planted a species of crop that was not covered under the commodities program.

Status may be an important issue for organic row crop production. Four farmers had experienced some teasing from other farmers regarding their organic practices. As such an ability to disregard or at least withstand negative comments may be an important trait of organic adopters. All five row crop farmers claimed they had little concern for other people's opinions of the way they farm. The respondent from Case 3 put it this way—

“Other farmers look at me as if I am crazy because I am different. If you're different, you're going to get some attention, and it's not all good. Organic farming is that way. Not all the attention you get is good. You get a lot of ridicule because of weeds in your field. If you value your neighbor's opinion more than your profitability, you don't survive. I'd say that's one of the most limiting factors about organic farming... is doing your own thing. I tease with people about the premium in organic production. I only have to be half as good as them, and I still make more money than they do. Weeds don't bother me at all, and, fortunately, I've got some land owners that rent ground to me at an extremely high price. They like the cash better than clean fields, so we all get along. Now if I tried to rent the ground for \$10 less than everyone else, then no one would play the game.”

In addition to economic factors and status aspects, comfort and time issues are also sub-criteria in evaluating relative advantage. The row crop case respondents all said that organic farming takes more time than conventional farming. They attributed the greater time requirement to the necessity of keeping more detailed records, completing more paperwork, and spending more time performing mechanical cultivation. Despite the greater time requirement, respondents from three of the five cases said they have experienced greater comfort as organic farmers than they did as conventional farmers.

The respondents who said they were more comfortable as organic farmers attributed their increased comfort to their enjoyment of doing field work; they said they feel like they are closer the production process than they were when they were conventional farmers. Two of these respondents also mentioned that they are more comfortable with organic farming because they do not have to worry about the environmental or health effects of using synthetic chemicals on their farms.

Two of the five row crop cases have received incentive payments (in the form of certification cost-share assistance). The respondents from the cases not receiving cost-share assistance had a variety of reasons for not applying for the money. The respondent from Case 3 suggested that it was not worth his time to apply for the cost-share. The respondent from Case 3 operates a large farming operation. He suggested that certification costs are a very small part of his expenses and that his benefit in applying for the cost-share money is relatively small. The respondent from Case 4 said that he had not applied for certification cost-share assistance because he does not want the government subsidizing organic agriculture in that manner. He said that the cost of organic certification is relatively small for his operation and that he would rather not take money from the government. The respondent from Case 10 had not received any cost-share assistance at the time of the interview because he had always been late in submitting his cost-share application to the state department of agriculture. The respondent from Case 10 indicated that he thought he had not received any cost-share money because he thought the state department of agriculture had run out of cost-share money, which the federal department of agriculture had allotted to it. Overall, the row crop case respondents suggested that certification costs were a relatively small expense on their

farms, and that certification cost-share assistance did not play a role in their decision to obtain/maintain organic certification. All the case respondents except one (from Case 4) have recouped the cost of certification through product sales every year that they have been producing organic crops—the respondent from Case 4 had recouped his certification cost in six of seven years that he had been raising organic row crops.

5.2.1.3 Livestock & Poultry

Table 7 (next page) outlines some of the most relevant comments obtained from cases 1, 7, 9, 10, and 11 regarding the relative advantage of organic livestock production. Statements in the chart represent outcomes and/or events that the cases have experienced as a result of converting to organic production and/or obtaining organic certification.

Table 7: Relative Advantage of Organic Farming/Certification Among Organic Livestock Farmers

| | <u>Outcome/Event/Situation after organic conversion</u> | <u>Case 1</u> Hogs & Cattle | <u>Case 7</u> Poultry-Meat | <u>Case 9</u> Cattle | <u>Case 10</u> Cattle | <u>Case 11</u> Poultry-Eggs |
|--|---|--------------------------------|-------------------------------|-------------------------|--------------------------|--------------------------------|
| <u>Economic Factors</u> | Ability to secure a premium price for products | Hogs – Yes Cattle – No | Yes | Yes | Yes | Yes |
| | Profitability of farm increased | Yes | No | No | No | No |
| | Decrease in input costs | N/C | No | No | No | No |
| | Reduction in marketing uncertainty | No | N/C | No | No | No |
| <u>Status Aspects</u> | Increase in credibility with buyers | N/C | Yes | N/C | N/C | N/C |
| | Other farmers' viewed producer more positively | No | No | No | No | No |
| <u>Comfort & Time Issues</u> | Decrease in the amount of time spent performing farming activities | No | No | No | No | No |
| | Increase in comfort level | Yes | Yes | No | Yes | N/C |
| <u>Incentive Payments</u> | Received organic certification cost-share assistance | Yes | No | Yes | No | Yes |
| <u>Immediacy of Reward</u> | Recuperated the cost of organic certification for each year of organic status | No (2 of 3 years) | No | No* | No* | No |
| <p>Note: N/C denotes that the producer(s) did not comment on the issue *Organic livestock production did not produce enough revenue to cover the cost of organic certification; however, the producer's certification costs were recuperated through organic grain sales.</p> | | | | | | |

Five operations either currently raise or have previously raised organic livestock and/or poultry. These cases include case numbers 1, 7, 9, 10 and 11. All five cases also produce(d) some other type of organic product. Cases 1, 9, and 10 obtain most of their farm revenues through the production of organic row crops. While his operation is no longer certified organic, the respondent from Case 7 produces milk as well as meat chickens (which had previously been certified organic). Like Case 7, Case 11 is no

longer certified organic, but when the operation was certified organic, the respondents from Case 11 were producing vegetable crops as well as organic eggs.

The cases included in the study as part of the livestock/poultry category are diverse with respect to the animal species produced on each farm. However, many of the comments from the respondents of these cases were similar. Overall, the comments from the respondents seem to express a lack of relative advantage in organic livestock and/or poultry production. The most notable disadvantage described by the producers was a lack of profitability. Producers mainly attributed the lack of profitability in organic livestock/poultry production to high input costs and a general lack in marketing opportunities. The producers cited expensive feed costs as one of the major contributors to high input costs in organic production. While some of the respondents from the cases (cases 1, 9 and 10) grow their own organic feed, their opportunity cost of using their crops to feed livestock was relatively high. These producers said they would have made more money selling their crops instead of using them for meat production. When asked about the advantages of organic beef production, one of the respondents from Case 9 said, “We were trying to fatten calves using our organic grain in a feed lot. What we ended up doing was cheapening our grain. I can’t really say there are many advantages in the livestock end.”

Respondents from four of the five cases included in this category stated that organic premiums were not able to offset the higher input costs associated with producing and marketing organic livestock and/or poultry products. Only one of the five case study respondents (the respondent from Case 1) indicated that he had recouped his cost of organic certification. The Case 1 respondent said he had recouped the cost of organic

certification for two of the three years that he has had certified organic livestock. The respondents from the other cases included in this category had either recouped their certification costs through organic row crop production (cases 9 and 10) or had dropped organic certification (cases 7 and 11).

With regard to status aspects, the organic respondents from cases 1, 7, 9, 10, and 11 made comments that were similar to both the produce and row crop cases described previously—some of the cases overlap in terms of farming category. The respondents' comments from cases 1, 9, and 10 have already been described in the previous section. Overall, the respondents from these cases say they have experienced some teasing (most of which had been associated with weeds in organic crop fields rather than livestock) but that they have not let other farmers' comments dissuade them from continuing as organic farmers. The respondent from Case 7 noted that having organic status gave him greater credibility with his customers when he initially got started in direct marketing his farm products. He also noted that once his customer base became fairly well-established, his customers no longer expressed concern about whether he possessed organic certification or not. The respondents from Case 11 stated that they had received some unsupportive comments from their family members.

The respondents' comments on comfort and time issues related to organic farming were similar among the five cases in this category. All the respondents mentioned that they spend more time doing farming and marketing activities because of their adoption of organic practices/certification. The producers attributed the time increase to greater paperwork and marketing coordination demands. The respondents from Case 9 also stated that the time required to produce organic beef is longer than the time required to

produce conventional beef. The Case 9 respondents claimed that it takes longer to raise an organic beef animal to finishing weight than it does a conventional beef animal because organic beef producers are not allowed to use growth hormones and other non-approved substances. The Case 9 respondents said that they often market their beef animals at 20 to 24 months of age whereas conventional beef producers would probably be able to market their animals at 16 to 18 months of age. In regard to comfort, some of the case respondents expressed that they were more comfortable using organic techniques and some expressed that their comfort level had not changed with organic conversion. The respondents from cases 1, 7, 10 said that their comfort levels improved with organic conversion. The respondents from these cases stated that their comfort level improved because of less exposure to synthetic chemicals that are traditionally used on conventional pastures. Also, the respondent from Case 1 mentioned that he is more comfortable working with his animals in a more “natural” way. The respondents from Case 9 suggested that their comfort level had not changed because of organic conversion. The respondents from Case 11 did not comment on a change in comfort.

5.2.1.4 Dairy

Table 8 (next page) outlines some of the most relevant comments obtained from cases 6, 7, and 8 regarding the relative advantage of organic milk production. Statements in the chart represent outcomes and/or events that the cases have experienced as a result of converting to organic production and/or obtaining organic certification.

Table 8: Relative Advantage of Organic Farming/Certification Among Organic Dairy Farmers

| | Outcome/Event/Situation after organic conversion | <u>Case 6</u> | <u>Case 7</u> | <u>Case 8</u> |
|--|---|---------------|---------------|---------------|
| <u>Economic Factors</u> | Ability to secure a premium price for products | No* | No* | No* |
| | Decrease in input costs | Yes | Yes | Yes |
| | Increase in milk production | No | No | No |
| <u>Status Aspects</u> | Other farmers' viewed producer more positively | No | No | No |
| <u>Comfort & Time Issues</u> | Decrease in the amount of time spent performing farming activities | No | No | No |
| | Increase in comfort level | Yes | Yes | Yes |
| <u>Incentive Payments</u> | Received organic certification cost-share assistance | No | No | No |
| <u>Immediacy of Reward</u> | Recuperated the cost of organic certification for each year of organic status | No | No | Yes |
| *Price premiums did exist when the producers entered the organic market; however, the premium for organic milk vanished soon after each producer became certified. | | | | |

Three operations in the study produce dairy products—cases 6, 7, and 8. Only Case 8 currently operates under organic certification. The other two cases, 6 & 7, discontinued organic certification in 2008 after having been certified organic for almost two years each. All three of the dairy operations are grass-based rather than grain-based.

All three of the case respondents from the dairy operations stated that they were originally attracted to organic production because of the potential for increased profitability. At the time that each of the producers was considering organic conversion of their milking herds, price premiums for organic milk were around 35%. However, soon after their operations became certified, the price premiums for organic milk vanished. The disappearance of the price premium for organic milk caused cases 6 and 7

to drop organic certification. However, both cases still use mostly organic farm management practices. Case 8 still possesses organic certification. However, the respondent from Case 8 is not presently selling his milk as organic. Because of hauling costs and a lack in marketing opportunities, the milk produced by Case 8 is sold as conventional milk to the same milk buyer who had previously been purchasing the respondent's organic milk.

At the time of the interviews, the respondents from all three of the dairy cases indicated that there was no current economic advantage of producing certified organic milk over conventional milk. However, the producers also indicated that using grass-based organic practices on their farms had decreased their overall input costs by reducing grain purchases and nearly eliminating veterinary bills. By using grass as a feedstock instead of grain, the respondents claim that their cost per pound of milk produced is less than if their operations used grain as a feedstock. The producers stated that although their milk production on a per cow basis is less than most conventional grain-based dairies, their costs of production on a per-pound-of milk-produced-basis are less than most conventional dairies'.

In addition to commenting on the economic factors affecting the relative advantage of organic dairying, the respondents also commented on the status aspects of being organic dairymen. The Case 6 respondent stated that he felt alienated because he was not able to purchase the inputs for his operation locally as an organic producer. Because organic production required him to purchase only organically approved feed and other inputs, the respondent had to stop buying from local agricultural retailers. Instead, the Case 6 respondent had to buy inputs from more distant retailers. The Case 6

respondent suggested that this lack of doing business locally hurt his relationships with the people of the local agricultural retail stores. The respondent from Case 7 stated that having the organic certification gave him credibility with his customers. The Case 7 respondent said that having the organic certification was important in establishing relationships with his customers. However, the respondent from Case 7 also stated that after his customer-base had become fairly well-established, his customers no longer showed concern over his organic status. The respondents from all three of the dairy cases indicated that they had not experienced any ridicule from other farmers nor did they feel that other farmers changed their views of them because they had converted to organic production.

In terms of time and comfort issues associated with organic conversion, all three case respondents indicated that their conversion to organic dairying increased the amount of time they spent doing paperwork. The respondent from Case 6 also indicated that organic conversion increased the amount of time he spent trying to procure inputs for his operation (e.g. organic feed). The Case 6 farmer said,

“There is more time involved in organic dairying. There’s a lot more time spent on the phone trying to find organic feeds. That was frustrating. In my mind, the worst thing was all the paper work. You had to keep record of almost every step you made on the farm... every place the cows went... every paddock... had to keep record of every calf and report everything that happened to it. It was difficult to buy grain because you had to have written verification that the truck had been cleaned out before it was loaded with organic grain. You couldn’t even bail hay without having your equipment cleaned, and then you had to prove that it was clean... you had to show the paperwork that it was clean.”

In terms of comfort, all three case respondents indicated an increase in their level of comfort with the conversion to an organic, grass-based system of production. The producers attributed their increase level of comfort to the feelings of satisfaction they get

from producing what they say is a healthier product. The respondents from cases 6 and 8 also mentioned that they are more satisfied with organic versus conventional production because they see greater biological activity on their farms. Furthermore, the respondents from cases 6 and 7 said that they feel more relaxed using organic grass-based practices rather than conventional practices.

None of the dairy producers included in the study have received financial incentives for organic conversion/certification. Cost-share assistance was not obtained by any of the producers because none of them applied for it.

5.2.1.5 Summary & Discussion of Relative Advantage

Table 9 (next page) summarizes the differences observed in relative advantage among the differing product sectors.

Table 9: Summary of Relative Advantage

| | Outcome/Event/Situation after organic conversion | Produce | Row Crop | Livestock / Poultry | Dairy |
|---|---|----------------|-----------------|----------------------------|--------------|
| <u>Economic Factors</u> | Ability to secure a premium price for products | Y | Y | Y/N 4/1 | Y/N* |
| | Profitability of farm increased | Y/N 2/1 | Y | Y/N 4/1 | Y/N* |
| | Decrease in input costs | N | Y/N 1/4 | N | Y |
| | Increase in production | N | N | N | N |
| <u>Status Aspects</u> | Other farmers' viewed producer more positively | N | N | N | N |
| | Increase in credibility with buyers | Y | N | Y | N |
| <u>Comfort & Time Issues</u> | Decrease in the amount of time spent performing farming activities | N | N | N | N |
| | Increase in comfort level | N | Y | Y | Y |
| <u>Incentive Payments</u> | Received organic certification cost-share assistance | Y | Yes/No 2/3 | Y/N 3/2 | N |
| <u>Immediacy of Reward</u> | Recuperated the cost of organic certification for each year of organic status | Y | Y/N 4/1 | N | N |
| <p>Note: "Y" indicates "Yes" or an affirmative response from the producers; "N" indicates "No" or a negative response from the producers *Dairy respondents indicated that price premiums and the profitability of their farms changed over time.—See section 5.2.1.4 for further details.</p> | | | | | |

Producers' views of the relative advantage of organic farming varied across farming sectors. Row crop farmers described the economic advantages of organic production most positively among the groups of farmers. The row crop farmers suggested that they have been able to consistently market their crops for premium prices (often double the conventional price), which has had the effect of increasing the profitability of each of their farms. While the row crop farmers suggested that input costs are higher in organic systems, they said that the price premiums have been more than enough to offset higher expenses. The produce farmers also described economic

advantages to organic farming, citing that organic price premiums can range from 25% to 300% depending on the type of vegetable and market characteristics. However, the produce farmers suggested that markets offering premium prices are scarce and that a price premium is not guaranteed. In general, the produce growers said that while organic production has higher input costs than conventional production, it has increased the profitability of their farms because of their abilities to secure organic price premiums. Livestock and poultry farmers suggested that organic markets for meat and poultry products are scarce and that input costs, especially for feed, take much of the profitability out of organic production. While the producers described being able to secure organic premiums, they said profitability in organic production is lacking due to high input costs and few marketing opportunities. The lack of development in the organic livestock market could potentially be due to the relative immaturity of the organic meat market. The USDA established organic standards for livestock production later than the standards for the other product sectors (ERS-USDA, 2008). The late establishment of livestock standards could be a reason for producers' inability to secure adequate marketing opportunities because there has not yet been enough time for buyers to respond to the availability of new organic meat products coming into the food system. Producers from the dairy sector suggested that the profitability of their operations initially improved with the adoption of organic management. The dairy producers cited price premiums and reductions in input costs as the main reason for improvements in profitability early on in their organic production experiences. However, the dairymen said that the price premium for organic milk evaporated within two years of their initial certification, causing two of the producers to drop organic certification altogether.

The differences in economic advantages described by the producers coincide with the findings from Darnhofer et al (2005) and Midmore et al (2001). Both studies—Darnhofer from Austria and Midmore from England—found that financial opportunities in organic production varied according to the types of products produced on farms. Like Darnhofer et al (2005) and Midmore et al (2001), the findings from this study suggest that the potential for profitability in organic production may be more or less favorable in some production sectors than others. Like the studies from Austria and England, this study suggests that the differences in the economic advantages among the product categories arise from disparities in production costs, premiums, and marketing opportunities.

No group of farmers described any social advantages to organic conversion. Most farmers said that their status as “organic” had little effect on the way other farmers viewed them. However, some of the row crop farmers did say that they had experienced some teasing because of their organic conversion. These farmers mostly referred to the presence of weeds in their fields as the basis of the teasing. The row crop farmers’ experiences with teasing are consistent with findings from Lockeretz & Madden (1987). The study from the Midwestern United States found that farmers using organic practices often experienced some ridicule from non-organic farmers. Other farmers included in this case study, especially from the livestock and dairy sectors, may not have experienced teasing from other farmers because of the relatively low visibility of their organic status. While obtaining organic status may not have been a social advantage among their farming peers, some farmers found that having organic certification improved their perceived credibility, particularly with customers. The produce and livestock farmers,

who said that having organic certification increased their credibility with their customers, engaged in direct marketing to consumers. The farmers' marketing avenue—direct selling, probably had more to do with the increase in credibility than did the farmers' production category. Of the farmers included in the study, produce and livestock farmers seemed more likely to engage in direct marketing than row crop and dairy producers. The scales of these producers' operations were generally smaller than the scales of the row crop and dairy farmers' operations. The relatively smaller sizes of the farmers' operations seemed to correlate with their involvement in direct marketing. This correlation may have been due to the small producers need or desire to capture higher margins from sales of less total farm products as compared to the larger farmers who likely captured smaller margins on a greater amount of total farm production.

Farmers from all of the production categories said that organic farming is more time consuming than conventional farming. Producers from the produce and row crop sectors attributed the increase in time to both increased requirements in record keeping and pest management. Producers from the livestock/poultry and dairy sectors mainly referred to record keeping as the source of a greater time requirement.

Generally, farmers from the row crop, livestock/poultry, and dairy categories said they were more comfortable (physical comfort) using organic practices than conventional practices. Produce farmers, however, said they would probably be more comfortable using conventional practices than organic practices. The produce farmers emphasized that organic produce farm management is extremely labor intensive and that conventional growers have many more options in terms of chemicals to reduce farm labor requirements.

Some farmers in the produce, row crop, and livestock farming sectors utilized cost-share assistance for organic certification. None of the dairy producers applied for cost-share money. All three farms from the produce category received cost-share assistance. Farm size and farmers' individual perceptions of government involvement in agriculture seem to be more important factors than production category in influencing farmers' decisions to apply for cost-share. The farmers' comments suggested that larger farms can spread their certification costs over more units of production; therefore, certification costs are relatively less expensive for larger farms. Certification costs for small farms, however, seem to add substantial cost according to the case respondents' comments. Some producers also expressed dissatisfaction with government involvement in agriculture and said that they did not apply for certification cost-share assistance because of their feelings toward government involvement.

5.2.2 Compatibility

Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. The interview questions dealing with the concept of compatibility (outlined in Table 3) focused on the case respondents' values, previous farming experience, and needs. The following sections summarize the case study respondents' comments with regard to compatibility. Summaries of the respondents' comments are organized according to the cases' product sector(s).

5.2.2.1 Produce

Table 10 below presents a summary of the produce farmers’ views on the compatibility of organic production.

Table 10: Produce Farmers’ Views on the Compatibility of Organic Production

| | | <u>Case 2</u> | <u>Case 5</u> | <u>Case 11</u> | |
|---------------|--------------------------------|---|---------------|----------------|-----|
| Compatibility | Values Identified by Producers | Health | Yes | Yes | Yes |
| | | Environmental Welfare | Yes | Yes | Yes |
| | | Food safety | Yes | N/C | N/C |
| | | Profitability | Yes | Yes | Yes |
| | | Reduction in off-farm inputs | Yes | Yes | Yes |
| | Previous Experiences | At least one of the operators had some farming experience | Yes | Yes | Yes |
| | Needs Identified by Producers | Respondent mentioned the need for a challenge | No | Yes | No |

The respondents from the produce cases described several common areas of compatibility with regard to organic farming practices and organic certification. In terms of existing values, respondents from all three cases identified health and environmental concerns as two of their most important considerations in choosing to use organic farming methods. Furthermore, all of the respondents mentioned that organic farming is compatible with their values for low-input food production—i.e. production that uses a minimal amount of inputs coming from off-farm sources. The respondents from Case 2 also emphasized their views of the relationship between food safety, ethics, and organic production—

“We get asked, ‘Why organic?’ all the time. For me, it’s the right thing to do. It’s a real simple answer. It’s the right thing to do. If you’re selling food or giving food away, it should be as secure as you can make it. There shouldn’t be any poison with it. If you spray it with something to kill bugs and it sticks to the product... I don’t know what’s going to happen in 20 years. Does anybody? I wouldn’t want to be responsible for feeding some little kid an insecticide, and I certainly don’t want to eat it. I just think it’s the right thing to do, and I always have.”—Case 2 Respondent

In addition to health, environmental welfare, and food safety, the case respondents also expressed their views of the profitability of organic farming. The farmers’ comments suggest that profitability is a secondary consideration compared to the farmers’ other values for health, the environment and food safety. While all of the respondents emphasized the importance of profitability for the sustainability of their farms, they stated that their choice of using organic production practices over conventional production practices transcends a comparison of the profitability of the two systems. However, the respondents did emphasize that the pursuit of increased farm profitability was a major consideration in obtaining organic certification. The respondents from all of the cases indicated that the only reason they obtained organic certification was to gain a marketing advantage.

Producers’ previous experiences are also important in considering the compatibility of organic farming. At least one of the farm operators from each of the produce cases (2, 5, & 11) had had experience in working on and/or operating a farming operation before starting in organic production. Although the experiences described by the respondents were not directly related to organic produce farming, the respondents’ indicated that having some farming experience was helpful in their transition to organic produce farming.

Compatibility with potential adopters’ needs is also an important consideration in adoption. Only one of the respondents expressed a way in which organic farming addressed his needs. A Case 5 respondent said that he enjoyed the challenges of being an organic farmer, suggesting that conventional production did not meet his need for a challenge.

5.2.2.2 Row Crops

Table 11 below presents a summary of the row crop farmers’ views on the compatibility of organic production.

Table 11: Row Crop Farmers’ Views on the Compatibility of Organic Production

| | | | Case 1 | Case 3 | Case 4 | Case 9 | Case 10 |
|---|--------------------------------|--|---------------|---------------|---------------|---------------|----------------|
| Compatibility | Values Identified by Producers | Health | No | Yes | N/C | Yes | Yes |
| | | Land Ethics | Yes | N/C | Yes | Yes | N/C |
| | | Profitability | Yes | Yes | Yes | Yes | Yes |
| | Previous Experiences | Producer had some experience using organic practices before conversion | Yes | Yes | Yes | Yes | Yes |
| Note: N/C denotes that the producer(s) did not comment on the issue | | | | | | | |

Row crop respondents mainly cited their values for profitability, health, and ethical land management as compatible with their status as organic producers. Each emphasized that their pursuit of greater profitability was their biggest motivation in choosing to adopt organic production. When asked about how his values relate to organic farming, the respondent from Case 3 said, “It’s not a religion with me. I farm the way I do for the same reasons most other farmers do—to make money. I’m doing it for the income.” Respondents from three of the five cases (cases 3, 4, and 9) indicated that if

conventional row crop production were more profitable than organic production, they would not farm organically. The respondents from cases 1 and 10, however, suggested that even if organic production were not more profitable than conventional production, they would continue using organic farming methods. While the respondents from cases 1 and 10 said they were originally attracted to organic farming because of its potential for increasing their profitability, they also said that the principles of organic farming (holistic management, soil regeneration, etc.) had become more important to them over time and that profits were no longer their primary motive in choosing to farm organically.

In addition to their values for profitability, respondents from three of the five cases (cases 3, 9, and 10) emphasized the compatibility of organic production with their values for a healthy working environment. In particular, they value the minimal synthetic chemical intensiveness of organic production systems and suggested that they have experienced less exposure to harmful chemicals than they would if farming conventionally.

Farmers from three of the five cases (cases 1, 4, and 9) also stated that organic farming is compatible with their values for ethical land management. They felt that organic land management is generally better at improving soil health than conventional production. The farmers said that part of the reason they choose to farm organically is because they want to maintain and/or improve the soil on their farms for future generations.

In addition to describing the compatibility between their values and organic production, the respondents from the row crop cases also described the compatibility between their previous experiences and organic production. The respondents from all of

the cases had had working experience on conventional row crop farms before they converted to organic production. Some of the skills they learned as conventional farmers (tractor operation, field cultivation, equipment maintenance, etc.) were easily transferable to their careers in organic farming.

5.2.2.3 Livestock & Poultry

Table 12 below presents a summary of the livestock/poultry farmers' views on the compatibility of organic production.

Table 12: Livestock/Poultry Farmers' Views on the Compatibility of Organic Production

| | | | Case 1 | Case 7 | Case 9 | Case 10 | Case 11 |
|---------------|--------------------------------|-------------------------------------|---------------|---------------|---------------|----------------|----------------|
| Compatibility | Values Identified by Producers | Profitability | Yes | Yes | Yes | Yes | Yes |
| | | Animal welfare | Yes | Yes | No | Yes | Yes |
| | | Production of high quality products | No | Yes | No | Yes | Yes |
| | | Minimal input use | No | Yes | No | Yes | No |
| | Previous Experiences | Raised conventional livestock | Yes | Yes | Yes | Yes | No |

The respondents from the five livestock/poultry cases identified multiple aspects of organic farming that are compatible with their values and previous experiences. In terms of compatibility with needs, however, the producers provided no comments. Values mentioned by the farmers as compatible with organic farming included the farmers' values for profitability (all five cases), animal welfare (four cases), quality (three cases), and minimal input use (two cases). The respondents from all five of the cases referred to the compatibility of organic farming with their value for profitability. Each of

the respondents said that one of the major reasons he/she chose to pursue organic production was because of the potential for greater profitability through organic marketing. Three of the cases (cases 7, 10, and 11) no longer possess organic certification because they were not able to increase their profitability through organic certification. The operations that had dropped certification, however, were still using organic farming methods with their livestock/poultry at the time of the interviews because of the operators' other values for animal welfare and high quality production.

In terms of the producers' previous experiences, many of the respondents described using livestock production methods that were similar to the organic production methods used during their careers as conventional farmers. Respondents from four of the five cases explained that they had practiced production methods that were similar to the organic production standards before the USDA established official organic standards. The respondents from these four cases noted that several aspects of their previous livestock production experiences were compatible with the USDA's organic production standards.

5.2.2.4 Dairy

Table 13 (next page) presents a summary of the dairy farmers' views on the compatibility of organic production.

Table 13: Dairy Farmers’ Views on the Compatibility of Organic Production

| | | | Case 6 | Case 7 | Case 8 |
|---------------|--------------------------------|-------------------------------------|---------------|---------------|---------------|
| Compatibility | Values Identified by Producers | Profitability | Yes | Yes | Yes |
| | | Animal welfare | Yes | Yes | Yes |
| | | Production of high quality products | Yes | Yes | Yes |
| | | Minimal exposure to chemicals | Yes | Yes | Yes |
| | | Low-input production | Yes | Yes | Yes |
| | | Natural processes | Yes | Yes | Yes |
| | | Sustainability | Yes | Yes | Yes |
| | Previous Experiences | Dairy operations (grain based) | Yes | Yes | No |
| | | Grazing management | No | No | Yes |

The respondents from the three dairy cases included in the study described many similar values in relation to the compatibility of organic production. The respondents from all three of the cases identified their values for profitability, animal welfare, high quality products, minimal use of chemicals, and natural processes as compatible with organic production. The farmers also mentioned values for low-input production and sustainability as compatible with organic production. It is interesting to note that while the respondents from all three of the cases referred to the compatibility of organic farming with their value for profitability, only one of the cases possessed organic certification at the time of the interview. Furthermore, none of the respondents was marketing milk as “organic” at the time of the interviews because of an absence of an organic premium. Even so, the producers interviewed said that organic grass-based production is compatible with their values for profitability because the production system has very low input costs, which has had the effect of increasing the gap between their expenses and farm revenue.

The respondents from the dairy cases also described how some of their previous experiences were compatible with organic production. The respondents from cases 6 and 7 stated that their experiences in working on conventional grain-based dairies had helped them understand the basics of milk production and dairy management. However, these producers also noted many differences between conventional grain-based dairy management and organic grass-based dairy management. The respondent from Case 8 had had some experience in managing grazing livestock; however, before his conversion to organic, he had had little experience in milk production.

5.2.2.5 Summary & Discussion of Compatibility

Table 14 below summarizes the differences observed in producers' views of compatibility among the differing product sectors.

Table 14: Summary of Compatibility

| | <u>Produce</u> | <u>Row Crop</u> | <u>Livestock / Poultry</u> | <u>Dairy</u> |
|--|--|-----------------------------------|---|---|
| Values identified by producers | Health; Environment; Food safety; Profitability; Minimal input use | Profitability; Health; Land ethic | Animal welfare; Profitability; Quality; Minimal input use | Profitability; Animal welfare; Quality; Health; Minimal input use; Sustainability |
| Producers had some farming experience before organic conversion | No | Yes | Yes | Yes |
| Producers had some experience with organic farming methods before conversion | No | Yes | No | No |

Farmers from the different production categories identified several similar values as being compatible with organic production. However, each category of farmers emphasized their values in different ways. While the farmers from all of the production categories said they were motivated to engage in organic production because of its potential to increase the profitability of their farms, their value for profitability varied across production categories. For example, both the produce and row crop farmers said that they value the profitability of organic production. However, most of the row crop farmers said that if conventional production were more profitable than organic, they would convert back to conventional production. The produce farmers, in contrast, said that they would continue organic production on their farms even if conventional production were more profitable. The produce growers said that profitability was important to sustain their farms, but it was not their main reason for choosing to farm organically. Instead of profitability, the produce growers cited health and environmental concerns as their main motives in choosing to farm organically. One potential factor that may influence the differing values among the produce and row crop farmers could be that the products produced by the two groups of farmers are generally used in different ways. That is, consumers generally consume produce in an un-processed form. Whereas row crops are generally an input for the production of another food—milk, meat, and/or eggs—or processed to make a value-added food product—bread, soymilk, granola. The way in which the two groups prioritize their values may be influenced by how the product is used after it leaves their farms. Because produce is typically consumed directly, produce farmers may value the health aspects of organic production over profitability; whereas, because row crops are generally not consumed directly, row crop

farmers' may not view a strong connection between their product and consumers' health and, instead, value profitability as their top priority.

Like the produce and row crop farmers, the livestock/poultry and dairy producers said they chose to engage in organic production for its potential to increase farm profitability. However, many of these farmers have discontinued organic certification because they found certification was not profitable for their farms. All the livestock/poultry and dairy producers who dropped organic certification, however, still manage their farms using organic methods. It is evident that these producers value organic production for reasons other than profitability. Common values identified by the livestock/poultry and dairy farmers were animal welfare and product quality. Most of the livestock/poultry and all the dairy producers said that organic production is better for animal welfare and results in higher quality food products than conventional production.

Overall, the stated values of the farmers in this study are consistent with previous literature concerning farmers' values and motives in choosing to farm organically. Farmers' values and motives for organic farming—such as profitability, environmental welfare, health concerns, and animal welfare—have been identified in the following previous studies: Fairweather (1999), Kaltoft (1999), Midmore et al (2001), Tress (2001), Howlett et al (2002), Lauwere et al (2004), Darnhofer et al (2005), and Koesling et al 2009.

In addition to the farmers' values, the farmers' previous experiences also contributed to their views of the compatibility of organic farming. In general, all the groups of farmers, except the produce growers, had some experience in using farming practices that are compatible with organic management. The previous experiences

described by the farmers as compatible with organic production included planting, cultivation, harvesting, animal handling, and pasture management. In general, the produce growers included in the study had little or no experience in farming before starting their organic farming careers. Many of the respondents from the produce farms were second career farmers, while all the farmers included in the other farming categories had been raised on farms that produced similar products to those that the farms are now producing.

5.2.3 Complexity

The **complexity** of an innovation generally refers to the degree of difficulty that adopters find in using and/or understanding the innovation. The interview questions dealing with the attribute of complexity (outlined in Table 3) focused on the case respondents' views regarding their own understanding of organic farming practices, the availability of organic production information, and the difficulties of organic production/certification. The following sections summarize the case respondents' comments with regard to the complexity of organic farming. Summaries of the respondents' comments are organized according to the cases' product sector(s).

5.2.3.1 Produce

Table 15 (next page) summarizes the produce farmers' views of the complexity of organic production.

Table 15: Organic Produce Farmers' Views of the Complexity of Organic Production

| | | Case 2 | Case 5 | Case 11 |
|---|--|---------------|---------------|----------------|
| Producers' Understanding and Use of Organic Methods | Producers expressed confidence in their knowledge of organic methods | Yes | Yes | Yes |
| | Producers expressed confidence in their use of organic methods | Yes | No | No |
| Availability of Information | Producers stated that production information is readily available | Yes | Yes | Yes |
| Difficulties Identified | Pest management | Yes | Yes | No |
| | Organic seed procurement | Yes | Yes | No |
| | Record keeping | Yes | Yes | Yes |
| | Educating buyers | Yes | No | Yes |
| | Soil fertility | No | Yes | No |

The produce farmers described the complexities of organic farming in similar ways. The respondents from all three cases expressed confidence in their knowledge of organic farming practices and the certification standards. However, only the farmers from Case 2 expressed confidence in using organic methods in farm management. While the farmers from cases 5 and 11 said that they possessed a good deal of knowledge about organic farming, they suggested that it had been difficult for them to put their knowledge into practice as farm managers. It is important to note that the growers from Case 2 had been using organic farming methods since the early 1980s while the growers from cases 5 and 11 started farming organically in the 2000s. The growers from Case 2 may be more confident than the growers from cases 5 and 11 because they have more experience as organic farm managers.

The respondents from all of the cases suggested that production information regarding organic vegetable production is readily available. The farmers emphasized that books and the Internet had been major information sources for them during their organic farming careers. Other areas of complexity described by the produce respondents

included organic pest management, organic seed procurement, record keeping, educating buyers, and soil fertility management. The growers from cases 2 and 5 identified organic pest management as a major struggle. These farmers stated that dealing with pests in organic systems is especially difficult because there are few effective organic pest management products available. The respondents from cases 2 and 5 also described organic seed procurement as a complex activity. The respondents from these cases plant well over 100 different varieties of seed. Finding an organic seed source for all of their desired varieties has been difficult. All respondents described record keeping as a complex activity. The growers emphasized that keeping detailed records on organic produce farms is especially difficult because of the diversity of crops grown on produce farms. The growers also noted that keeping track of crop yields is a struggle because it is difficult to monitor the quantity of produce coming from a single plant or acre of ground. This difficulty arises from the perishable characteristics of the crops and the harvesting methods used—mainly hand methods. One of the respondents from Case 5 had this to say about the complexities of his certifier’s record requirements—

“They write it up so that it fits the conventional row-crop guys. They want us to take a seed and track it all the way through and tell them how many pounds of tomatoes came from that one seed. You know, it’s impossible for us to do that. When we pick, we pick from lots of plants. It’s not like I’m in a combine with a yield monitor, and I’m loading into trucks. I don’t have scale tickets from the elevator. It’s a lot harder for us to track this stuff. To me, it’s kind of irrational. They need to re-do that. They’ve always pressed us for production data, but, honestly, we just don’t have the time to do it.”

5.2.3.2 Row Crops

Table 16 (next page) summarizes the row crop farmers’ views of the complexity of organic production.

Table 16: Organic Row Crop Farmers' Views of the Complexity of Organic Production

| | | Case 1 | Case 3 | Case 4 | Case 9 | Case 10 |
|---|---|--------|--------|--------|--------|---------|
| Producers' Understanding and Use of Organic Methods | Producer expressed confidence in his knowledge of organic methods | Yes | Yes | No | Yes | Yes |
| | Producers expressed confidence in his use of organic methods | Yes | Yes | No | Yes | Yes |
| Availability of Information | Producer stated that production information is readily available | No | Yes | Yes | Yes | Yes |
| Difficulties Identified | Pest management | Yes | Yes | Yes | Yes | Yes |
| | Organic seed procurement | No | No | No | No | No |
| | Record keeping | Yes | Yes | No | No | No |
| | Educating buyers | No | No | No | No | No |
| | Soil fertility | No | Yes | Yes | No | Yes |
| | Wet field conditions | Yes | Yes | Yes | Yes | Yes |
| | Marketing | Yes | No | Yes | No | No |
| Harvesting equipment cleanliness | No | No | Yes | Yes | No | |

The row crop farmers described the complexities of organic farming in similar ways. Four of the five farmers stated that they were confident in both their understanding and use of organic farming methods. The farmer from Case 4 did not overtly express confidence in his knowledge or skills as an organic farmer. This producer had not had as many years of experience as many of the other organic row crop farmers included in the study. His lack of experience could be a contributing factor to his lack of confidence. The Case 4 farmer was also the only part-time organic farmer interviewed, which may also contribute to his lack of experience and confidence.

Four of the row crop farmers said that organic production information is readily available. The main information sources referred to by the farmers were the internet and other organic farmers. The farmer from Case 1 suggested that production information is

not readily available. His main source of production information has been other farmers whom he contacts via telephone. The Case 1 farmer was the only row crop farmer who did not have home access to the internet. His lack of internet access may have contributed to his views on the availability of production information.

The row crop farmers identified several areas of difficulty that have contributed to their views on the complexity of organic farming. All five farmers described pest management and wet field conditions as major complexities for their operations. The farmers said that weeds are the most prevalent pest on their farms and that they are often difficult to control because of wet field conditions. Wet field conditions do not permit the use of mechanical cultivation, which is the main method of weed control in organic row crop farming. Because the row crop farmers use relatively large equipment in their fields (as compared to the organic produce farmers), wet field conditions are especially problematic.

Harvesting equipment cleanliness was another area of complexity described by two of the farmers (cases 4 & 9). Early in their organic farming careers, these two farmers had trouble with leasing combines that were contaminated with harvest residues from genetically modified field crops. Under the national organic standards all equipment used to harvest organic crops must be thoroughly cleaned to ensure no cross contamination with conventional products. The producers said that cleaning a combine is a difficult and time-consuming activity that added complexity to organic farming. Both farmers eventually purchased their own combines later in their organic farming careers to minimize the complexities of harvesting organic row crops. The purchase of a combine was a big investment for each farmer, especially the farmer from Case 4 as he farms a

relatively small number of acres. The harvesting equipment predicament described by the two farmers suggests that there may be some advantages to scale in organic row crop farming.

Two of the farmers identified record keeping as a source of complexity in organic farming. These producers noted that keeping track of all field operations was a struggle for them. The other three farmers, however, did not identify record keeping as a major complexity. They noted that record keeping takes a significant amount of time on an organic farm, but that it had not added complexity to their operations.

Soil fertility management was also described as a complexity of organic farming. Three farmers said that procuring and applying organic fertilizers has been difficult on their farms due to the expense and logistical considerations of handling the fertilizers. Furthermore, obtaining an organic fertilizer with the desired nutrient analysis had been difficult for these farmers.

The farmers from cases 1 and 4 stated that marketing is one of the greatest complexities of organic farming. The farmer from Case 1 indicated that finding a reputable buyer for organic row crops is difficult—“Marketing is a major hurdle, really, to getting organic to work—getting to know all the buyers and stuff. Who’s honest. There are a lot of crooked people out there.” The Case 1 respondent noted that he had had several bad experiences with buyers who did not uphold the conditions described in marketing contracts. The farmer from Case 4 emphasized a lack in price information as a major struggle in marketing his crops. He said that the only way he had been able to obtain pricing information was to call several buyers and obtain price quotes. The producer described his method obtaining pricing information as more complex than he

would like. Because of the intensive use of contract selling in organic row crop production, all the row crop producers emphasized the importance of having on-farm storage for their crops. Having on-farm storage gives the producers time to find buyers and generate contracts for their crops without having to rent off-farm storage space. The producers noted that without on-farm storage, marketing organic row crops would be more difficult and less profitable.

Unlike the organic produce growers, the organic row crop farmers did not cite organic seed procurement or educating buyers as major complexities of organic farming. This is probably because row crop farmers grow fewer plant species on their farms. The row crop farmers described growing four or five species of crops on their farms while the produce growers described growing at least 10 different species and hundreds of different varieties on their farms. The produce farmers also described complexity in educating buyers whereas the row crop farmers did not. Many of the produce growers engaged in direct selling to consumers while the row crop farmers described selling their products to organic processors and/or livestock/dairy producers. While consumers may be uninformed about the characteristics of organic vegetables and be more indecisive about buying organic over conventional produce, large-scale grain buyers are likely to have knowledge about organic production and be decisive about buying organic grains. Because of the differences in their marketing arrangements, the produce growers have to provide greater amounts of information to their buyers than do row crop producers.

5.2.3.3 Livestock & Poultry

Table 17 below summarizes the livestock/poultry farmers' views of the complexity of organic production.

Table 17: Organic Livestock/Poultry Farmers' Views of the Complexity of Organic Production

| | | <u>Case 1</u> Hogs & Cattle | <u>Case 7</u> Poultry-Meat | <u>Case 9</u> Cattle | <u>Case 10</u> Cattle | <u>Case 11</u> Poultry-Eggs |
|---|---|--------------------------------|-------------------------------|-------------------------|--------------------------|--------------------------------|
| Producers' Understanding and Use of Organic Methods | Producer(s) expressed confidence in knowledge of organic methods | Yes | No | Yes | Yes | No |
| | Producer(s) expressed confidence in use of organic methods | Yes | No | Yes | Yes | No |
| Availability of Information | Producer(s) stated that production information is readily available | No | No | No | Yes | No |
| Difficulties Identified | Record keeping | No | Yes | No | Yes | No |
| | Finding organic approved inputs (feed, medications, mineral) | No | Yes | Yes | Yes | Yes |
| | Meat processing regulations | No | Yes | No | No | No |
| | Educating buyers | No | No | Yes | No | Yes |
| | Marketing | Yes | Yes | Yes | Yes | Yes |

The livestock/poultry farmers described several areas of complexity in organic farming. The farmers from all five cases described marketing as a complex activity. All the farmers have engaged in direct marketing of their meat/poultry products. The farmers with cattle said that direct marketing their animals is difficult because consumers are generally unfamiliar with buying a whole or half beef carcass, which is the standard way a small-scale butcher sells custom-processed animals. In addition, restaurant buyers of

organic beef were described as being especially selective about the types and styles of beef cuts, which has made dealing with restaurant buyers especially difficult. One of the respondents from Case 9 had this to say about direct marketing organic beef—

“We tried selling to restaurants. Well, every chef wants everything cut differently. One chef might want all Kansas City Strips while the next one wants New York Strips. No one wants the roasts. So what do you do with the roasts? The logistics becomes a nightmare. For the chicken side, turkeys, and pork, there’s not near as many pounds of different cuts. A chicken is a chicken. You’ve got breasts and legs, and that’s it. With a cow, you’ve got all sorts of different cuts. You are also talking a lot more dollars for just one animal. There’s a lot of tricks and a lot of trial-and-error on feeding cattle. We always tell everyone that it’s kind of like farming with your hands tied behind your back. It’s a real challenge.”

The farmers who do not raise beef, said that their most complex challenges in marketing arise from an absence of buyers who are willing to pay a premium price for their products. Overall, the producers suggested that the markets for organic livestock and poultry products are relatively less developed than for other organic products like milk and produce.

Livestock/poultry producers also described the complexity of finding organic approved inputs. The farmers from cases 7, 9, 10, and 11 stated that they have had difficulty in procuring organic feed, medications, and/or mineral supplements for their animals. The farmers who raise hogs and/or cattle did not mention a problem with finding organic feed as they grow most of their own feed themselves. However, the poultry producers (cases 7 and 11) bought organic feed instead of growing their own. These producers said that finding a reliable source of organic feed was a difficult task.

The farmers from cases 9 and 11 said that educating buyers has been a source of complexity for their operations. The farmers from these cases suggested that they have

spent a lot of time with their customers informing them of the benefits of organic meat/poultry products and justifying the prices for their products.

The farmer from Case 7 who had produced organic frying chickens in the past said that local health department regulations were a source of complexity for his operation. He noted that he was forced to have inspections performed on his operation before he was permitted to butcher and sell meat products from his farm.

Overall, the farmers from three of the five cases expressed confidence in their knowledge and use of organic farming methods. The farmers from cases 7 and 11 said that they had learned a lot since they started using organic methods; however, they also said that they had a lot to learn in terms of their knowledge and management skills. Additionally, only one producer (Case 10) said that organic production information is readily available. The other farmers suggested that there is a lack of information on organic animal husbandry.

5.2.3.4 Dairy

Table 18 below summarizes the dairy farmers' views of the complexity of organic production.

Table 18: Organic Dairy Farmers' Views of the Complexity of Organic Production

| | | <u>Case 6</u> | <u>Case 7</u> | <u>Case 8</u> |
|---|---|---------------|---------------|---------------|
| Producers' Understanding and Use of Organic Methods | Producer(s) expressed confidence in knowledge of organic methods | Yes | No | Yes |
| | Producer(s) expressed confidence in use of organic methods | Yes | No | Yes |
| Availability of Information | Producer(s) stated that production information is readily available | Yes | Yes | Yes |
| Difficulties Identified | Record keeping | Yes | Yes | Yes |
| | Finding organic approved inputs | Yes | Yes | No |
| | Cooperation from neighbors | Yes | No | No |

The dairy producers' views on the complexity of organic farming were somewhat varied. Two of the producers expressed confidence in their knowledge and use of organic methods. However, the farmer from Case 7 expressed some hesitancy when asked about his organic knowledge and managerial expertise. The most notable information source referred to by the farmers from all the cases was a publication called *The Stockman Grass Farmer*. The farmers also referred to other publications, but none referred to internet sources of information. The farmers from all the cases stated that organic dairy production information is readily available.

The common difficulty described by the dairy farmers was record keeping. All the farmers noted that it had been a challenge for them to keep track of all the inputs used on their operations. Furthermore, it had been difficult for the farmers from cases 6 and 7 to find organically approved inputs for their farms. These farmers described the difficulty of finding organically approved inputs like feed, medicines, and mineral supplements. The farmer from Case 6 also noted that obtaining cooperation from his neighbors had added some complexity to his farming operation. Under the organic standards, a buffer zone must exist between parcels of ground that animals are grazing and those parcels that have had chemicals applied to them. Instead of building an additional fence inside the perimeter of the existing fence, the farmer from Case 6 explained that he chose to ask his neighbors not to apply chemicals within 30 feet of his fence line. If the farmer had built more fences, he would have added costs to his operation and reduced the amount of forage available to his cows. Asking his neighbors not to apply chemicals seemed like a more favorable alternative to address the buffer requirement than building more fences. The farmer said that the buffer zone requirement

added some complexity to managing the dairy but that his neighbors were accommodating to his requests.

When asked about the general complexity of organic versus conventional dairying, the farmer from Case 6 had this to say—

Well, if you consider what's available (inputs—remedial products), it's probably more complex to do it organically. With organic farming, you are trying to manage a lot of things all at once. Whereas with conventional, you kind of address one problem at a time—you buy a product to solve things. There are a lot of complexities in organic.

5.2.3.5 Summary & Discussion of Complexity

Table 19 below summarizes the differences observed in producers' views of complexity among the differing product sectors.

Table 19: Summary of Complexity

| | <u>Produce</u> | <u>Row Crop</u> | <u>Livestock / Poultry</u> | <u>Dairy</u> |
|--|---|---|--|--|
| Producers expressed confidence in their knowledge of organic methods | Yes | Y/N 4/1 | Y/N 3/2 | Y/N 2/1 |
| Producers expressed confidence in their use of organic methods | Y/N 1/2 | Y/N 4/1 | Y/N 3/2 | Y/N 2/1 |
| Producers stated that production information is readily available | Yes | Y/N 4/1 | Y/N 1/4 | Yes |
| Difficulties Identified by Producers | Pest management; Record keeping; Soil fertility; Organic seed procurement; Educating buyers | Pest management; Record keeping; Soil fertility; Wet field conditions; Marketing; Equipment cleanliness | Record keeping; Finding inputs; Meat processing regulations; Educating Buyers; Marketing | Record keeping; Finding inputs; Cooperation from neighbors |

Producers' views of the complexity of organic farming varied by production category. In general, livestock/poultry farmers expressed the greatest concerns over the complexity of organic production. The farmers from this sector suggested that organic production information is generally unavailable and that marketing their products had been difficult for a variety of reasons including a limited number of buyers, distance to markets, and processing requirements (e.g. butchering, cold storage requirement of meat products, etc.). Because organic livestock must be processed separately from conventional livestock, wholesale buyers must make special arrangements to ensure that livestock are slaughtered in accordance with the organic standards. The livestock producers in the study said that organic wholesale buyers and slaughter facilities are few in number and often far away.

Producers from the produce, row crop, and dairy product categories generally agreed that production information is readily attainable. However, the producers' views of the complexities of marketing organic products in these sectors varied widely. Similar to the findings from Midmore et al (2001), the results from this study suggest that the markets for some types of organic products are more developed than others. Some row crop farmers expressed greater concern over the complexities of marketing than others. Row crop farmers using cooperative marketing arrangements (contracting with an organic grain-marketing cooperative) generally expressed less concern over marketing than those farmers not using cooperative arrangements. These farmers suggested that they have less uncertainty about marketing outlets and prices. The produce farmers in the study generally use a mix of direct and wholesale marketing strategies. This group of farmers referred to educating buyers as their biggest challenge in marketing. The

produce farmers suggested that teaching potential customers about the benefits of organic products is a key element to success in direct selling to consumers. The dairy farmers in the study generally use production contracts with wholesale organic milk buyers to market their milk. The dairymen did not view marketing as a complex activity. This is likely because the dairymen were using the same milk buyer before their conversion to organic production as they were after their conversion.

Like the producers' views of information and complexity of marketing, the producers' views of the major difficulties in organic production also varied by product sector. Both produce and row crop farmers identified pest management as one of the greatest difficulties on their farms. These farmers especially emphasized weed management as a source of complexity. Produce farmers noted that no commercially available organic approved substances for weed management are effective. In contrast, row crop farmers generally referred to wet field conditions as their biggest challenge in weed management. Obtaining organically approved inputs like feed, mineral supplements, and medications was the most notable difficulty described by the livestock/poultry and dairy farmers. Record keeping was also mentioned as a difficulty across all production categories.

Overall, producers' descriptions of their own understanding and abilities in using organic methods seemed to coincide more with their level of experience in organic farming rather than with their respective product sector(s). In general, farmers with fewer years of organic experience exhibited less confidence in their knowledge and abilities in organic management than those farmers with more years of experience. Farmers from all categories suggested that knowledge of organic principles is not the

limiting factor in increasing the productivity of their farms. Instead, the farmers suggested that time and management skills are greater issues in improving their operations.

5.2.4 Trialability

Trialability is the degree to which an innovation may be experimented with on a limited basis. The interview questions dealing with trialability (outlined in Table 3) focused on the case respondents' abilities in experimenting with organic production methods. The following sections summarize the case respondents' comments regarding the trialability of organic farming methods. Summaries of the respondents' comments are organized according to the cases' product sector(s).

5.2.4.1 Produce

Table 20 below summarizes the produce farmers' comments regarding the trialability of organic farming.

Table 20: Organic Produce Farmers' Views of the Trialability of Organic Production

| | | Case 2 | Case 5 | Case 11 |
|---|--|---------------|---------------|----------------|
| Trialability | Producers experimented with organic practices on a small-scale before implementing the practices farm-wide | No* | No* | No* |
| | Producers find it relatively easy to experiment with new organic techniques | Yes | Yes | Yes |
| | Producers described obtaining approval of their certifier as the main challenge in experimenting | Yes | Yes | Yes |
| *Producers have been using organic practices on a farm-wide basis since the inception of their farm | | | | |

Applying the concept of trialability to the group of produce farmers is problematic. Since each of the farmers had used organic farming methods since the inception of his farm, describing the degree to which the produce farmers experimented with organic farming before they implemented organic practices farm-wide is challenging. While none of the producers experimented with organic methods on a small scale before implementing organic practices farm-wide, it would be unfair to suggest that experimentation with organic farming practices in vegetable production cannot occur. On the contrary, the organic produce farmers' comments regarding trialability suggest that experimentation with organic methods in vegetable production is relatively easy. The only challenge described by the respondents in experimenting with new organic methods was in obtaining the approval of their organic certifier. Without the approval of his certifier, a farmer could potentially lose his organic certification if his experiment violates the official organic standards.

5.2.4.2 Row Crops

Table 21 (next page) summarizes the row crop farmers' comments regarding the trialability of organic farming.

Table 21: Organic Row Crop Farmers’ Views of the Trialability of Organic Production

| | | Case 1 | Case 3 | Case 4 | Case 9 | Case 10 |
|---|---|---------------|---------------|---------------|---------------|----------------|
| Trialability | Producer experimented with organic practices on a small-scale before implementing the practices farm-wide | Yes | No* | Yes | Yes | Yes |
| | Producer finds it relatively easy to experiment with new organic techniques | Yes | Yes | Yes | Yes | Yes |
| | Producer described obtaining approval of his certifier as the main challenge in experimenting | No | No | No | No | No |
| *Producer has been using organic practices on a farm-wide basis since the inception of his farm | | | | | | |

All the row crop farmers except for the respondent from Case 3 described their entry into organic farming as gradual. In order to evaluate the feasibility of organic production, the farmers from cases 1, 4, 9, and 10 started in organic farming by transitioning a small portion of each of their farms. After they experimented with organic production, the farmers gradually transitioned their entire acreages to certified organic status. The respondent from Case 4 described his entry into organic production this way—

I enrolled about 25% of the farm the first year. I set it aside. I did not fertilize it. I sowed clover into it. So that 42 acres was my starting point. Then I raised soybeans on the rest of the farm. Then the next year, I planted another portion of the farm to wheat, and that portion became transitional. I worked my way into it. It took about four years to get things into the organic rotation.

The farmer from Case 3 started his adult farming career as an organic farmer. He did not experiment with organic farming on a portion of his farming acreage. However, he did have experience raising organic crops for another firm before he started raising organic crops on his own. Overall, the row crop producers said that they find it relatively

easy to experiment with new organic production techniques. Most of the farmers described experiments involving the use of new or different kinds of equipment—field cultivators, rotary hoes, harrows, etc. Trying new and different seed varieties was also a common area of experimentation mentioned by the farmers. Unlike the produce farmers, the row crop farmers did not describe approval from certifiers as a major obstacle in experimenting with organic farming methods.

5.2.4.3 Livestock & Poultry

Table 22 below summarizes the livestock/poultry farmers’ comments regarding the trialability of organic farming.

Table 22: Organic Livestock/Poultry Farmers’ Views of the Trialability of Organic Production

| | | Case 1 | Case 7 | Case 9 | Case 10 | Case 11 |
|---|---|---------------|---------------|---------------|----------------|----------------|
| Trialability | Producer experimented with organic practices on a small-scale before implementing the practices farm-wide | No | No | No | No | No* |
| | Producer finds it relatively easy to experiment with new organic techniques | No | No | No | No | No |
| | Producer described obtaining approval of his certifier as the main challenge in experimenting | No | No | Yes | No | No |
| *Producers have been using organic practices on a farm-wide basis since the inception of their farm | | | | | | |

Each of the organic livestock/poultry farmers transitioned all of his animals to organic at one time. The organic livestock/poultry producers suggested that experimentation with new organic methods is not easy. The farmers said that separating and managing two different groups of animals—organic and conventional would have

been difficult, expensive, and time consuming. In order to perform side-by-side comparisons of the two production systems, the farmers would have had to make extra investments in animal housing, fencing, and feed storage facilities. Additionally, experimentation would require extra time in caring for both groups of animals. The statement below from Case 9 describes the farmer’s view of the trialability of organic beef production—

“If you are going to raise an organic calf, you decide two years ahead of time how you are going to market that animal. It’s a long process. It’s one thing to raise a small number like five or so for people in the area, but why are you going to raise five like this when you’ve got 85 other ones. Now you gotta keep everything separate... this feed and that feed and clean everything out. It’s like if you’re feeding five this way, why do all 90 of them? We just decided to do all them

The farmers also emphasized that there is a limited number of approved products available to organic livestock/poultry producers, which makes experimentation with new or different products difficult. Only one of the case respondents (Case 9) said that obtaining approval from his certifier was his biggest challenge in experimentation.

5.2.4.4 Dairy

Table 23 below summarizes the dairy farmers’ comments regarding the trialability of organic farming.

Table 23: Organic Dairy Farmers’ Views of the Trialability of Organic Production

| | | Case 6 | Case 7 | Case 8 |
|--------------|---|---------------|---------------|---------------|
| Trialability | Producer implemented organic practices on a small-scale before implementing the practices farm-wide | No | No | Yes |
| | Producer finds it relatively easy to experiment with new organic techniques | Yes | Yes | Yes |
| | Producer described obtaining approval of their certifier as the main challenge in experimenting | No | No | Yes |

The dairy farmers described two different modes of organic conversion. The farmers from cases 6 and 7 converted all of their land and transitioned all their cows so that both their land and cows would become certified organic at the same time. However, the farmer from Case 3 made a more gradual transition to organic. The Case 3 farmer transitioned his cows in three stages. The farmer transitioned in this manner because he had purchased cows to add to his herd three different times. Each time the farmer added a group of cows to his herd, he enrolled the new cows into the organic program. Therefore, the cows gained organic certification on three different dates. While the farmer's cows became certified on different dates, the farmer did not begin selling milk as organic until the last group of cows became certified. The farmers from all three cases said that managing both an organic and conventional milking herd would be very difficult due to pasture management and milk storage issues. Organic cows would need to graze only on organic pastures and conventional cows on conventional pastures. Furthermore, the groups of cows would need to be milked at separate times so that milking equipment could be cleaned between organic and conventional milking sessions. Additionally, the farmers would have had to make extra investments in milk storage equipment to keep conventional milk separate from organic milk.

All the dairy farmers stated that experimentation with organic techniques is relatively easy. The farmers emphasized that they had performed many experiments on their farms, especially in relation to their grazing practices. Only the Case 8 farmer described obtaining approval from his certifier as a challenge to experimentation. The type of experimentation he referred to when describing the certifier's authority was in experimenting with new inputs like fly spray or medications for his cows.

5.2.4.5 Summary & Discussion of Trialability

Table 24 below summarizes the differences observed in producers' views of the trialability of organic farming among the differing product sectors.

Table 24: Summary of Trialability

| | <u>Produce</u> | <u>Row Crop</u> | <u>Livestock / Poultry</u> | <u>Dairy</u> |
|--|----------------|-----------------|----------------------------|--------------|
| Producers experimented with organic practices on a small-scale before implementing the practices farm-wide | No | Y/N 4/1 | No | Y/N 1/2 |
| Producers find it relatively easy to experiment with new organic techniques | Yes | Yes | No | Yes |
| Producers described obtaining approval of their certifier as the main challenge in experimenting | Yes | No | Y/N 1/4 | Y/N 1/2 |

The producers' comments suggest that the trialability of organic production is greater in the produce and row crop categories than in the livestock/poultry and dairy categories. Farmers raising produce or row crops suggested that they could easily divide their farms such that organic and conventional production could occur at the same time. In contrast, livestock/poultry and dairy producers suggested that managing the two types of production systems simultaneously would be very difficult.

In terms of experimenting with new or different organic techniques, farmers from the produce, row crop, and dairy categories said that experimenting with new seed varieties, equipment, and grazing practices is relatively easy. However, livestock/poultry producers viewed experimentation with new/different organic techniques as challenging.

The livestock/poultry farmers suggested that experimentation with animals is both intensive and expensive.

Produce farmers described the most difficulty in obtaining their organic certifier’s approval for experimentation. The produce farmers included in the study suggested that they try numerous experiments each year whereas the other types of farmers only suggested that they try one or two experiments per year.

5.2.5 Observability

Observability refers to the visibility of an innovation and its results. The interview questions dealing with observability (outlined in Table 3) focused on the case respondents’ abilities to witness the practices and outcomes of organic farming from other organic farmers’ experiences. The following sections summarize the case respondents’ comments regarding the observability of organic farming. Summaries of the respondents’ comments are organized according to the cases’ product sector(s).

5.2.5.1 Produce

Table 25 below summarizes the produce farmers’ comments regarding the observability of organic farming.

Table 25: Organic Produce Farmers’ Views of the Observability of Organic Production

| | | Case 2 | Case 5 | Case 11 |
|----------------------|--|---------------|---------------|----------------|
| Observability | Producers observed organic practices on other farms before implementing organic management | No | No | No |
| | Producers know other organic vegetable farmers within a 50-mile radius of their farms | No | Yes | No |
| | Producers are part of a formal or informal network of organic farmers who participate in information sharing | Yes | Yes | Yes |

The produce farmers reported mostly similar views on the observability of organic farming. None of the growers said that they observed organic farming practices on other farms before implementing the practices on their own farms. In addition, the growers from two of the cases (cases 2 & 11) said that they did not know any other organic farmers living in their geographical area. The farmers from Case 5, however, indicated that they know other organic growers in their area. All of the farmers indicated that they are part of either formal or informal networks of organic produce growers. The farmers emphasized that these networks have been important sources of information and observation.

5.2.5.2 Row Crops

Table 26 below summarizes the row crop farmers' comments regarding the observability of organic farming.

Table 26: Organic Row Crop Farmers' Views of the Observability of Organic Production

| | | Case 1 | Case 3 | Case 4 | Case 9 | Case 10 |
|----------------------|--|---------------|---------------|---------------|---------------|----------------|
| Observability | Producer observed organic practices on other farms before implementing organic row crop management | Yes | Yes | Yes | No | Yes |
| | Producer knows other organic row crop farmers within a 50-mile radius of his farm | Yes | Yes | Yes | No | Yes |
| | Producer is part of a formal or informal network of organic farmers who participate in information sharing | Yes | Yes | Yes | Yes | Yes |

All but one of the organic row crop farmers indicated that they had made observations from other organic farmers' experiences before implementing organic management on their own farms. The exception was the farmer from Case 9 who also

indicated that he did not know of any other organic farmers in his geographical area. The other farmers from cases 1, 3, 4, and 10 said that they knew of at least one other organic row crop farmer living within a 50-mile radius of their home farms. In addition, all the farmers indicated that they were part of formal and/or informal networks of organic farmers who share production information with one another. Overall, the row crop farmers said that being able to observe organic farming practices before conversion is important to the success of an organic row crop operation because it minimizes a farmers' chances of making irreparable mistakes. The respondent from Case 4 expressed the importance of having a mentor for purposes of observation—

“The number one thing you’ve got to have if you’re trying to get into organic is a mentor. You’ve got to have somebody that has been through it because there is too much stuff, and there isn’t any place to go find out. Setting up all the paperwork—There’s a whole series of things that just isn’t common knowledge.”

5.2.5.3 Livestock & Poultry

Table 27 below summarizes the livestock/poultry farmers' comments regarding the observability of organic farming.

Table 27: Organic Livestock/Poultry Farmers' Views of the Observability of Organic Production

| | | <u>Case 1</u> | <u>Case 7</u> | <u>Case 9</u> | <u>Case 10</u> | <u>Case 11</u> |
|---------------|--|---------------|---------------|---------------|----------------|----------------|
| Observability | Producer observed organic practices on other farms before implementing organic management | Yes | No | No | No | No |
| | Producer knows other organic livestock/poultry farmers within a 50-mile radius of his farm | No | No | No | No | No |
| | Producer is part of a formal or informal network of organic farmers who participate in information sharing | Yes | Yes | Yes | Yes | Yes |

Only one of the livestock producers (Case 1) indicated that he had observed organic livestock production practices before engaging in organic management on his own farm. However, the farmer from Case 1 also said that his observations were indirect. Instead of visiting organic livestock farms firsthand, the farmer made observations through engaging in telephone conversations with other organic livestock farmers. The farmer from Case 1 said that he was able to make some observations about organic livestock production by listening to other farmers describe their experiences with organic livestock production. The rest of the farmers said that when they started managing their animals organically they had not observed any other organic farms either directly or indirectly. Furthermore, none of the organic farmers knew of any other organic livestock/poultry farmers in their geographic region at the time of the interviews. However, all the farmers were part of formal or informal information-sharing networks. Overall, the farmers suggested that observing organic livestock/poultry management is difficult because there are relatively few organic livestock/poultry farms their regions.

5.2.5.4 Dairy

Table 28 below summarizes the dairy farmers' comments regarding the observability of organic farming.

Table 28: Organic Dairy Farmers' Views of the Observability of Organic Production

| | | Case 6 | Case 7 | Case 8 |
|---------------|--|---------------|---------------|---------------|
| Observability | Producer observed organic practices on other farms before implementing organic management | No | No | No |
| | Producer knows other organic dairy producers within a 50-mile radius of his farm | No | No | Yes |
| | Producer is part of a formal or informal network of organic farmers who participate in information sharing | Yes | Yes | Yes |

None of the dairy farmers said that they had made any firsthand observations of other organic dairies before converting to organic production. However, the farmer from Case 8 did say that he was part of a group of dairymen who were transitioning to organic production at the same time. While the Case 8 farmer did not make any firsthand observations from the other farmers converting at the same time, he did network with them during the transition phase of his operation. Only one of the producers—the producer from Case 8—knew of other organic dairymen in his geographical area. The farmer from Case 6 said that he only knew of one other organic dairyman in the state. Despite knowing few other organic dairymen in Missouri, the farmers indicated that they had made contacts with other organic milk producers across the nation through formal and informal networks. All the farmers described being avid readers of publications that focus on grass-based milk production systems. The farmers said that these publications have been important sources of information and that they have provided them with many contacts.

5.2.5.5 Summary & Discussion of Observability

Table 29 (next page) summarizes the differences observed in producers' views of observability among the differing product sectors.

Table 29: Summary of Observability

| | <u>Produce</u> | <u>Row Crop</u> | <u>Livestock / Poultry</u> | <u>Dairy</u> |
|--|----------------|-----------------|----------------------------|--------------|
| Producers observed organic practices on other farms before implementing organic management | No | Y/N 4/1 | Y/N 1/4 | No |
| Producers know other organic livestock/poultry farmers within a 50-mile radius of their farms | Y/N 1/2 | Y/N 4/1 | No | Y/N 1/2 |
| Producers are part of a formal or informal network of organic farmers who participate in information sharing | Yes | Yes | Yes | Yes |

Considering the farmers’ responses, row crop farming seems to be the type of organic production that is most easily observed in Missouri. The farmers from four of the five row crop cases stated that they had observed organic farming on other farms before making the decision to transition their own farms. All but one of the farmers from the other production categories said that they did not make observations of other organic farmers before conversion. Additionally, the farmers’ statements regarding their acquaintance with other organic farmers in their geographical areas suggest that row crop farmers possess the greatest ability to view other organic farms of similar production type. Respondents from four of the five row crop cases said that they knew other organic row crop farmers living within a 50-mile radius. Respondents from one of the produce cases and one of the dairy cases said that they knew of other organic growers in their area, but none of the livestock/poultry farmers knew of any other organic farmers in their

areas. The farmers' comments suggest that organic row crop farming may be the most prevalent type of organic agriculture in the state.

All farmers indicated that they are part of formal and/or informal networks of organic farmers who share information regarding production practices, markets, and certification issues. The farmers suggested that being part of a network has been very important to their organic farming experiences. They pointed out that other organic farmers have often been their most valuable sources of information concerning production related problems.

CHAPTER 6: CONCLUSIONS

6.1 Summary and Conclusions

Results from this study indicate that an organic farmer's participation in a specific production category—produce, row crop, livestock/poultry, and/or dairy—influences his or her views of the relative advantage, compatibility, complexity, trialability, and observability of organic production. The relative advantage of organic production is greater in the row crop and produce sectors than in the livestock/poultry and dairy farming categories. In general, farmers from the row crop category expressed the greatest ability to market their crops at premium prices consistently, which has had the effect of increasing the profitability of their farms. Produce farmers also indicated that organic certification has increased the profitability of their farming operations. Farmers from the livestock/poultry and dairy sectors, however, said that the costs of organic production were not justified by increased farm revenues. According to the respondents from the study, the differences in relative advantage between the sectors arise from disparities in price premiums, production costs, and marketing opportunities.

Overall, farmers' views of the compatibility of organic production were similar across production categories. Farmers identified their values for profitability, environmental & animal welfare, health & food safety, and reductions in off-farm inputs as compatible with organic production systems. However, farmers of different production categories prioritized their values differently. Overall, produce livestock/poultry, and dairy farmers emphasized that their values to maximize profits were secondary to their other values regarding organic production. While row crop

farmers mentioned many of the same values as the other farmers, most claimed that if conventional farming were more profitable than organic production, they would convert to conventional farming.

Farmers' views of the complexity of organic production varied according to production category. Livestock/poultry farmers expressed the greatest concern regarding the availability of production information. For the most part, farmers from the other categories suggested that production information was readily attainable. The most significant challenges identified by the groups of farmers were as follows: produce—marketing (educating buyers) and record keeping; row crop—pest management and soil fertility; livestock/poultry—marketing (finding buyers) and finding organic approved inputs; dairy—record keeping and finding inputs. In general, farmers' confidence in their understanding and use of organic farming methods seemed to be more closely associated with farmers' experience in organic farming than with their product category. Farmers with more years of experience in organic farming expressed more confidence in their knowledge and management skills than farmers with fewer years of experience did.

Farmers from the row crop category viewed trialability and observability most favorably. In general, the row crop farmers suggested that trying organic production on a small scale before certifying a whole row crop operation was doable. These farmers also suggested that observing other organic row crop farmers was achievable for them. Produce farmers expressed less ability in trying organic production on a small-scale and in observing other farmers than the row crop farmers did. Dairy and livestock/poultry farmers expressed the least ability in trying and observing organic production. These farmers stated that managing both conventional and organic animals

at the same time would be time-consuming and expensive. Furthermore, they stated that they were not able to observe organic farming before they adopted the production system nor did they know many other organic farmers in their geographical area. Overall, the farmers from each sector emphasized the importance of being part of formal and/or informal information-sharing networks of organic farmers. The producers stressed the importance of these networks in providing production and marketing information.

The results of this study affirm some of the previously stated research propositions (Chapter 3) while disaffirming others. The results of the study affirm Proposition #1, which stated that produce, row crop, and dairy farmers would have more positive views of relative advantage than livestock/poultry farmers would. Proposition #2 regarding the compatibility was not affirmed by the results. Proposition #2 conjectured that produce farmers would view compatibility most positively among the groups of farmers. However, all the farmers seemed to exhibit a similar outlook regarding the compatibility of organic farming. Propositions 3, 4, and 5 stated that livestock/poultry farmers' views of the complexity, trialability, and observability (respectively) would be the least positive among all the farmers. The results affirm these propositions.

6.2 Policy and Program Considerations

This study provides an important comparison of organic farmers' perceptions and motives regarding organic production. Understanding the differences in farmers' views of organic agriculture is important for the future of organic policy and program development. It is hoped that the results of this research will aid policy makers in

enacting policies that are appropriate for their target population(s) and provide public program administrators with valuable information in understanding their clientele.

Findings from this study suggest that farmers from differing organic product sectors may be affected differently by policies and/or programs. This study has shed light on areas where different types of organic farmers could benefit from policy and program development. Overall, it seems that the farmers from all the production categories would benefit from the development of mentorship programs. Mentorship programs designed to increase the flow of information and improve the management skills of inexperienced organic farmers would promote growth and efficiency in all organic product sectors. The development and promotion of such programs like the Midwest Organic and Sustainable Education Service's Farmer-to-Farmer Mentoring Program could address farmers' needs for information and training. Additional areas for the development of policies and/or programs include the following:

- organic market development (especially in the area of meat and poultry products)
- the formation of professional networking organizations and/or programs
- record keeping and production monitoring systems that are tailored to specific types of organic production (especially for organic produce growers)
- research & development regarding organic approved inputs (fertilizers and animal medications)
- grants and or grant writing assistance for on-farm organic research trials (especially for organic livestock/poultry producers)

6.3 Limitations and Suggestions for Future Research

This research contributes to the literature on the adoption of organic farming systems by emphasizing the role of farmers' product sector(s) in influencing their views of organic production. While this study has identified important differences among organic product sectors, the findings of the study also suggest several areas for future research.

First, the results from this study were generated from a relatively small number of cases that may not have been representative of the true composition of Missouri's organic agricultural landscape. While efforts were made to select cases that offered representative views on the different aspects of each production category, the ability to generalize from the results of the study are limited. Further research using a survey method could improve the ability generalize from such a study of organic farmers' views.

Secondly, results of this research may have been influenced by the economic conditions that were present at the time of the interviews (July and August 2009). At the time the data collection portion of the study was conducted, the organic agriculture industry was experiencing instability. Several farmers reported that 2009 would be one of their most difficult years in organic farming because of weak demand for their products and poor weather conditions. However, the economic and weather conditions did not seem to affect all product sectors in the same way. Therefore, farmers' views of organic farming (as reflected in their interview responses) may have been largely temporal. Future research could attempt to gather data/observations from multiple time periods, which would minimize the effects of temporal economic and weather conditions on farmers' views

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APPENDIX A: CASE DESCRIPTIONS

Case #1

The informant for Case #1 has been raising organic row-crops on 500 acres in north Missouri since 1994. He was raised on the farm where he currently lives and works. During his career as an organic farmer, he has raised organic field corn, popcorn, soybeans, wheat (100 acres in 2009), black beans (190 acres in 2009), barley, and forage for hay. The informant also has a farrow-to-finish hog operation and 28 beef cows. Currently he has 110 sows under five hoop houses—all of which have access to an outdoor dirt area. The informant's hogs are certified organic (since 2006). However, because of a lack in organic marketing opportunities, he is currently selling his hogs as all-natural. The informant's beef cows are managed using the organic standards such that the calves born to the cows can be marketed as organic; however, the cows cannot be sold as organic because they have not been managed organically for their entire lives. The informant has been raising organic beef since 2008. The informant markets his organic calves directly to local individuals and through conventional livestock markets. Up until the time of the interview, the informant had received no premium for his organic beef calves.

Case #2

Case #2 is a produce farm in west-central Missouri. Informants for the interview consisted of the two farm owners—a husband and wife—and the owners' son. The farm produces a variety of vegetable crops and transplants. The owners market their produce

through a wholesale buyer (75%) and farmers' markets (25%). Both the husband and wife have worked full-time on the farm since 1999 when the farm obtained organic certification. The husband and wife have tried to use organic practices on the farm since the farm came under their ownership in 1979; however, the farm was not certified organic until 1999. The son does not live or work on the farm full-time. (At the time of the interview, the son was visiting his parents.) The farm does employ some outside labor during the growing season. The total area of the farm is 613 acres. Eight acres of the farm are used for vegetable production while the remaining portion is used as pasture for conventional beef cows.

Case #3

The informant for Case #3 started producing organic row-crops in 1995. During the first two years of his organic farming experience, the informant was hired by a company from Minnesota to raise organic food-grade soybeans in Missouri. In 1997, the informant began farming on his own by renting land in north Missouri—much of which was land that had come out of contracts from the USDA-NRCS Conservation Reserve Program. Before coming to organic farming on a full-time basis, the informant worked as a grain merchandiser for 15 years. He had also grown up on a conventional crop/livestock farm. Currently, the informant has a partner in his farming operation. Together the pair farm about 1400 acres in Missouri—all of which is planted to row crops. The informant and his partner also own 1000 acres of certified organic land in Colorado and 3800 acres of certified organic land in Nebraska. The land located outside of Missouri is farmed under contractual arrangements with farmers from those regions. In terms of farm labor, the

informant and his partner employ four to five college students each year during the summer to operate cultivation equipment. The informant and his partner sell all of their crops using contracts. Livestock production is not part of the operation.

Case #4

The informant for Case #4 has 300 acres in an organic row crop rotation. Soybeans, wheat, and red clover are the main crops produced on the farm. He also has about 100 head of conventional cow-calf pairs that generally consume all of the informant's organic hay crop. The informant has been raising organic crops since 2001. The informant markets his crops using contracts. He employs no additional labor. In addition to organic farming, the informant has a full-time job with a government agency. The informant was raised on a conventional crop/livestock farm in north-central Missouri, which is the same area where the informant currently resides.

Case #5

Case #5 is a three-acre produce farm located in the Kansas City metropolitan area. The informants for Case #5 included the two farm operators. The farm produces a variety of popular vegetable crops including tomatoes, peppers, cucumbers, lettuce, broccoli, etc. The informants started their farming operation in 2000 and obtained organic certification in 2003. The farm operators have a variety of market outlets for their produce. Their market outlets include local grocery stores, restaurants, farmers' markets, and a farm stand. The informants estimate that about 30% of their sales come from wholesale buyers and 70% come from direct selling. The two farm operators for Case #5 come

from differing backgrounds. One of the men came to organic farming after working as a chef on the east coast for several years. The other farm operator has a graduate degree in agronomy and has an additional full-time job as a manager of a city-owned conventional row crop farm.

Case #6

Case #6 is a family-based dairy farm in southwest Missouri that was certified organic from June of 2007 to June of 2008. The farm consists of about 500 acres of pasture and 90 dairy cows. The informant for Case #6 is a third generation dairy farmer. The informant began his own operation in 1992 as a conventional dry-lot dairy. In 1995, the informant began experimenting with grass-based dairy management. In 2001, the informant stopped using synthetic fertilizers on his pastures. The informant started the organic certification process in 2006 in response to an organic marketing program offered by his milk buyer. In 2008, the informant discontinued certification because the price premium for organic milk disappeared. The informant does not employ outside labor, but he does have four sons that help him on the farm.

Case #7

The informant for Case #7 has dairy cows (30 head), hogs (5 sows), and poultry (600 fryers 2008) on his farm (160 acres). His family has been on the same farm in northwest Missouri for three generations. Before taking over as the full-time manager of the family farm in the late 90s, the informant had been in partnership with his parents raising conventional row crops and livestock. After the informant's father passed away in 1997,

he began looking for alternatives to conventional agricultural production. In 1998, the informant started a grass-based dairy operation. Before that time, the informant had essentially no experience as a dairyman. In 2006, the informant began pursuing organic certification for his land, dairy cows, and poultry. The informant began selling organic agricultural products in 2007, but he discontinued his certification at the end of 2008 because of dissatisfaction with his certifier and because his customers had expressed indifference toward the organic label. In terms of the sources of sales from the farm, one-third of the farm sales come from meat chickens, one-third comes from milk and milk products, one-sixth comes from pork, and one-sixth from egg sales. The informant has used a variety of marketing avenues to sell his products—a CSA, farmers' markets, and on-farm sales. The informant does not hire outside labor; however, he has a son who currently lives and works on the farm with him. The informant's two daughters had also been helping on the farm until the end of 2008.

Case #8

The informant for Case #8 owns a grass-based dairy farm in central Missouri. The informant bought his parents' farm (where he was raised) in 2000. Before the farm changed ownership, it had been a conventional dairy operation. When the informant first acquired the farm, he was only raising beef cows, which are no longer part of the operation. The informant re-entered the dairy business in 2006. At the time of his re-entry, the informant began pursuing organic certification for his land and dairy cows. The informant currently owns 186 acres of pasture and 64 dairy cows. In 2007, the informant started selling organic milk. The informant stopped selling his milk as organic

in June of 2009. Currently, the informant uses organic production methods to maintain his certification. However, because of a collapse in the market for organic milk, he was not selling his organic milk as “organic” at the time of the interview. Although the informant is still selling his milk to the same buyer, he is selling all of his milk as a conventional product. Currently, the informant’s 16-year-old daughter and 13-year-old son help him manage his organic grass-based dairy operation.

Case #9

Case #9 consists of a father-son farming operation. Together, they produce certified organic row crops and organic beef on about 1050 acres in northwest Missouri. Both the father and son had experience with conventional farming before converting to organic farming. The informants’ had their operation (their farmland) certified in 2000 as a strategy to increase the value of the crops produced on the farm. Their main goal in obtaining organic certification was to find a way to increase the profitability of the farm so that the son could return to the farm as a full-time farmer after completing his college education. In addition to raising organic row crops, the pair started raising organic beef in 2004. Together they have about 160 cows. The father and son market their organic grain through an organic grain-marketing cooperative. Their cattle have been marketed through Dakota Beef Company and through direct sales to individuals and families.

Case #10

The informant for Case #10 has been raising organic row crops since 1992. His rotation includes soybeans, wheat, corn, and red clover. His row crops are produced on

approximately 600 acres of land in west-central Missouri. The informant markets his organic grain through an organic grain marketing cooperative based in Kansas. In addition to row crops, the informant also owns 80 beef cows. He has owned cattle since the mid 90s but did not have them certified under the organic standards until 2006. Presently, the informants' cattle are not certified, but he still uses organic practices in managing his herd. The informant dropped organic certification on his livestock in 2008 due to poor marketing opportunities. The informant attempts to market his beef calves through direct sales to local individuals and families. The calves that the informant does not sell to local people go to conventional market channels. The informant was raised on a conventional crop/livestock farm during the 40s and 50s. He got back into farming in 1990 as a conventional row crop farmer and then converted his farm to organic production in 1992 as a way to increase the profitability of the farm and as a way to reduce his exposure to farm chemicals.

Case #11

Case #11 consists of a husband-and-wife farming operation. Together the couple produces herbs and vegetables on about an acre of ground in east-central Missouri. At the time of the interview, they were also raising 300 pullets as a future flock of egg layers. Most of the income for the farm comes from herbs that are produced in a greenhouse on the farm. The main vegetable produced on the farm is pea shoots. Products produced on the farm are mainly marketed through two local CSA programs and three restaurants. The husband and wife are beginning farmers who both still have jobs off the farm. The couple bought their 30-acre farm in 2005 and obtained organic

certification for their land immediately as it had not had any prohibited substances applied to it for over three years. The couple started their operation by raising vegetables and herbs and then added 50 organic laying hens in 2006. In 2007, the couple dropped the organic certification for the farm due to lack of profitability. While the farm is no longer certified organic, the couple still manages all of their land and animals using organic practices. Since dropping the organic certification, the couple has obtained labeling permission from Certified Naturally Grown—an alternative certification program to the USDA’s National Organic Program. The couple does not employ any additional labor; however, they do have one volunteer that works on the farm approximately one day per week during the growing season.