

**FINANCIAL PERFORMANCE COMPARISON  
FOR ABC FARM**

by

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## **ABSTRACT**

This thesis had two objectives. One objective was to compare one northeast Kansas farm's financial performance from 2002 through 2011 to various groups of farms participating in the Kansas Farm Management Association (KFMA) during the same period. The second objective was to compare the crop acreage growth trends of the same northeast Kansas farm from 2002 through 2011 to the same groups of farms participating in the KFMA. In this thesis the northeast Kansas farm was referred to as ABC Farm. The purpose of this thesis was to provide ABC Farm's owners and management with information that could be used to formulate long-term goals for ABC Farm and to help identify strategies for achieving those goals.

ABC Farm's 10-year financial performance was compared to six different KFMA member groups using 12 different financial measures or ratios. The KFMA groups included all NE region farms, NE region farms in the highest value of farm production (VFP) category, STATE irrigated crop farms, NE region farms in the highest net farm income quartile, NE region farms in the highest crop acreage category, and NE region farms in the lowest adjusted total expense ratio quartile. The 12 financial measures or ratios included VFP, net farm income, adjusted total expense ratio, operating profit margin ratio, asset turnover ratio, percent return on assets, VFP per worker, total crop acres farmed, crop machinery investment per crop acre, crop machinery cost per crop acre, current ratio, and debt to asset ratio.

ABC Farm's 10-year average financial performance was better than the 10-year average of any KFMA group for most financial measures. ABC Farm's VFP, net farm

income, operating profit margin ratio, VFP per worker, total crop acres, and current ratio were all higher than any KFMA group. ABC Farm's adjusted total expense ratio, crop machinery cost per crop acre, and debt to asset ratio were also lower than those of the various KFMA groups compared to. ABC Farm did not compare favorably to other KFMA groups for some of the financial measures. ABC Farm's average crop machinery investment per crop acre was higher than every group. ABC Farm's average asset turnover ratio was lower than every group. ABC Farm's average return on assets was lower than all but one group, all NE region farms.

## TABLE OF CONTENTS

<b>List of Figures.....</b>	<b>vi</b>
<b>List of Tables .....</b>	<b>vii</b>
<b>Acknowledgments .....</b>	<b>viii</b>
<b>Chapter I: Introduction .....</b>	<b>1</b>
1.1 Introduction .....	1
1.2 Objectives .....	3
1.3 Study Outline.....	3
<b>Chapter II: Literature review .....</b>	<b>5</b>
2.1 Introduction .....	5
2.2 Sustained Competitive Advantage.....	5
2.3 Benchmarking.....	6
2.4 Financial Performance Measurement .....	7
<b>Chapter III: Methods.....</b>	<b>13</b>
3.1 Introduction .....	13
3.2 Background Information .....	13
3.3 Financial Ratios .....	14
3.4 KFMA Comparisons .....	19
3.5 Total Crop Acre Growth Trend Comparisons .....	21
<b>Chapter IV: Data .....</b>	<b>22</b>
4.1 Introduction .....	22
4.2 Data Sources .....	22
4.3 Data and Trends for ABC Farm.....	23
<b>Chapter V: Benchmark Comparisons .....</b>	<b>26</b>
5.1 Introduction .....	26
5.2 General Observations .....	26
5.3 NE KFMA Farms .....	27
5.4 NE KFMA Farms with the Highest Value of Farm Production .....	28

5.5 STATE KFMA Irrigated Farms.....	29
5.6 NE KFMA Farms in the Top Net Farm Income Quartile .....	30
5.7 NE KFMA Farms in the Highest Crop Acre Category .....	31
5.8 NE KFMA Farms in the Lowest Adjusted Total Expense Ratio Quartile .....	32
5.9 KFMA Group Acreage Growth Trends.....	32
<b>Chapter VI: Conclusions .....</b>	<b>43</b>
6.1 Summary.....	43
6.2 Conclusions .....	44
6.3 Future Strategies .....	45
<b>References.....</b>	<b>48</b>

## **LIST OF FIGURES**

**Figure 5.1: Machinery Investment and Cost per Crop Acre ..... 34**

## LIST OF TABLES

<b>Table 4.1: ABC Farm Data, 2002 to 2011.....</b>	<b>25</b>
<b>Table 5.1: 10-year Average Data, 2002 to 2011.....</b>	<b>35</b>
<b>Table 5.2: NE Region Data, 2002 to 2011 .....</b>	<b>36</b>
<b>Table 5.3: NE Region Highest Value of Farm Production Data, 2002 to 2011.....</b>	<b>37</b>
<b>Table 5.4: STATE Irrigated Crop Data, 2002 to 2011.....</b>	<b>38</b>
<b>Table 5.5: NE Region Highest Net Farm Income Quartile Data, 2002 to 2011 .....</b>	<b>39</b>
<b>Table 5.6: NE Region Highest Crop Acreage Data, 2002 to 2011 .....</b>	<b>40</b>
<b>Table 5.7: NE Region Lowest Adjusted Total Expense Ratio Quartile Data, 2002 to 2011 .....</b>	<b>41</b>
<b>Table 5.8: ABC Farm and KFMA Group Total Crop Acre Data, 2002 to 2011 .....</b>	<b>42</b>

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## **CHAPTER I: INTRODUCTION**

### **1.1 Introduction**

Growth and consolidation has been the norm in American business. Growth has often been a measure of business success. Successful businesses tend to grow while unsuccessful businesses tend to shrink and eventually disappear. Consolidation occurs as companies merge, making larger organizations out of smaller ones. All across America, in nearly every business and industry, companies have grown and consolidated. Many small businesses have been replaced by fewer larger businesses and that trend will likely continue.

American agriculture has experienced similar growth and consolidation. A few generations ago, a much higher percentage of the population lived on family farms. Because nearly all farm work was labor intensive, even large farm families could only manage to complete the work required to operate a small farm. Farmers grew most of what they needed to survive, machinery needs were small, and cash crop production was a small part of the farming enterprise. As time passed, farming became more mechanized such that fewer laborers were able to complete the work required to operate larger farms. The standard of living was also rapidly improving and in order to participate, farmers had to generate greater cash flow. Farms that were once large enough to support multiple families either had to grow or family members had to leave. Farms consolidated and farming gradually turned into more of a business than a way of life.

Many aspects of agriculture's heritage still remain. Farmers still refer to other farmers as neighbors, not competitors. Nearly all farmers and many city dwellers still refer to the agricultural "community" rather than the "industry". Most farmers are still very

concerned about their neighbor's perception of themselves and their farm. Most farmers still prefer getting along and cooperating with neighbors rather than competing against them.

In stark contrast is the economic reality that farms today are businesses whose long-term survival depends upon being profitable. Economies of scale have driven farms into sometimes heated competition for limited land and labor resources. Farmers find themselves asking the same question as businesses in other industries, which is what must be done to stay in business? How can a farm remain sufficiently profitable to successfully compete with other farms? Outperforming competitors means having and executing a superior business model or plan. Sometimes that plan includes farming more land, which means acquiring neighboring land from other farmers. Aggressively pursuing additional land is nearly always viewed negatively by the farming community and so the tendency is to maintain rather than grow. The quantity of agricultural land in a particular community is typically either fixed or gradually decreasing. Aggressive growth by one farm requires one or more other farms to become smaller and farmers rarely appreciate losing acreage.

In this thesis, the historical financial performance of one northeast Kansas farm will be compared to selected groups of farms belonging to the Kansas Farm Management Association (KFMA). This farm is hereinafter referred to as ABC Farm. The purpose is to provide ABC Farm's owners with information that will facilitate informed long-term decision-making. The owners have numerous alternatives, four of which are listed. One, sell the farm and invest the proceeds in more lucrative business opportunities; two, maintain the farm in basically the same manner as in the past; three, embark on a growth strategy; four, stop operating the farm and rent the land to other farmers.

## **1.2 Objectives**

The objective of this thesis is to provide useful financial performance and growth trend information to ABC Farm's owners so long-term goals can be formulated for this farm and then strategies can be identified for achieving those goals. This objective will be accomplished in two primary ways. First, the past 10 years of this farm's financial performance will be compared to groups of Kansas farms belonging to the KFMA during the same time period. Specific financial measures compared include value of farm production (VFP), net farm income, adjusted total expense ratio, operating profit margin ratio, asset turnover ratio, percent return on assets, VFP per worker, total crop acres farmed, crop machinery investment per crop acre, crop machinery cost per crop acre, current ratio, and debt to asset ratio (Herbel and Langemeier 2010). Understanding how ABC Farm has performed will facilitate the strategic planning process. Finally, crop acreage growth trends of the same groups of farms belonging to the KFMA will be analyzed and compared to ABC Farm's own crop acreage growth. Knowing historic growth trends will create a likely picture of future trends and help ABC Farm set goals and plan for the future.

## **1.3 Study Outline**

The remainder of this thesis is organized as follows. Chapter two presents a review of literature related to this thesis topic. This review will provide the reader with a broader understanding of previous farm financial performance research. Chapter three will present the methods used to compare ABC Farm's financial performance to a sample of KFMA member farms. Chapter four will present and describe ABC Farm's financial performance data that will be used to compare to groups of KFMA farms. Chapter five will present and

summarize the KFMA group financial data as well as provide comparisons to ABC Farm.

Chapter six will describe the conclusions resulting from this study.

## CHAPTER II: LITERATURE REVIEW

### 2.1 Introduction

Resource-based theory suggests it is possible for firms to have a sustained competitive advantage over competitors. Similarly, previous research pertaining to production agriculture has demonstrated that farms can have a sustained competitive advantage over other farms. Benchmarking is a method of comparing one firm to another. Past research has demonstrated the importance of benchmarking to profitability. Because farms are different in many ways, it is important to use benchmarking to understand and quantify how and why profits vary from farm to farm.

This literature review contains three sections. Section 2.2 summarizes Barney and Clark's literature pertaining to sustained competitive advantage. Section 2.3 summarizes literature pertaining to benchmarking. Section 2.4 summarizes additional literature pertaining to the measurement of farm financial performance. It also discusses ways farms tend to differentiate themselves in terms of profitability.

### 2.2 Sustained Competitive Advantage

Using resource-based theory, Barney and Clark (2007) present the concept that it is possible for a firm to possess a sustained competitive advantage over competitors. "A firm is said to have a sustained competitive advantage when it is creating more economic value than the marginal firm in its industry and when other firms are unable to duplicate the benefits of this strategy" (Barney and Clark 2007, 52). Sustained competitive advantage is possible when firm resources are heterogeneous and immobile as opposed to homogeneous and perfectly mobile. For the purpose of this thesis, "farm" can conveniently be substituted for "firm". If farm resource heterogeneity and immobility exists, then it may be possible for specific farm resources to be sources of sustained competitive advantage.

The alternative to at least some farm resources being heterogeneous and immobile is for all farm resources to be homogeneous and perfectly mobile. Under such a scenario every farm should behave exactly the same way in every respect because all farm resources have the potential to be identical. Since farms are clearly diverse in numerous ways, at least some farm resources must be heterogeneous and immobile.

Farm resources must be valuable, rare, imperfectly imitable, and exploitable in order to be potential sources of sustained competitive advantage. Farm resources can be imperfectly imitable (or costly to imitate) for one or a combination of three reasons: (a) the ability of a farm to obtain a resource is dependent on unique historical conditions, (b) the link between the resources possessed by a farm and a farm's sustained competitive advantage is causally ambiguous, or (c) the resource generating a farm's advantage is socially complex.

Sustained competitive advantage does not equal permanent competitive advantage. Competitive advantage can be sustained for a period of time and then lost due to resources becoming obsolete or irrelevant. Competitive advantage can be sustained only as long as a farm's resources meet the criteria previously described (Barney and Clark 2007).

### **2.3 Benchmarking**

Robert C. Camp of Xerox said the formal definition for benchmarking is "finding and implementing the best business practices" (1993, 25). Xerox uses "the continuous process of measuring our products, services and practices against those of our toughest competitors or companies renowned as leaders" for their benchmarking definition (Camp 1993, 23-24). Another informative definition is "a method for identifying aspects of an organization's activity that could be more efficient and/or effective by comparison with other relevant organizations' performance" (Francis and Holloway 2007, 172).

In their literature review on benchmarking, Dattakumar and Jagadeesh (2003, 176) said: "Benchmarking is recognized as an essential tool for continuous improvement of quality." They identified more than 350 publications pertaining to benchmarking. Francis and Holloway (2007, 171) said "Twenty years of widespread use have seen benchmarking become an accepted management practice rather than just another management fad." They also described 12 types of benchmarking, one of which is competitive benchmarking. Competitive benchmarking is the process of "comparison to the best of the direct competitors" (Francis and Holloway 2007, 174). Yeager and Langemeier (2009, 112) said "...internal and external benchmarking is extremely important in gauging the competitiveness of individual farms and for determining the impact of a change in the farm operation."

#### **2.4 Financial Performance Measurement**

Kastens, et al. (1999) conducted a study in 1997 to determine what makes some farms more profitable than neighboring farms. The study evaluated potential sources of profitability differences including crop yields, input costs, crop prices, and technology adoption, which together were named management factors. The study used 10 years of data from about 1,000 farms that were continuously enrolled in KFMA from 1987 to 1996. They found that input costs had the greatest impact on profitability. Being in the lowest one third of input costs resulted in a \$20.57 per acre profit advantage over the average farm. Similar studies were conducted in 2001, 2002, 2004, 2005, 2006, 2007 and 2011. Each subsequent study used 10 years of data from farms continuously enrolled in KFMA. Over the years, additional management factors were added to the study and refinements were made to the analysis models.

In the 2001 study, Nivens, Kastens and Dhuyvettter (2002) evaluated crop prices and yields, input costs, technology adoption, planting intensity, government payments, farm size, and risk. They found that risk had the greatest impact on profitability followed by farm size, input costs, and planting intensity. Risk was represented by income variability. In most businesses high income variability would be an undesirable characteristic even though it strongly impacted profitability. In the short term, farm size is usually beyond the farm manager's control. Therefore, input costs might offer the best opportunity to differentiate one's farm from neighboring farms in terms of profitability in the short run.

In the 2002 study, Kastens, Dhuyvettter and Nivens (2002) evaluated the same factors as the 2001 study and also added percent of crop acres rented. Technology adoption was renamed as less-till technology adoption. Risk, planting intensity, and input costs had the greatest impact on profitability.

In the 2004 and 2005 studies, Kastens and Dhuyvettter (2004; 2005) found that risk, input costs, and percent of crop acres rented had the greatest impact on profitability. Profitability increased along with the percentage of rented acres. In 2006, Kastens and Dhuyvettter (2006) introduced the profit impact of being in the best one-third and a new analysis method that assumed diminishing returns to improved management. The study found that farm size, input costs, and planting intensity had the greatest impact on profitability. The 2007 study (Kastens and Dhuyvettter 2007) was an update of the 2006 version and it found that farm size, input costs, and percent of crop acres rented had the greatest impact on profitability.

The 2011 study (Dhuyvetter, Morris and Kastens 2011) used the same analysis methods but added seed costs and proportion of custom hire to the management factor list. The study found that farm size, input costs, and planting intensity had the greatest impact on profitability. This study also evaluated the importance of farm size and crop prices over the years this study has been repeated. The importance of farm size has gradually increased over time and has shown the greatest impact on profitability in the last three studies. Crop price had very little profit impact in the first three studies, but its importance has continued to grow over time and in this latest study, its impact was nearly equal to planting intensity and technology adoption.

Albright (2002) studied enterprise budgets from KFMA farms from 1999 to 2001 with the goal of determining farm profitability characteristics. Selected enterprise budgets were averaged for the three-year period to reduce variability and then the results were divided into three profitability groups; high, middle, and low; based on net returns to management. "The average net return to management for high profit farms was \$97.91 per acre higher than for the low profit farms for the seven crop enterprises analyzed. Sixteen percent of this difference could be attributed to gross income while the other 84% was the result of cost differences" (Albright 2002, 7). Machinery costs were a significant portion of the total cost difference. Additionally, high-profit farms tended to be larger, having the most acres for five of the seven enterprises, indicating economies of size. High-profit farms also had the highest yields for each crop enterprise. Selling at the highest commodity price was not a consistent characteristic of high-profit farms. The difference in commodity price never exceeded 10% on any crop and averaged just over 1% across all crops.

Albright's study has been updated four times. Berns, Dhuyvettter and Kastens (2006) evaluated 2002-2004 KFMA data. Crosby, Dhuyvettter and Kastens (2007) evaluated 2002-2006 KFMA data. Fewell, Dhuyvettter and Kastens (2010) evaluated 2006-2008 KFMA data. Dhuyvettter and Smith (2010) evaluated 2007-2009 KFMA data. Results of the updates were generally consistent with Albright. Each study found significant average profit differences between high and low-profit farms ranging from \$65.39 per acre for wheat in the 2007 study to \$256.98 per acre for irrigated corn in the latest 2010 study. In most cases, input costs accounted for all or most of the profitability differences. Differences in machinery costs were always a significant portion of input cost differences. In a few cases, income differences were partially responsible for profitability differences. In those instances, yield differences made up the vast majority of the difference and price was rarely a difference-maker.

Langemeier (2007) compared financial performance to farm size for 1,160 farms having continuous participation in the KFMA from 2002 to 2006. Farms were divided into four VFP categories and the financial performance of each category was averaged and reported. Economic total expense ratio and operating profit margin ratio both improved as value-of-farm-production increased, indicating larger farms tend to be more profitable. This study was updated each year from 2009-2011 using five-year data for over 1,000 KFMA member farms (Langemeier, 2009; 2010; and 2011). In each study, the economic total expense ratio and operating profit margin ratio both improved as VFP increased.

Yeager and Langemeier (2009) examined the financial performance of 377 KFMA farms from 1988-2007 to see if it was possible for farms to demonstrate a sustained competitive advantage. Approximately 30% of the farms had efficiency levels that were

statistically higher than average and therefore demonstrated a sustained competitive advantage. Approximately 28% percent of the farms had efficiency levels that were statistically below average and therefore demonstrated a sustained competitive disadvantage. Results showed that while it was possible for individual farms to have a competitive advantage, it was difficult for a farm to consistently outperform peers. Each farm was ranked each year based on their overall efficiency indices. The farm having the highest overall efficiency had an average ranking of 30 and was 100 percent efficient relative to all other farms only 3 out of 20 years. Farms demonstrating a sustained competitive advantage tended to be larger in terms of VFP. They also had significantly lower expense ratios and significantly higher profit margins.

Snider and Langemeier (2009) studied the changing structure of Kansas farms using five-year average data for farms participating in KFMA continuously from 1973-2007. One goal was to determine whether small farms were catching up to larger farms or whether the difference in performance between these two groups of farms was widening. Results showed there was "divergence in terms of farm size and financial performance between small and large farms" (Snider and Langemeier 2009, 12). Additionally, they found larger farms were growing more rapidly than small farms and that the financial performance for larger farms was improving over time.

Each year, the United States Department of Agriculture (USDA) conducts the Agricultural Resource Management Survey (ARMS) through USDA's Economic Research Service (ERS) and National Agricultural Statistics Service (NASS). The ARMS typically includes more than 20,000 farms in the continental United States. Hoppe and Banker (2010) used data from the 2007 ARMS to compare the financial performance of U.S.

farms. They found that the largest category of farms, those with gross sales exceeding \$500,000 annually, had the highest average profit margin and lowest operating expense ratio.

The key factors related to financial performance measurement identified in this subsection are farm size or economies of scale; input costs, particularly machinery cost; and crop yields. Crop price, though not as important historically, is starting to become a more important factor.

## **CHAPTER III: METHODS**

### **3.1 Introduction**

Chapter three describes the methods used to compare ABC Farm's financial performance to a sample of KFMA member farms. Section 3.2 provides background information for KFMA and ABC Farm. Section 3.3 describes the financial ratios used to compare financial performance. Section 3.4 explains what groups of KFMA farms will be compared to ABC Farm. Section 3.5 describes how crop acreage growth trends will be compared between ABC Farm and KFMA groups.

### **3.2 Background Information**

Founded in 1931, the Kansas Farm Management Association (KFMA) is one of the largest farm management programs in the U.S. KFMA is administered by Kansas State University and is organized into six regional associations that together cover all of Kansas. Each region has KFMA economists who work with farmers to provide members with an accrual accounting system, decision making assistance, performance comparisons, and tax planning strategies. Approximately 2,350 farms were part of KFMA in 2011. Each year, KFMA economists collect all of the financial transactions as well as other important farm business information such as labor months, and crop acres and production. KFMA collects and organizes the information in a consistent manner so that valuable reports can be produced and compared over multiple-year time frames.

ABC Farm is a 2,600 acre crop farm located in northeast Kansas. The farm primarily grows corn and soybeans under center pivot irrigation but other crops are also grown occasionally. The farm has been owned by the same family since the 1940's. ABC Farm has never been a member of KFMA so ABC Farm's financial data is not part of the KFMA database. Since one objective of this thesis is to compare ABC Farm's financial

performance to a sample of KFMA member farms, ABC Farm's financial records from the past 10 years had to be collected, organized, and entered into the KFMA database.

### **3.3 Financial Ratios**

Clearly understanding the financial details of farm businesses is very important. The agricultural industry has evolved from subsistence production to complicated businesses utilizing land, machinery, and labor to create profit. Most farm businesses utilize borrowed and/or investment capital. Lenders and investors must be able to accurately measure a farm's financial position and performance before lending or investing.

Financial ratios are an accepted method used to measure financial position and performance (Financial Guidelines for Agricultural Producers 2008). This source has been used extensively to discuss the financial ratios below. Financial ratios are preferred over raw values because ratios can be used to compare dissimilar farms.

Financial position refers to the resources controlled by a business and the claims against those resources at a single point in time. Financial position measures indicate the capacity of a farm to withstand risk of future operations. Financial performance refers to the results of financial and production decisions over time. Financial performance measures include external factors beyond anyone's control such as rainfall. Both position and performance measures provide benchmarks against which to compare.

Many different financial ratios have been created. They are grouped into five categories: liquidity, solvency, profitability, repayment capacity, and financial efficiency measures. Each measure serves a different purpose and each has its own strengths and limitations. Liquidity measures a farm's ability to meet financial obligations resulting from ordinary business without disrupting normal business operations. Solvency measures the farm's ability to repay financial obligations if all the assets were sold, and the ability to

continue as a viable business in the face of financial adversity. Profitability measures the farm's ability to generate a profit by utilizing its resources. Repayment capacity measures the farm's ability to repay debt. Financial efficiency measures how intensely a farm utilizes its resources to generate revenue, and the effectiveness of various business decisions such as purchasing and marketing.

In order for financial ratios to be of any value, they must be measured consistently and reliably. KFMA records financial data in a systematic and consistent manner so that financial ratios can be calculated and used to evaluate farm businesses across Kansas. In this thesis, specific financial ratios will be used to compare the financial performance of ABC Farm to other KFMA farms. The following ratios will be compared; adjusted total expense ratio, operating profit margin ratio, asset turnover ratio, return on assets, VFP per worker, crop machinery investment per crop acre, crop machinery cost per crop acre, current ratio, and debt to asset ratio.

Adjusted total expense ratio is a financial efficiency measure that describes the relationship between expenses and revenue (Herbel and Langemeier 2010). Adjusted total expense ratio equals total expense plus unpaid operator and family labor, all divided by VFP. In cases where a farm's asset turnover ratio is low because the farm owns significant assets, the adjusted total expense ratio can be used to gain further insight into a farm's financial operating efficiency because it ignores the value of the farm's assets and instead focuses on the expenses required to produce revenues.

Operating profit margin ratio measures profitability in terms of return per dollar of gross revenue. Operating profit margin ratio equals net farm income plus interest expense minus unpaid operator and family labor, all divided by gross revenues. In the KFMA, VFP

is substituted for gross revenue in this ratio. VFP equals the sum of livestock, crop, and other income computed on an accrual basis minus accrual feed purchased (Herbel and Langemeier 2010). VFP provides a measurement of value-added and can be a measure of farm size. Farms can increase profit by increasing profit per unit produced or increasing production volume if the business is profitable. Operating profit margin can be overstated or understated if net farm income is not measured by matching the revenues and expenses incurred to create those revenues.

Asset turnover ratio is a financial efficiency measure that describes how efficiently assets are being used to generate revenue. Asset turnover ratio equals gross revenues divided by average total farm assets. Again, KFMA substitutes VFP for gross revenues in this ratio. Asset turnover ratio is heavily influenced by the value placed on assets. This ratio can vary widely depending on the proportion of owned assets, such as land, on the farm. For example, a farm owning all the land it farms will likely have a very low asset turnover ratio because the land value far exceeds annual revenue generated. Owning a high percentage of assets is likely most common on farms that have existed for multiple generations and so a low asset turnover ratio is not necessarily indicative of poor financial efficiency. In these cases, other ratios can shed additional light on the true financial efficiency of a particular farm.

Return on assets measures profitability by describing the rate of return on farm assets and is often used as an overall index of profitability. Return on assets equals net farm income plus interest expense minus unpaid operator and family labor, all divided by average total farm assets. The value or importance of return on assets can vary with the structural characteristics of the farm, especially with the proportion of owned land or other

assets used in the farming operations. Return on assets may seem low compared to non-farm investments but it should be recognized that neither realized nor unrealized gains on farm real estate are included as farm income.

VFP per worker is an efficiency measure that describes the relationship between farm production and labor (Herbel and Langemeier 2010). Number of workers includes unpaid family labor, unpaid operator labor, and hired labor. Farms that are more efficient in their labor use will have higher VFP per worker.

Crop machinery investment per crop acre is an efficiency measure that describes the relationship between the investment in cropping machinery and the number of acres farmed. Crop machinery investment represents the value of equipment attributed to the cropping systems on a farm (Herbel and Langemeier 2010).

Crop machinery cost per crop acre is an efficiency measure that describes the relationship between the costs of operating machinery and the number of acres farmed. Crop machinery cost represents the crops' share of repairs, fuel, machine hire, machinery and equipment management depreciation, farm share of auto, and eight percent interest charge on machinery investment reduced by custom work income produced by machinery use off of the farm (Herbel and Langemeier 2010). Machinery investment and operating costs are one of the major expenses associated with farming today. Albright (2002) found that having lower machinery costs was a significant factor in controlling overall production costs.

Current ratio is a liquidity measure that describes whether current farm assets would cover current farm liabilities if the current assets were liquidated. Current ratio equals total current farm assets divided by total current farm liabilities, where the higher the

ratio, the higher the farm's liquidity. Some limitations of current ratio are that it measures liquidity at a given point in time and does not measure future fund flows or the adequacy of future fund inflows in relation to outflows. Current ratio ignores committed lines of credit as financial resources available to assure timely payment of obligations. The ratio also does not recognize that many current assets cannot be liquidated instantly or that many current liabilities are not due instantly. Current assets and liabilities are based on a one-year time horizon. The current ratio is affected by the value placed on current assets, which may not be accurate or measured consistently across farms. On most balance sheets there is no indication of whether or not assets are of sufficient quality that they can be sold for the balance sheet value. Finally, businesses with limited current assets and liabilities can have a strong current ratio but limited liquidity.

Debt to asset ratio is a solvency measure that explains financial position by comparing total farm debt obligations to total farm assets. Debt to asset ratio equals total farm liabilities divided by total farm assets, where the higher the ratio, the greater the risk exposure of the farm. Debt to asset ratio can be calculated using either the cost or market value of assets. KFMA utilizes a modified cost approach that is a mixture of the cost and market value methods. KFMA revalues land every five years and machinery assets are valued at cost minus economic depreciation. Some limitations of debt to asset ratio are that it is heavily influenced by asset values and miscalculating those values can easily make the ratio higher or lower than the true value. Another limitation is that appropriate values for this ratio vary for different types of farms. The range of acceptable values varies depending on income variability, proportion of owned land, risks associated with normal production, and agricultural asset value fluctuations due to changing demand.

### **3.4 KFMA Comparisons**

ABC Farm's financial performance will be compared to six different groups of KFMA farms using the financial ratios described in the previous section. Each year's financial performance from 2002 through 2011 will be compared. In order for the comparisons to be of value to ABC Farm, KFMA comparison groups must be selected with a particular goal in mind that explains why each comparison is being made. For example, comparing ABC Farm, which is primarily an irrigated crop farm, to a group containing only hog farms would not be of value unless there were some reason for the comparison. Since ABC Farm does not have a goal of entering the hog farming business, such a comparison would be of limited value to ABC Farm.

The first group that will be compared will be all KFMA member farms in the NE region. The purpose of this comparison is to explain how ABC Farm compares to the baseline or average for farms located in the same geographical region of Kansas. This comparison is of value because it establishes ABC Farm's financial position relative to the average of the NE region.

The second group that will be compared will be farms with similar VFP from the NE region. ABC Farm's VFP has trended higher from 2002 through 2011 and it is likely other farms have experienced similar increases. Therefore the VFP criteria will change over the years, but the goal of comparing to similar VFP will remain. This comparison will explain how ABC Farm compares to farms of similar size in terms of production value in northeast Kansas. This is a very important comparison because it will show how ABC Farm has performed compared to farms that should have similar economies of scale.

The third group that will be compared will be farms of the same farm type as ABC Farm from the NE region, or the STATE region if sufficient data are not available for the

NE region. ABC Farm is classified as an irrigated crop farm. This comparison will explain how ABC Farm compares to other farms that are in a similar business. Corn and soybean are ABC Farm's primary crops and they are also the primary crops grown under irrigation in northeast Kansas. So, other farms classified as irrigated crop farms in the NE region are very likely to be in a similar business to ABC Farm. As noted above, state averages might have to be used to gather a large enough sample to make the comparison valid because irrigated crop farms are not the most common farm type in the NE region.

The fourth group that will be compared will be the highest 25 percent in terms of net farm income in the NE region. Each year KFMA publishes reports that divide association member farms into quartiles based on net farm income. The top quartile is the top 25 percent. This group represents the highest net farm income group in the NE region and will provide a valuable comparison of ABC Farm to the most profitable farms.

The fifth group that will be compared will be farms with total crop area exceeding 2,000 acres in the NE region. This group represents farms of similar size in terms of crop acreage to ABC Farm and will provide a valuable comparison to the largest farms in terms of crop acreage. The greater than 2,000 acre category is the largest category in the NE region.

The sixth and final group that will be compared will be farms in the NE region in the lowest 25 percent in terms of adjusted total expense ratio. This group represents the most financially efficient group in that their total expense per dollar of farm production is the lowest in the NE region. This is potentially one of the most valuable of all comparisons because it will provide insight into ABC Farm's financial efficiency.

### **3.5 Total Crop Acre Growth Trend Comparisons**

The total crop acre growth trend for ABC Farm was compared to the trend for each of the six groups. Total crop acre growth rates were computed using 2002 to 2011 data for ABC Farm and each group, and the exponential trend feature in EXCEL. This was done by creating graphs displaying total crop acres on the Y axis and year on the X axis. Exponential trendlines were then displayed on each graph along with the exponential equation. The rate of change portion of the equation was then extracted and reported. This procedure was also used to determine and report the rate of change for the other variables studied in this thesis.

## **CHAPTER IV: DATA**

### **4.1 Introduction**

Chapter four presents and describes the data used to compare ABC Farm's financial performance to groups of KFMA member farms. Specifically, Section 4.2 provides information on the data sources used and Section 4.3 describes the summary data for ABC Farm. Table 4.1 shows ABC Farm's financial data from 2002 through 2011.

### **4.2 Data Sources**

Data used in this study were collected from two sources. ABC Farm data were collected from ABC Farm's financial records that were provided to Mark Dikeman, KFMA NE Region Extension Ag Economist. The data were then organized so that they matched the standard format used by KFMA. ABC Farm Annual Reports were created for each year from 2002 through 2011. In doing this, ABC Farm's data should be the same as if ABC Farm had been a KFMA member and the data had been collected each year.

All of the KFMA member comparison data were extracted from KFMA reports that are published annually. As explained above, KFMA collects and summarizes the same types of data from each member farm. Once collected, the data can be sorted many different ways and reports created that provide different perspectives and include different farm groups. For example, a summary report can be created that lists average values for all farms in a particular region. Another report can be created that separates farms into net farm income quartiles. Each KFMA Association publishes 14 different annual reports. Data for this study were collected from six of those reports including the Summary, Value of Farm Production, Farm Type, Net Farm Income Quartiles, Acreage, and Adjusted Total Expense Ratio reports.

#### **4.3 Data and Trends for ABC Farm**

Table 4.1 shows ABC Farm's financial data from 2002 through 2011. VFP averaged \$1.47 million and ranged from a low of \$0.92 million in 2002 to a high of \$2.13 million in 2009. VFP increased at an average rate of 9.8 percent per year. Net farm income averaged \$744,000 and ranged from a low of \$323,000 in 2002 to a high of \$1.2 million in 2011. Net farm income increased at an average rate of 15 percent per year.

The adjusted total expense ratio averaged 0.54 and ranged from a low of 0.45 in 2007 to a high of 0.68 in 2002. The adjusted total expense ratio decreased at an average rate of 4.4 percent per year. The operating profit margin ratio for ABC Farm averaged 0.46 and ranged from a low of 0.32 in 2002 to a high of 0.55 in 2007. The operating profit margin ratio increased at an average rate of 5.5 percent per year.

The asset turnover ratio averaged 0.14 and ranged from a low of 0.11 in 2005 to a high of 0.18 in 2009. The asset turnover ratio increased at an average rate of 1.4 percent per year. The percent return on assets averaged 6.5 percent and ranged from a low of 3.9 percent in 2005 to a high of 9.7 percent in 2009.

VFP per worker averaged about \$450,000 and ranged from a low of \$282,000 in 2002 to a high of \$656,000 in 2011. VFP per worker increased at an average rate of 10 percent per year.

Total crop acres averaged 2,879 acres and ranged from a low of 2,384 acres in 2002 to a high of 3,144 acres in 2011. Actual farmed acreage only changed once during the study period when ABC Farm started renting additional land in 2006. Other acreage changes shown in Table 4.1 resulted from more or less double cropping and other minor field changes from year-to-year. Over the entire study period, total crop acres increased at an average rate of 3.3 percent per year.

Crop machinery investment per crop acre averaged \$202 per acre and ranged from a low of \$151 per acre in 2003 to a high of \$264 per acre in 2009. Crop machinery investment per crop acre increased at an average rate of 5.8 percent per year. Crop machinery cost per crop acre averaged \$61 per acre and ranged from a low of \$43 per acre in 2003 to a high of \$68 per acre in 2011. Crop machinery cost per acre increased at an average rate of 2.0 percent per year.

The current ratio was well above 2.0, a commonly suggested target, during the entire period. The debt to asset ratio was also very low over the period, averaging 0.002. ABC Farm has no long-term liabilities and stays current on short-term liabilities. In addition, all of ABC Farm's assets are owned. This combination makes the current ratio unusually high and the debt to asset ratio unusually low.

**Table 4.1: ABC Farm Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	10 Yr Ave
Value of Farm Production (\$)	917,375	1,064,622	1,020,044	1,097,778	1,332,727	1,602,311	1,617,364	2,131,292	1,815,680	2,080,256	1,467,945
Net Farm Income (\$)	323,116	471,373	437,357	401,155	636,704	930,586	834,431	1,193,299	1,020,621	1,193,474	744,212
Adjusted Total Expense Ratio	0.6772	0.5826	0.5977	0.6592	0.5429	0.4478	0.5134	0.4636	0.4668	0.4579	0.5409
Operating Profit Margin Ratio	0.3228	0.4174	0.4024	0.3410	0.4571	0.5522	0.4866	0.5364	0.5332	0.5421	0.4591
Asset Turnover Ratio	0.1322	0.1372	0.1271	0.1142	0.1317	0.1546	0.1498	0.1815	0.1187	0.1398	0.1387
Return on Assets (%)	4.27	5.73	5.11	3.89	6.02	8.54	7.29	9.74	6.33	7.58	6.45
Value of Farm Production/Worker (\$)	282,269	327,576	313,860	337,778	410,070	493,019	497,650	655,782	558,671	656,232	453,291
Total Crop Acres Farmed (acre)	2,384	2,560	2,564	2,560	3,128	3,130	3,117	3,088	3,111	3,144	2,879
Crop Machinery Investment (\$/acre)	172.07	150.66	158.95	200.48	185.78	176.24	215.98	264.06	254.08	244.56	202.29
Crop Machinery Cost (\$/acre)	70.37	42.90	54.54	67.27	57.19	56.81	63.19	66.14	64.58	68.00	61.10
Current Ratio	583.16	726.31	799.25	704.49	838.95	1,166.36	759.18	650.34	1,812.25	1,115.88	915.62
Debt to Asset Ratio	0.0088	0.0059	0.0039	0.0003	0.0003	0.0002	0.0003	0.0005	0.0002	0.0002	0.0021

## **CHAPTER V: BENCHMARK COMPARISONS**

### **5.1 Introduction**

Section 5.2 discusses general observations pertaining to the comparisons between ABC Farm and each group. Sections 5.3 through 5.8 compare ABC Farm's financial performance to six KFMA groups including all the farms in the NE region, NE region farms with similar VFP, STATE irrigated crop farms, NE region farms in the highest net farm income quartile, NE region farms in the highest crop acre category, and NE region farms in the lowest adjusted total expense ratio quartile. Section 5.9 describes acreage growth trends for ABC Farm and each KFMA group. Table 5.1 shows the 10-year averages for ABC Farm and each comparison group. Tables 5.2 through 5.7 present annual data for each comparison group. Table 5.7 does not include 2002 data because KFMA did not begin publishing adjusted total expense ratio quartile data until 2003. Table 5.8 presents crop acreage data for ABC Farm and each comparison group.

### **5.2 General Observations**

Comparing to group averages is both a blessing and a curse. Individual farms obviously do not want everyone else knowing their intimate financial details so having access to data in the form of group averages is a great blessing. Averages smooth out the unusual and point directly at the middle of each group, which is also a blessing. However, the data clearly show that ABC Farm does not really match or align well with the average of any particular group, which then makes one wish for more farm specific data with which to compare.

Several general themes or observations were apparent when comparing ABC Farm to the various KFMA groups. ABC Farm's 10-year average VFP, net farm income, operating profit margin, and current ratio were substantially higher than any of the

comparison groups. Adjusted total expense ratio, asset turnover ratio, and debt to asset ratio were substantially lower than any of the comparison groups. Other factors, including return on assets, VFP per worker, total crop acres, crop machinery investment per acre, and crop machinery cost per acre were reasonably similar to at least one or more KFMA group.

VFP is often used as a farm size indicator. Previous research has shown that larger farms tend to be more profitable and efficient, which is supported by the results in Table 5.1 and could partially explain some of the differences between ABC Farm and KFMA groups.

ABC Farm owns free and clear all of the physical property used to generate revenue. ABC Farm does not have any long-term liabilities and stays current on short-term liabilities. Therefore, ABC Farm's current ratio was considerably higher and the debt to asset ratio was considerably lower than all of the comparison groups.

ABC Farm's asset turnover ratio was lower than all of the comparison groups. Asset turnover ratio equals VFP divided by average total farm assets. Since ABC Farm's VFP was higher than all of the groups but the asset turnover ratio was lower, the asset portion of the equation was responsible. If ABC Farm rented most of its cropland to generate the same revenue, the asset turnover ratio would be higher.

### **5.3 NE KFMA Farms**

The primary purpose of including all NE region farms was to establish a NE region average farm baseline. ABC Farm was not expected to be similar to the average NE region farm and that turned out to be the case. The value from including the group comes from having a picture of how ABC Farm compares to the average NE region farm.

In terms of VFP and net farm income, the difference between ABC Farm and NE region farms steadily widened during the 10-year study period. The difference stayed

about the same between ABC Farm and NE region farms in terms of adjusted total expense ratio, operating profit margin ratio, and asset turnover ratio. VFP per worker increased steadily for both ABC Farm and NE region farms and the difference remained steady. Machinery investment per crop acre was very similar for both ABC Farm and NE region farms throughout the study period. Machinery cost per crop acre was also similar until 2007 when machinery cost per crop acre started trending higher for NE region farms. By 2011 the machinery cost per crop acre difference was \$28 per acre.

#### **5.4 NE KFMA Farms with the Highest Value of Farm Production**

From 2002 through 2008, those farms having VFP greater than \$500,001 were in the highest VFP category and an average of 47 farms in the NE region met that criteria. The average VFP during that period was \$767,000. ABC Farm's average VFP during that time was over \$1.2 million so ABC Farm was considerably larger than the average of the highest VFP category. In 2009 and 2010, the highest VFP category increased to \$1,000,001 and in 2011 it increased to \$1,250,000. During those years 27, 29, and 25 farms in the NE region met that criteria. For 2009 and 2010, the average VFP for the highest VFP category was slightly below \$1.5 million and in 2011 it was a little over \$2 million. ABC Farm's VFP was about \$2 million each year from 2009 through 2011. So, NE region farms in the highest VFP category were catching up to ABC Farm in terms of VFP. This could be attributed to a faster crop acreage growth rate by NE region farms in the highest VFP category. Their crop acreage growth rate averaged 4.9 percent per year compared to ABC Farm's 3.3 percent per year.

The difference in net farm income between ABC Farm and NE region farms in the highest VFP category was fairly steady from 2002 through 2005. The difference then widened from 2006 through 2010, and narrowed in 2011. In terms of adjusted total

expense ratio and operating profit margin ratio the difference between ABC Farm and farms in the highest VFP category remained fairly constant over the 10-year period. Asset turnover ratio was consistently higher for farms in the highest VFP category. VFP per worker steadily increased for both ABC Farm and farms in the highest VFP category and the difference between the two remained steady. Highest VFP farms steadily reduced the difference in total crop acres. Machinery investment per crop acre was similar throughout the study period. Machinery cost per crop acre was similar until 2007 when machinery cost per crop acre started trending higher for highest VFP farms. By 2011 the difference in machinery cost per crop acre between ABC Farm and farms in the highest VFP category was \$49 per acre. Figure 5.1 shows the relationship between ABC Farm and farms in the highest VFP category in terms of machinery investment per crop acre and machinery cost per crop acre.

## **5.5 STATE KFMA Irrigated Farms**

KFMA classifies ABC Farm as an irrigated crop farm. Few farms are classified as such in the NE region. An average of six irrigated crop farms existed in the NE region during the study period. Average irrigated crop data were only published six of 10 years because too few farms were classified as irrigated crop farms. However, for the state the number of irrigated crop farms between 2002 and 2011 averaged 81. Therefore, the following section compares ABC Farm to irrigated crop farms in the entire state.

Most of ABC Farm's 10-year average values for the factors measured were better than STATE irrigated crop farm averages. However, trends for several factors show that the STATE irrigated crop farms were catching up. The difference in VFP was fairly steady through 2009 but narrowed considerably in 2010 and 2011. Net farm income showed a similar trend where the difference actually widened through 2009, but has since narrowed.

Adjusted total expense ratio, total crop acres, and operating profit margin ratio were trending closer to ABC Farm during the entire 10-year period. The asset turnover ratio for the STATE has been trending lower since 2007, but was still considerably higher than ABC Farm's asset turnover ratio, which remained relatively stable. VFP per worker trended higher for both ABC Farm and the STATE irrigated crop farms. The VFP per worker for the STATE irrigated crop farms was higher than ABC Farm in 2010 and 2011. For most years, ABC Farm's machinery investment per crop acre was higher than that for the STATE irrigated crop farms, which was different than the comparison between ABC Farm and the other KFMA groups. Machinery cost per crop acre was higher for the STATE irrigated crop farms and the difference was relatively stable throughout the study period.

## **5.6 NE KFMA Farms in the Top Net Farm Income Quartile**

Net farm income for the NE region's highest quartile group averaged \$264,895 compared to \$744,212 for ABC Farm. The net farm income trend between the highest quartile group and ABC Farm steadily widened during the 10-year period. The difference in VFP, adjusted total expense ratio, operating profit margin ratio, VFP per worker, return on assets, and total crop acres remained fairly steady from 2002 through 2011. The highest net farm income quartile consistently had a higher asset turnover ratio and return on assets than ABC Farm, but ABC Farm was consistently better in the other categories. Machinery investment per crop acre has been steadily increasing for both ABC Farm and the high net farm income quartile group. Machinery cost per crop acre had an upward trend for the highest quartile group beginning in 2006. The highest quartile group's machinery costs per crop acre were almost double that of ABC Farm by 2011.

## **5.7 NE KFMA Farms in the Highest Crop Acre Category**

Acreage criteria for being in the NE region's highest crop acre category changed a couple times during the 2002 through 2011 time period. From 2002 through 2004, the highest category required at least 1,751 crop acres and an average of 39 farms met that criteria. From 2005 through 2010, the highest category required at least 2,100 crop acres and an average of 27 farms met that criteria. In 2011 the highest category required at least 2,000 acres and 34 farms met that criterion. From 2002 through 2005, ABC Farm operated an average of 2,517 crop acres. From 2006 through 2011, ABC Farm operated an average of 3,120 acres.

VFP for both the highest crop acre group and ABC Farm steadily increased during the study period with the difference remaining steady at about \$0.5 million, nearly the same as the average difference for the period. Net farm income also steadily increased for both. The difference in net farm income steadily increased until 2011 when ABC Farm's net farm income was more than double the net farm income for the highest crop acre group. Adjusted total expense ratio gradually declined and operating profit margin ratio gradually increased for both groups with the difference remaining steady near the average difference. Asset turnover ratio and return on assets were consistently higher for the highest crop acre group, but return on assets for the highest crop acre group has been declining since 2006. Machinery investment per crop acre has been steadily increasing for both ABC Farm and the highest crop acre group. Machinery cost per crop acre for the highest crop acre group started trending higher than ABC Farm in 2006. By 2011 the difference was \$34 per acre in favor of ABC Farm.

## **5.8 NE KFMA Farms in the Lowest Adjusted Total Expense Ratio Quartile**

Ten-year average adjusted total expense ratio was 0.88 for NE region farms in the lowest adjusted total expense ratio quartile and 0.54 for ABC Farm. Throughout the 10-year period, the adjusted total expense ratio trend was lower for both and the difference remained about the same.

VFP for both the lowest adjusted total expense ratio quartile and ABC Farm steadily increased during the study period with the difference gradually increasing over time. Net farm income also steadily increased for both, and the difference steadily increased until 2011 when ABC Farm's net farm income was 2.7 times more than that for the lowest adjusted total expense ratio quartile. Asset turnover ratio and return on assets was consistently higher for the highest crop acre quartile. VFP per worker steadily increased for both. In 2011, VFP per worker for ABC Farm and the lowest adjusted total expense ratio quartile was similar. Total crop acres for the lowest adjusted total expense ratio quartile have been declining since 2008 while ABC Farm's total crop acres remained steady. Machinery investment per crop acre steadily increased. The difference in crop investment per acre between ABC Farm and the lowest adjusted total expense ratio quartile was similar for the entire study period. Machinery cost per crop acre for the lowest adjusted total expense ratio quartile started trending higher than ABC Farm beginning in 2007. By 2011 the difference was \$35 per acre in favor of ABC Farm.

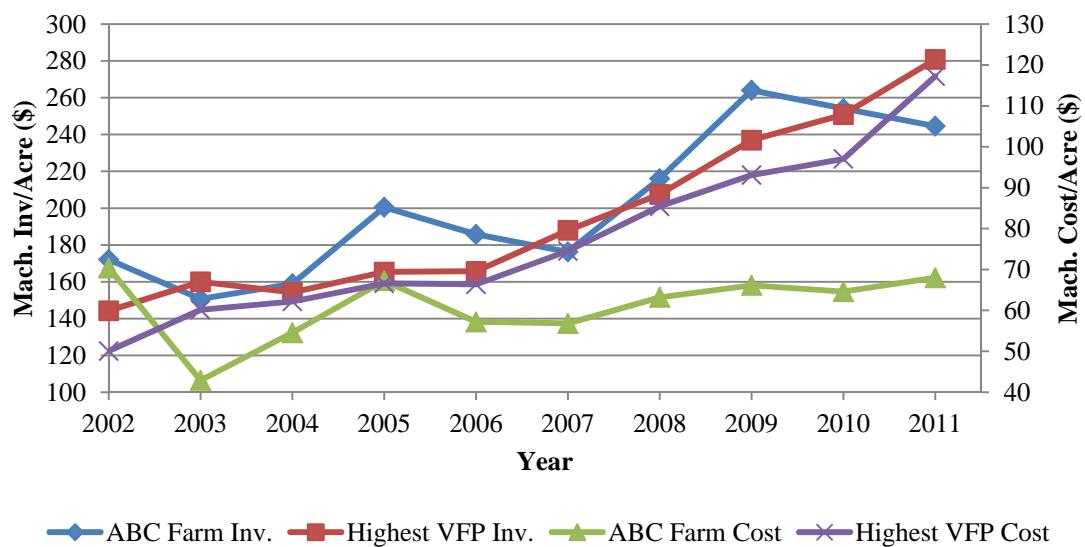
## **5.9 KFMA Group Acreage Growth Trends**

During the study period, total crop acreage for all farms in the NE region averaged 978 acres and grew at an average rate of 3.2 percent per year. Total crop acreage for NE region farms in the highest VFP category averaged 2,100 acres and grew at an average rate of 4.9 percent per year. Acreage peaked in 2009 and declined in both 2010 and 2011.

Total crop acreage for STATE irrigated crop farms averaged 1,872 acres and grew at an average rate of 6.4 percent per year. Total crop acreage for NE region farms in the highest net farm income quartile averaged 1,647 acres and grew at an average rate of 4.8 percent per year. Acreage stopped increasing in 2008 and actually decreased in 2010, and 2011. Total crop acreage for NE region farms in the highest acreage category averaged 2,626 acres and grew at an average rate of 2.3 percent per year. Again, acreage stopped increasing in 2008, was flat through 2010, and decreased in 2011. Total crop acreage for NE region farms in the lowest adjusted total expense quartile averaged 1,237 acres and grew an average rate of 1.8 percent per year. Again, acreage stopped increasing in 2008 and began a steady decline through 2011. ABC Farm's total crop acreage averaged 2,879 acres and grew at an average rate of 3.3 percent per year.

It seems unlikely that total crop acreage actually declined on very many individual farms that made up the largest farm groups. The number of farms in each KFMA group differed from year-to-year. Therefore, total crop acreage declines in some KFMA groups were more likely the result of changes in the makeup of each KFMA group rather than total crop acreage declines on individual farms.

**Figure 5.1: Machinery Investment and Cost per Crop Acre**



**Table 5.1: 10-year Average Data, 2002 to 2011**

	ABC Farm	All NE Region	Highest VFP	STATE Crop	Highest Irrigated NFI	Highest 25% Crop Acreage	Lowest 25% ATER
Number of Farms	1	262	41	81	66	31	63
Value of Farm Production (\$)	1,467,945	378,122	1,043,069	700,326	769,634	968,474	567,732
Net Farm Income (\$)	744,212	93,964	283,033	166,216	264,895	236,665	237,299
Adjusted Total Expense Ratio	0.5409	0.9141	0.8350	0.8796	0.7777	0.8766	0.7113
Operating Profit Margin Ratio	0.4591	0.1411	0.2169	0.1693	0.2641	0.1756	0.3219
Asset Turnover Ratio	0.1387	0.3163	0.4356	0.4170	0.4011	0.4435	0.3672
Return on Assets (%)	6.45	4.71	9.63	7.13	10.75	8.19	11.87
Value of Farm Production per Worker (\$)	453,291	243,457	329,712	431,154	327,669	312,934	379,162
Total Crop Acres Farmed (acre)	2,879	978	2,100	1,872	1,647	2,626	1,237
Crop Machinery Investment (\$/acre)	202.29	185.51	195.36	185.73	195.40	171.48	192.64
Crop Machinery Cost (\$/acre)	61.10	69.73	77.27	80.01	74.25	68.37	71.09
Current Ratio	915.6168	2.9581	2.6059	2.1989	3.1929	2.4494	4.1010
Debt to Asset Ratio	0.0021	0.2785	0.3500	0.3497	0.2834	0.3654	0.2235

**Table 5.2: NE Region Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Number of Farms	350	265	321	264	247	254	244	232	228	217	262
Value of Farm Production (\$)	179,899	213,380	278,742	292,960	303,127	403,807	471,706	486,751	499,521	651,323	378,122
Net Farm Income (\$)	10,082	38,630	79,013	68,520	54,341	114,903	121,891	117,854	120,647	213,758	93,964
Adjusted Total Expense Ratio	1.1035	1.0151	0.8897	0.9250	0.9701	0.8439	0.8614	0.8785	0.8793	0.7750	0.9141
Operating Profit Margin Ratio	-0.0158	0.0468	0.1631	0.1299	0.0927	0.2171	0.1879	0.1684	0.1647	0.2566	0.1411
Asset Turnover Ratio	0.2476	0.2928	0.3520	0.2894	0.2801	0.3537	0.3679	0.3490	0.2873	0.3433	0.3163
Return on Assets (%)	-0.39	1.37	5.74	3.76	2.60	7.68	6.91	5.88	4.73	8.81	4.71
Value of Farm Production per Worker (\$)	121,860	146,757	182,381	194,716	197,761	268,430	283,419	304,794	326,906	407,546	243,457
Total Crop Acres Farmed (acre)	837	887	878	921	945	996	1,061	1,081	1,090	1,087	978
Crop Machinery Investment (\$/acre)	137.00	140.76	148.62	154.99	159.66	174.92	191.72	220.39	269.66	257.39	185.51
Crop Machinery Cost (\$/acre)	49.71	51.35	57.26	61.72	62.95	68.83	79.40	82.10	88.13	95.87	69.73
Current Ratio	2.2000	2.6000	2.5650	2.8650	2.8000	3.0700	3.3050	3.5800	3.1611	3.4345	2.9581
Debt to Asset Ratio	0.3250	0.2950	0.3300	0.2750	0.2800	0.2900	0.2850	0.2650	0.2280	0.2120	0.2785

**Table 5.3: NE Region Highest Value of Farm Production Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Minimum VFP (\$)	500,001	500,001	500,001	500,001	500,001	500,001	500,001	1,000,001	1,000,000	1,250,000	
Number of Farms	15	19	51	41	41	74	89	27	29	25	41
Value of Farm Production (\$)	651,619	653,739	736,438	777,625	782,978	842,451	924,433	1,477,995	1,431,468	2,151,941	1,043,069
Net Farm Income (\$)	64,723	142,344	219,449	208,767	152,758	258,705	271,380	358,071	378,630	775,498	283,033
Adjusted Total Expense Ratio	0.9447	0.9147	0.8278	0.8482	0.9094	0.7783	0.7910	0.8269	0.8106	0.6987	0.8350
Operating Profit Margin Ratio	0.1410	0.1456	0.2251	0.2022	0.1467	0.2822	0.2521	0.2177	0.2283	0.3282	0.2169
Asset Turnover Ratio	0.3543	0.4349	0.4871	0.4146	0.3640	0.4500	0.4633	0.4856	0.4240	0.4780	0.4356
Return on Assets (%)	5.00	6.33	10.96	8.38	5.34	12.70	11.68	10.57	9.68	15.69	9.63
Value of Farm Production per Worker (\$)	148,158	203,291	237,861	263,711	268,412	340,106	349,955	426,345	469,122	590,155	329,712
Total Crop Acres Farmed (acre)	1,500	2,092	1,904	1,859	2,080	1,752	1,858	2,743	2,619	2,594	2,100
Crop Machinery Investment (\$/acre)	144.26	159.99	154.19	165.34	165.68	188.00	207.48	236.96	250.84	280.82	195.36
Crop Machinery Cost (\$/acre)	50.07	60.14	62.19	66.61	66.37	74.53	85.45	93.08	97.04	117.24	77.27
Current Ratio	2.0150	1.7000	1.8800	2.3650	2.5150	2.5650	3.1100	3.3250	3.0207	3.5629	2.6059
Debt to Asset Ratio	0.3650	0.4500	0.4450	0.3600	0.3450	0.3550	0.3300	0.3350	0.2857	0.2296	0.3500

**Table 5.4: STATE Irrigated Crop Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Number of Farms	123	118	119	74	68	63	59	54	62	70	81
Value of Farm Production (\$)	296,720	378,592	420,195	488,888	553,385	896,855	763,096	815,001	1,040,537	1,349,994	700,326
Net Farm Income (\$)	7,605	50,585	61,034	50,116	79,724	265,912	159,308	180,578	323,039	484,256	166,216
Adjusted Total Expense Ratio	1.0880	0.9710	0.9539	0.9778	0.9420	0.7534	0.8439	0.8391	0.7399	0.6867	0.8796
Operating Profit Margin Ratio	-0.0117	0.0887	0.0958	0.0874	0.1168	0.2918	0.1930	0.2012	0.2906	0.3395	0.1693
Asset Turnover Ratio	0.3472	0.4528	0.4799	0.3872	0.3763	0.5183	0.4986	0.3838	0.3600	0.3659	0.4170
Return on Assets (%)	-0.41	4.02	4.60	3.38	4.40	15.12	9.62	7.72	10.46	12.42	7.13
Value of Farm Production per Worker (\$)	203,372	250,889	276,872	312,686	343,341	575,375	517,502	497,851	608,846	724,801	431,154
Total Crop Acres Farmed (acre)	1,420	1,532	1,455	1,652	1,762	2,055	1,879	2,118	2,237	2,613	1,872
Crop Machinery Investment (\$/acre)	142.95	143.09	160.94	167.25	187.54	188.75	176.37	227.31	225.29	237.81	185.73
Crop Machinery Cost (\$/acre)	66.52	63.38	72.33	75.06	76.61	81.87	87.24	88.58	94.12	94.42	80.01
Current Ratio	1.2700	1.3000	1.5800	1.7100	1.8550	2.0700	2.7700	2.6950	3.2000	3.5385	2.1989
Debt to Asset Ratio	0.4362	0.4752	0.4450	0.4000	0.3450	0.3500	0.3150	0.2950	0.2315	0.2039	0.3497

**Table 5.5: NE Region Highest Net Farm Income Quartile Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Number of Farms	88	66	80	66	62	64	61	58	57	55	66
Value of Farm Production (\$)	326,312	403,930	582,207	602,965	600,896	790,916	997,789	996,934	1,013,783	1,380,606	769,634
Net Farm Income (\$)	74,817	128,837	204,617	195,798	169,123	303,527	351,982	321,465	339,018	559,766	264,895
Adjusted Total Expense Ratio	0.8587	0.8559	0.7948	0.8118	0.8501	0.7059	0.7248	0.7567	0.7504	0.6681	0.7777
Operating Profit Margin Ratio	0.2080	0.1883	0.2483	0.2328	0.1953	0.3404	0.3109	0.2767	0.2860	0.3544	0.2641
Asset Turnover Ratio	0.3061	0.3745	0.4495	0.4006	0.3645	0.4428	0.4943	0.4441	0.3368	0.3979	0.4011
Return on Assets (%)	6.37	7.05	11.16	9.33	7.12	15.07	15.37	12.29	9.63	14.10	10.75
Value of Farm Production per Worker (\$)	159,619	195,307	225,881	246,871	253,095	362,338	415,461	436,394	433,111	548,612	327,669
Total Crop Acres Farmed (acre)	1,201	1,355	1,537	1,439	1,660	1,658	2,008	2,011	1,834	1,768	1,647
Crop Machinery Investment (\$/acre)	139.90	140.64	150.72	158.83	160.96	192.06	210.76	234.38	265.21	300.51	195.40
Crop Machinery Cost (\$/acre)	49.46	50.90	57.64	63.65	61.58	75.78	84.73	86.69	96.33	115.74	74.25
Current Ratio	2.3050	2.6100	2.3200	2.6350	3.1050	3.6850	3.5550	4.0700	3.7290	3.9150	3.1929
Debt to Asset Ratio	0.3200	0.3100	0.3500	0.3200	0.2800	0.2850	0.3050	0.2550	0.2222	0.1863	0.2834

**Table 5.6: NE Region Highest Crop Acreage Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Crop Acreage	>1,751	>1,751	>1,751	>2,100	>2,100	>2,100	>2,100	>2,100	>2,100	>2,000	
Number of Farms	37	34	45	24	23	25	28	32	30	34	31
Value of Farm Production (\$)	389,008	492,866	661,455	675,580	850,773	1,003,833	1,331,134	1,308,352	1,280,042	1,691,701	968,474
Net Farm Income (\$)	8,651	86,997	182,954	143,410	136,563	294,656	368,122	333,873	273,911	537,509	236,665
Adjusted Total Expense Ratio	1.0515	0.9677	0.8511	0.9124	0.9416	0.7953	0.8013	0.8227	0.8693	0.7532	0.8766
Operating Profit Margin Ratio	0.0168	0.0932	0.2006	0.1420	0.1181	0.2691	0.2465	0.2192	0.1746	0.2757	0.1756
Asset Turnover Ratio	0.3433	0.4057	0.4966	0.3765	0.4068	0.4789	0.5316	0.4959	0.4158	0.4835	0.4435
Return on Assets (%)	0.58	3.78	9.96	5.35	4.80	12.89	13.10	10.87	7.26	13.33	8.19
Value of Farm Production per Worker (\$)	148,538	208,685	233,272	265,802	248,007	386,090	336,996	395,347	417,088	489,514	312,934
Total Crop Acres Farmed (acre)	2,367	2,312	2,277	2,668	2,791	2,655	2,831	2,841	2,836	2,686	2,626
Crop Machinery Investment (\$/acre)	127.97	124.16	139.08	125.88	145.73	166.89	187.88	213.36	233.20	250.61	171.48
Crop Machinery Cost (\$/acre)	47.63	47.15	54.34	53.38	58.25	69.29	79.59	80.40	91.18	102.47	68.37
Current Ratio	1.7350	1.4700	1.9900	2.3450	1.8900	2.5000	2.7000	3.3950	2.8424	3.6265	2.4494
Debt to Asset Ratio	0.3700	0.4150	0.4200	0.3250	0.4250	0.3900	0.4100	0.3350	0.3094	0.2545	0.3654

**Table 5.7: NE Region Lowest Adjusted Total Expense Ratio Quartile Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
Number of Farms		67	81	66	61	62	61	58	57	54	63
Value of Farm Production (\$)	332,514	417,572	471,137	381,282	580,990	692,940	632,452	668,843	931,859	567,732	
Net Farm Income (\$)	114,872	173,726	171,276	141,482	261,024	292,311	254,588	277,355	449,058	237,299	
Adjusted Total Expense Ratio	0.8288	0.7487	0.7826	0.7863	0.6473	0.6601	0.6838	0.6758	0.5887	0.7113	
Operating Profit Margin Ratio	0.2164	0.2848	0.2624	0.2477	0.3905	0.3680	0.3430	0.3523	0.4319	0.3219	
Asset Turnover Ratio	0.3473	0.4095	0.3659	0.3210	0.3703	0.4374	0.4147	0.2870	0.3516	0.3672	
Return on Assets (%)	7.52	11.66	9.60	7.95	14.46	16.10	14.22	10.11	15.19	11.87	
Value of Farm Production per Worker (\$)	211,974	240,736	280,895	266,112	369,829	430,441	477,633	474,121	660,720	379,162	
Total Crop Acres Farmed (acre)	1,095	1,201	1,114	1,133	1,314	1,452	1,374	1,299	1,151	1,237	
Crop Machinery Investment (\$/acre)	142.77	142.91	163.52	162.32	184.39	192.32	216.36	242.89	286.32	192.64	
Crop Machinery Cost (\$/acre)	51.55	52.14	65.70	59.50	70.58	77.27	75.28	85.03	102.78	71.09	
Current Ratio	2.6350	2.9850	2.6800	4.2950	4.6800	4.4850	4.8500	5.3836	4.9157	4.1010	
Debt to Asset Ratio	0.2900	0.2800	0.2850	0.2050	0.2050	0.2300	0.2150	0.1544	0.1468	0.2235	

**Table 5.8: ABC Farm and KFMA Group Total Crop Acre Data, 2002 to 2011**

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Growth Rate (%)
ABC Farm	2,384	2,560	2,564	2,560	3,128	3,130	3,117	3,088	3,111	3,144	2,879	3.3
STATE Irrigated Crop	1,420	1,532	1,455	1,652	1,762	2,055	1,879	2,118	2,237	2,613	1,872	4.9
Highest VFP Category	1,500	2,092	1,904	1,859	2,080	1,752	1,858	2,743	2,619	2,594	2,100	6.4
Highest NFI Quartile	1,201	1,355	1,537	1,439	1,660	1,658	2,008	2,011	1,834	1,768	1,647	4.8
All NE Region	837	887	878	921	945	996	1,061	1,081	1,090	1,087	978	3.2
Lowest ATER Quartile	1,095	1,201	1,114	1,133	1,314	1,452	1,374	1,299	1,151	1,237	1,237	1.8
Highest Acreage Category	2,367	2,312	2,277	2,668	2,791	2,655	2,831	2,841	2,836	2,686	2,626	2.3

## **CHAPTER VI: CONCLUSIONS**

### **6.1 Summary**

ABC Farm's 10-year financial performance from 2002 through 2011 was compared to six different KFMA member groups using 12 different financial measures or ratios. ABC Farm's financial records from the past 10 years were organized and then entered into the KFMA database by Mark Dikeman, KFMA NE Region Extension Ag Economist. Annual reports were generated so specific financial measures and ratios could be extracted and tabulated.

KFMA groups were chosen based on the likelihood of their being representative of the most financially successful KFMA member farms. Six different KFMA member groups were identified to compare against including all NE region farms, NE region farms in the highest VFP category, STATE irrigated crop farms, NE region farms in the highest net farm income quartile, NE region farms in the highest crop acreage category, and NE region farms in the lowest adjusted total expense ratio quartile.

Twelve financial measures or ratios were selected to use in comparing financial performance including VFP, net farm income, adjusted total expense ratio, operating profit margin ratio, asset turnover ratio, percent return on assets, VFP per worker, total crop acres farmed, crop machinery investment per crop acre, crop machinery cost per crop acre, current ratio, and debt to asset ratio. For ABC Farm, values for each financial measure were extracted from each year's annual report. The values were tabulated and 10-year averages were calculated for each financial measure. For each KFMA group, values for each financial measure were extracted from published KFMA reports for each year from 2002 through 2011. The values were tabulated and 10-year averages were calculated for

each financial measure. Ten-year averages and year-to-year trends for each financial measure were compared between ABC Farm and each KFMA group.

## 6.2 Conclusions

ABC Farm's 10-year average financial performance was better than the 10-year average of any KFMA group for most of the financial measures. For example, ABC Farm's VFP, net farm income, operating profit margin ratio, VFP per worker, total crop acres, and current ratio were all higher than any KFMA group. ABC Farm's adjusted total expense ratio, crop machinery cost per crop acre, and debt to asset ratio were also lower than those of the various KFMA groups.

Despite the relatively strong performance for ABC Farm, some measures did not compare favorably. ABC Farm's average crop machinery investment per crop acre was higher than every group. ABC Farm's average asset turnover ratio was lower than every group. ABC Farm's average percent return on assets was lower than all but one group, all NE region farms. ABC Farm's advantage in year-to-year trends either widened or stayed about the same for most financial measures and most KFMA groups. However, there were indications that some KFMA groups were catching up to ABC Farm in certain areas. For example, STATE irrigated crop farms were closing the gap in terms of total crop acres.

Results were mostly encouraging from ABC Farm's perspective in that ABC Farm's 10-year averages were better than the 10-year averages of the KFMA groups. However, the results did not indicate that ABC Farm outperformed all other farms. Each KFMA group represented an average of 31 to 262 KFMA member farms, depending on the group. Individual farms within each group performed better or worse than the average so it is possible and even likely some individual farms had better 10-year average performances than ABC Farm. Each group included only KFMA member farms, and the possibility

exists that KFMA member farms were not representative of Kansas farms in general in terms of financial performance. Perhaps KFMA member farms as a whole performed better or worse than non-member farms.

One purpose in conducting this study was to search for examples of superior financial performance so that ABC Farm could identify areas of potential improvement. The results did not identify specific areas needing improvement, but instead provided hints of areas needing further investigation, which are discussed in the next section. ABC Farm's asset turnover ratio was lower than all KFMA groups but few farms would prefer to give up abundant assets to improve that particular ratio.

ABC Farm's total crop acreage only changed once during the study period, but it was a 23 percent increase the year it occurred. Average growth for the study period was 3.3 percent per year. Average KFMA group growth ranged from 1.8 percent to 7.2 percent per year so ABC Farm's average growth was somewhere in the middle. ABC Farm is an irrigated crop farm and crop acreage continually grew among other irrigated crop farms. Therefore, ABC Farm could easily find itself losing ground to other irrigated crop farms if ABC Farm does not seek opportunities to increase crop acreage.

### **6.3 Future Strategies**

ABC Farm's owners must first decide whether or not they want to remain in the farming business. Part of that decision depends on how farming compares to other business opportunities. This thesis provided 10 years of financial performance data for ABC Farm and other northeast Kansas farms. ABC Farm's owners can compare these results to the performance of other businesses to help them make decisions regarding their farming future. If ABC Farm's owners decide they want to remain in the farming business, then future farming strategies can be formulated.

ABC Farm obviously sustained at least one competitive advantage over several northeast Kansas farm groups during the past 10 years. But, as the saying goes, past performance is no guarantee of future performance. Competitive advantages need to be identified and studied so that they can be understood well enough to be exploited in the future. For example, perhaps ABC Farm performed better because it was larger. Because average farm size has been increasing for many years, it would be possible for a once large farm to become small if it never grew and thus lose that particular competitive advantage. One way to avoid losing that particular competitive advantage would be to implement a growth strategy. However, farm size is just one potential reason for sustained competitive advantage. There are likely many reasons why ABC Farm did well and size may have only been a small part of ABC Farm's success. That is why ownership and management need to evaluate and find out why ABC Farm did well. Implementing a growth strategy is likely a good idea, but will it result in the greatest bang for the buck? If ownership decides ABC Farm should grow, how should growth occur? Should more land be purchased? Is renting farmland a possibility? What about doing more custom farming work? Clearly, just deciding to grow is not the only answer to a complicated set of questions.

Once ABC Farm's competitive advantages are identified, they must be sorted or ranked according to their ability to be exploited in the future and their potential future benefit. For example, suppose ABC Farm believes its grain yields are higher than most other farms. Is that an advantage ABC Farm can continue to exploit? If ABC Farm were to expand crop acreage onto less productive land could ABC Farm also maintain a yield advantage? Many competitive advantages are related to and dependent on each other and

exploiting one might negatively impact others. Determining the best way to compete is likely a bigger project than measuring and comparing past financial performance.

Areas needing further investigation include ABC Farm's crop machinery investment cost per acre, asset turnover ratio, and return on assets relative to other KFMA member groups. Why was ABC Farm's crop machinery investment per acre higher than other groups while crop machinery cost per acre was lower than other groups? Is this a competitive advantage or disadvantage for ABC Farm? Is it something ABC Farm should continue, or are there ways to reduce machinery investment while maintaining low machinery costs? What can or should ABC Farm do to improve its asset turnover ratio and return on assets? Increasing VFP by renting additional crop acreage or performing more custom work would improve both ratios.

Measuring and comparing financial performance was an exercise of looking at the past, which is black and white. Exploiting competitive advantages in the future involves making wise decisions about unforeseen circumstances. One way to minimize the risks associated with the unknown is to limit the exposure by experimenting on a small scale rather than betting the whole farm.

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