

# Financial Statement Analysis

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Managing a farm business from a tax return or a lender's required statements is no longer good enough. Today's farm manager needs to use the same methods used by mainstream business managers in order to stay in business. Financial statements are the means by which success is achieved. Not only must today's managers be able to create these financial statements, but he must also be able to analyze and interpret them.

Financial statement analysis helps identify the operation's financial strengths and weaknesses and develop strategies for the future. Increasingly, agriculture has been developing standardized financial databases containing benchmarks for comparison between operations. However, the best indication of the health of the business is its own track record over time. Comparing the business to its past performance each year, can help determine if the business is growing or shrinking financially, and how the change is occurring. When historical, current and projected financial statements are completed and key ratios calculated, the business's financial position and performance can be interpreted.

At a very minimum, the financial statements used for financial analysis are: the beginning and ending balance sheet, the income statement, and a monthly cash flow budget. The balance sheet reports the financial position of the business on a specific date and summarizes the businesses assets, liabilities, and owner's equity. The income statement summarizes the businesses income and expenses for a certain period on time (usually a calendar year) and measures the profit of the business. The cash flow budget is used to evaluate the timing and flow of money. This helps to determine when cash is available for debt payment or capital purchases. It also shows whether there is a surplus or deficit of cash in any particular time period, pointing out when savings or a credit line may be needed. Once the balance sheet and income statement are prepared, several key ratios can then be calculated to reveal strengths and weakness of the farm business.

## Why should a producer analyze his agricultural operation?

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Financial analysis of the farm operation is done with the specific goal of determining the financial position and performance of the business. The following definitions were compiled from the Farm Financial Standards Council's "Financial Guidelines for Agricultural Producers."

*Financial analysis* of an agricultural business must focus on both its present position (called financial position), the results of operations, and past financial decisions (called financial performance).

*Financial position* refers to the total resources controlled by a business and total claims against those resources at a single point in time. Measures of financial position provide an indication of the capacity of the business to withstand risk and



provide a benchmark against which to measure the results of future business decisions.

*Financial performance* refers to the results of production and financial decisions over one or more periods of time. Measures of financial performance include the impact of external forces that are beyond anyone's control (drought, grain embargoes, etc.) and the results of operating and finance decisions made in the ordinary course of business.

## **How does a producer analyze his agricultural operation?**

There are several steps that can help producers in creating and analyzing the agricultural operation. These steps should be completed in the order they are listed.

- 1. Determine the objectives of the analysis.** – Is the analysis being conducted to determine the tax liability? Is the analysis being done to apply for credit? Is the analysis being done to determine the health/profitability of the operation?
- 2. Describe the business organization and its goals.** – Is the operation expected to make a profit? Are there measurable goals with regard to profit and growth? Who is in charge of analyzing the business?
- 3. Prepare financial statements.** – Be sure to exercise consistency between previous years for comparison purposes. Make sure data is accurate and complete. Be sure to include accrual adjustments.
- 4. Calculate financial ratios and prepare historical and projected financial summaries.** – Again, check for consistency and accuracy.
- 5. Compare results to similar operations if benchmarks are available.**
- 6. Summarize analysis to help when reviewing at a later date.** – Strengths and weakness should be expressed in a clear, concise manner with proper signals to the reader (user) as to the limitations of the analysis.

## **Where to start?**

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Once the financial statements have been prepared and checked for accuracy, it is possible to access the financial performance and position of the operation. The first thing to do is examine each of the statements independently. The income statement (sometimes called a Profit and Loss Statement) summarizes income and expense for a certain time period, usually a calendar year. The very last line of the income statement “Net Income”, often referred to as “the bottom line”, tells how much profit or loss the operation experienced. Very simply, if that number is positive,

the operation made money, if it's negative, the operation lost money. While this is a measure of profitability, more standardized measures will be examined in following paragraphs.

The next statements to examine are the beginning and ending balance sheets. The balance sheet summarizes the assets and liabilities of the operation at a particular point in time. Assets are tangible property, products, or inventories, etc. that the operation either owns or is currently buying on credit. Liabilities are what the operation owes its creditors for the purchase of assets or any other financial obligations. If the dollar amount of assets exceeds the dollar amount of liabilities, the owner has equity. Equity is often referred to as Owner Equity and accounts for the dollar amount of the operation that the owner actually owns. A word of caution... Changes in equity from year to year can be due to the way assets are valued. Consistency is the key.

In terms of analyzing the operation, the next step is to calculate certain financial measures and ratios. They are generally divided into five categories, liquidity, solvency, profitability, financial efficiency and repayment capacity. The following paragraphs will examine one or two ratios or measures from each of the first four of these categories.

## Measuring Liquidity

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The two balance sheet measures most often used to evaluate liquidity are the current ratio and working capital. The current ratio is the relationship between current farm assets and current farm liabilities. It is calculated as follows:

$$\text{Current Ratio} = \text{Total current assets} \div \text{Total current farm liabilities}$$

The ratio indicates the extent to which current farm assets, if liquidated, would cover current farm liabilities. If the ratio is greater than 1.0, the operation is considered liquid. The higher the ratio, the greater the liquidity. If the ratio less than 1.0, the operation is considered ill liquid, indicating some degree of cash flow risk.

One consideration when calculating the current ratio is deferred taxes. Because the ratio determines the impact of selling all current assets, the tax consequence should be considered. It is therefore a more conservative approach to include deferred taxes as a current liability when calculating the ratio. Generally, lenders and analysts like to see a current ratio of 1.5 to 2.0.

The second gauge of liquidity is working capital. Working capital is a measure of the amount of funds available to purchase inputs and inventory items after the sale of all current assets and the payment of all current liabilities at a single point in time. It is calculated as follows:

$$\text{Working Capital} = \text{Current farm assets} - \text{Current farm liabilities}$$

Because working capital is expressed as a dollar amount, it is difficult to make comparisons between operations. Generally, working capital should be positive, but the amount needed depends on the type and size of the operation, the time of the year, and the related seasonality of the production cycle.

## Measuring Solvency

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Solvency gives an indication of the business's ability to repay all debts if all the assets were sold. If the value of the total farm assets exceeds the value of the total farm liabilities, the farm is said to be solvent. If the sale of all the farm assets would not generate enough cash to pay off all liabilities, the farm is insolvent. The difference between the value of total farm assets and total farm liabilities, generally referred to as net worth or owner's equity, is the most often used measure of solvency. The most realistic approach to calculating solvency (owner's equity) is to use the market-based value of assets, including the consideration of deferred taxes. There are three commonly used ratios to measure financial solvency: equity-to-asset ratio, debt-to-asset ratio, and the debt-to-equity ratio. All three of these ratios are related and neither is necessarily preferred. The equity-to-asset ratio measures the proportion of total farm assets owned or financed by the owner's equity capital. It is calculated as follows:

$$\text{Equity-to-Asset Ratio} = \text{Total farm equity} \div \text{Total farm assets}$$

The higher the equity-to-asset ratio, the more capital supplied by the farm owner and the less supplied by the creditors. There is no exact standard for the equity-to-asset ratio that should be applied to every farm business. However, as the percent equity increases above 0.50, the owner is supplying a greater percent of the total assets in the business than the creditors. This ratio should increase over time if the owner retains farm profits and reduces debt obligations.

The debt-to-asset ratio measures the proportion of total farm assets owed to creditors. It is calculated as follows:

$$\text{Debt-to-Asset Ratio} = \text{Total farm liabilities} \div \text{Total farm assets}$$

The higher the ratio, the greater the risk to the business and those providing loan funds. The operator has less flexibility to respond to adverse natural or market phenomenon. As with the equity-to-asset ratio, there is no exact standard for every farm business. However, a debt-to-asset ratio greater than 0.50, indicates that the owners contribute less than 50 percent of the value of the farm's assets. Faced with this situation, the creditors are likely to be cautious in advancing additional funds.

The debt-to-equity ratio measures the proportion of funds invested by the creditors versus the farm owners. It is calculated as follows:

$$\text{Debt-to-Equity Ratio} = \text{Total farm liabilities} \div \text{Total farm equity}$$

The higher the debt-to-equity ratio, the more total capital supplied by the creditors relative to the farm owner. This ratio is also referred to as the leverage ratio. Leverage refers to increasing the use of debt relative to equity as a means of financing the business. The higher the leverage ratio, the more total capital supplied by the creditors and the less by the farm owner. Lenders are particularly interested in this ratio because it shows the proportion of the risk they are taking in comparison to the owner. Many lenders prefer the debt-to-equity ratio to be less than 1.0, with requirements varying depending on whether the liabilities are secured by current, intermediate,

or long-term assets. In general, the greater the loan risk and longer the loan terms, the lower the ratio desired by the lender.

## **Measuring Profitability**

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Profitability measures the financial performance of the operation over a period of time, usually one year, as a result of the decisions made regarding the use of land, labor, capital and other management resources. The five commonly used measures to assess profitability are net farm income, net farm income from operations, rate of return on assets, rate of return on equity, and operating profit margin. The following paragraphs will only discuss the rate of return on assets and the rate of return on equity.

The rate of return on farm assets (ROA) measures the relative income generated by the assets of the farm business and is often used as an overall index of profitability. ROA is calculated as follows:

$$\text{ROA} = \frac{\begin{array}{l} \text{Net farm income from operations} \\ + \text{Farm interest expense} \\ - \text{Value of unpaid operator and family labor and management} \end{array}}{\text{Average total farm assets}}$$

Once the income statement has been developed, net farm income from operations and farm interest expense can be taken directly from the statement. The value of unpaid operator and family labor and management must be estimated. Withdrawals from the business or the amount listed as family living expense can be used to estimate unpaid operator and family labor and management. Average total farm assets can be calculated by adding total assets from the beginning balance sheet plus total assets from the ending balance sheet and dividing by 2.

This ratio is often used as an overall index of profitability. It is most meaningful for comparisons between farms when the market value approach is used to value farm assets, because cost basis values can cause extreme differences between businesses. However, because the market value of farm assets can fluctuate from year to year, it is more meaningful to use the cost approach when evaluating an individual farm business over time.

The rate of return on assets will vary among different type of agricultural operations, but the higher the ROA, the more profitable the operation. While ROA is most often compared across years within an operation, ROA for any particular year can also be compared to the average interest rate the operation is currently paying or to the cost of new borrowing. If ROA exceeds the interest rate of new proposed borrowing, then borrowing more can be used to profitably grow the business (equity). However, if ROA is less than the average interest rate the operation is currently paying, then borrowed funds are not being used profitably, and adding new debt will reduce the growth of equity. Therefore, the level of profitability is an important key to the successful use of debt financing as a strategy to increase the equity of the operation.

It should be noted that the ROA in most agricultural operations might seem low when compared to non-agricultural investments such as stocks and bonds. This is important and re-enforces the notion that people invest in agricultural operations for reasons other than profit and equity growth.

The rate of return on equity (ROE) is another measure used in determining financial performance or profitability. It is calculated as follows:

$$\text{ROE} = \frac{\text{Net farm income from operations} - \text{Value of unpaid operator and family labor and management}}{\text{Average total farm equity}}$$

As with the previous calculation, net farm income from operations and farm interest expense can be taken directly from the statement, while the value of unpaid operator and family labor and management must be estimated. The earlier discussion of issues relating to the value of unpaid operator and family labor and management is still appropriate. Average total farm equity can be calculated by adding total farm equity from the beginning balance sheet plus total farm equity from the ending balance sheet and dividing by 2. In general, the higher the ROE, the more profitable the farm business.

## **Measuring Financial Efficiency**

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There are a number of ratios that measure efficiency, which is an important component of profitability. The ratios relate physical output to selected physical inputs and help evaluate whether or not farm assets are being used efficiently to generate income. The measures most widely used in agricultural businesses are the asset turnover ratio and the four operating ratios: the operating expense ratio, the depreciation expense ratio, the farm interest expense ratio, and the net farm income from operations ratio.

The asset turnover ratio measures how efficiently farm assets are being used to generate gross revenue. Consideration should be given to the way in which assets are valued and the same approach used to calculate ROA should be used to calculate asset turnover. It is calculated as follows:

$$\text{Asset Turnover Ratio} = \frac{\text{Gross farm revenue}}{\text{Average total farm assets}}$$

This ratio can vary substantially across agricultural businesses, but the higher the ratio, the more efficiently assets are being used to generate revenue. The agricultural industry as a whole tends to have both a slow rate of asset turnover and a relatively low operating profit margin.

In addition to the asset turnover ratio, the four operating ratios that measure financial efficiency are calculated as follows:

$$\text{Operating Expense Ratio} = \frac{\text{Total operating expense} - \text{depreciation expense}}{\text{Gross farm revenues}}$$

$$\text{Depreciation Expense Ratio} = \frac{\text{Depreciation expense}}{\text{Gross farm revenues}}$$

$$\text{Interest Expense Ratio} = \frac{\text{Total farm interest expense}}{\text{Gross farm revenues}}$$

$$\text{Net Farm Income From Operation Ratio} = \frac{\text{Net farm income from operations}}{\text{Gross farm revenues}}$$

The operating expense ratio reflects the extent to which gross farm revenues are expended on farm operating inputs, excluding depreciation and interest. The higher the value of the ratio, the larger proportion of gross farm revenues needed to offset all operating expenses. Ratios in the 40 to 60 percent range indicate relative efficiency, with efficiency declining as the ratio rises.

The depreciation expense ratio measures the proportion of gross farm revenue represented by the depreciation expense (a non-cash expense). A relatively low depreciation expense ratio could indicate little difficulty in making planned and timely replacement of capital assets, or it may indicate that capital assets (usually farm machinery) are relatively old. It should be noted that IRS depreciation rules could distort this ratio.

The interest expense ratio measures the proportion of gross farm revenues required to cover the farm's interest expense. Large interest expense ratios are characteristic of highly leveraged operations. As a general rule, the interest expense ratio should be less than 0.15. Interest expense ratios over 0.15 indicate that farm interest expense is a large proportion of gross revenues and the farm is likely suffering "financial stress." The farm interest expense ratio has important implications for the profitable use of debt financing and financial risk. As indicated in earlier discussions of profitability, if the rate of return on farm assets (ROA) exceeds the cost of debt financing, increasing debt can increase growth in farm equity.

The net farm income from operations ratio measures net farm income as a proportion of gross revenues. Thus, it reflects the proportion of gross farm revenues that remain after farm-operating expenses have been paid. It is calculated on a before-tax basis.

The four operational ratios discussed above, when added together, should equal to 100 percent. The producer should always keep in mind that all of these ratios can vary widely between different operations and from year to year within an operation due to different farm types and different marketing and production systems. Therefore, it is extremely important that producers compare projected values for the coming year to the most recent averages for their own operation.

## **Conclusion**

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Analyzing the level of key financial measures and their relationships can provide valuable insights to farm and ranch managers. Comparisons of measures year to year can signal whether the business financial performance is satisfactory and whether the financial position is improving or deteriorating.



# Financial Statement Analysis

## Lesson Plan

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### I. Goals and Objectives

- A. To learn how to measure financial performance and position within an agricultural operation.
- B. To learn the process of financial analysis of an agricultural operation.

### II. Steps

- Determine the objective of the analysis.
- Describe the business organization
- Prepare financial statements
- Calculate financial ratios and prepare historical and projected financial summaries.
- Compare results to similar operations if benchmarks are available.
- Summarize analysis to help communicate financial performance and position and when reviewing at a later date.

### III. Specific Documents to Complete

#### Financial statements

Income statement  
Beginning balance sheet  
Ending balance sheet  
Monthly cash flow budget

#### Ratios\Measures

Current ratio  
Working capital  
Equity-to-asset ratio  
Debt-to-asset ratio  
Debt-to-equity ratio  
Rate of return on assets (ROA)  
Rate of return on equity (ROE)  
Asset turnover ratio  
Operating expense ratio  
Depreciation expense ratio  
Interest expense ratio  
Net farm income from operations ratio

#### **IV. Highlights/Descriptions**

Once the financial statements are created and the ratios are calculated, the process of evaluating financial performance and position can begin. Much care should be taken to make sure the numbers are accurate. Concern should also be given to the way in which assets are valued with the goal of maintaining consistency in a single years' analysis and across years.

#### **V. Potential Speakers**

- A. Extension personnel
- B. Lender
- C. Accountant

#### **VI. Review Questions**

- A. What is the difference between financial position and financial performance?

*Answer: Financial position* refers to the total resources controlled by a business and total claims against those resources at a single point in time. Measures of financial position provide an indication of the capacity of the business to withstand risk provide a benchmark against which to measure the results of future business decisions.

*Financial performance* refers to the results of production and financial decisions over one or more periods of time. Measures of financial performance include the impact of external forces that are beyond anyone's control (drought, grain embargoes, etc.) and the results of operating and finance decisions made in the ordinary course of business.

- B. What are two measures used to assess profitability?

Answer: Rate of return on assets and rate of return on equity.

**VII. For More Details**

Please refer to the following publications.

Mapp, Harry P., Evaluating Financial Performance and Position, OSU Extension Facts, Publication F-790, Oklahoma Cooperative Extension Service.

Klinefelter, Danny A., Farm and Ranch Financial Management: Cash vs. Accrual Accounting, Publication B-5077, Texas Cooperative Extension.

## Financial Statement Analysis

### Overheads

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- ✓ ***Financial position*** refers to the total resources controlled by a business and total claims against those resources at a single point in time. Measures of financial position provide an indication of the capacity of the business to withstand risk provide a benchmark against which to measure the results of future business decisions.
- ✓ ***Financial performance*** refers to the results of production and financial decisions over one or more periods of time. Measures of financial performance include the impact of external forces that are beyond anyone's control (drought, grain embargoes, etc.) and the results of operating and finance decisions made in the ordinary course of business.
- ✓ **Six steps to the analysis process**
  - Determine the objective of the analysis.
  - Describe the business organization
  - Prepare financial statements
  - Calculate financial ratios and prepare historical and projected financial summaries.
  - Compare results to similar operations if benchmarks are available.
  - Summarize analysis to help communicate financial performance and position and when reviewing at a later date.

### ✓ **Liquidity Measures**

Current Ratio = Total current assets ÷ Total current farm liabilities

Working Capital = Current farm assets – Current farm liabilities

### ✓ **Solvency Measures**

Equity-to-Asset Ratio = Total farm equity ÷ Total farm assets

Debt-to-Asset Ratio = Total farm liabilities ÷ Total farm assets

Debt-to-Equity Ratio = Total farm liabilities ÷ Total farm equity

### ✓ **Profitability Measures**

$$\text{ROA} = \frac{\begin{array}{l} \text{Net farm income from operations} \\ + \text{Farm interest expense} \\ - \text{Value of unpaid operator and family labor and management} \end{array}}{\text{Average total farm assets}}$$

$$\text{ROE} = \frac{\begin{array}{l} \text{Net farm income from operations} \\ - \text{Value of unpaid operator and family labor and management} \end{array}}{\text{Average total farm equity}}$$

### ✓ **Efficiency Measures**

$$\text{Asset Turnover Ratio} = \frac{\text{Gross farm revenue}}{\text{Average total farm assets}}$$

$$\text{Operating Expense Ratio} = \frac{\text{Total operating expense} - \text{deprec. expense}}{\text{Gross farm revenues}}$$

$$\text{Depreciation Expense Ratio} = \frac{\text{Depreciation expense}}{\text{Gross farm revenues}}$$

$$\text{Interest Expense Ratio} = \frac{\text{Total farm interest expense}}{\text{Gross farm revenues}}$$

$$\text{Net Farm Income From Operation Ratio} = \frac{\text{NFI from operations}}{\text{Gross farm revenues}}$$

# **Financial Statement Analysis**

## **Case Study Application**

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Making good management decisions is highly dependant on a producers' ability to analyze financial statements. Good financial management is a lot like good health management. By conducting regular checkups on financial condition and performance, and by taking timely action based on accurate information, producers can treat the cause of problems rather than the symptoms. The following discussion is based on the financial statements from the limited resource example of John and Jane Doe.

### **What do the Beginning and Ending Balance Sheets reveal?**

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A quick look at the beginning and ending balance sheet for John and Jane Doe reveal that the Does' net worth (equity) increased by \$690 (\$70,114 – \$70,804). The increase occurred because the capital contribution from Mrs. Doe's salary was more than the net loss experienced by the farm.

### **What does the Income Statement reveal?**

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A quick look at the income statement reveals that the farming operation lost \$15,310 when depreciation and personal living are included. This is a common occurrence in today's agricultural environment where profit margins are very tight.

Total revenue received was \$18,569, while total expenses from the operation were \$33,879. Of the \$33,879 total expenses, \$13,390 was for personal withdrawals and depreciation accounted for an additional \$3,629. Without these two expenses the farming operation would be making a positive \$1,709. However, all personal withdraws would have to come from Mrs. Does salary. Mr. Doe would not be making anything for his time, labor or management. In addition, without the depreciation expense, the operation would survive in the short run as long as it did not have to replace any equipment. This isn't feasible.

### **What does the Cash flow statement reveal?**

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A quick look at the cash flow statement reveals that the operation does not experience a cash deficit in any month during the year and in fact ends the year with more cash than it started with. The question is, "how is this possible when the farm is losing \$15,310?" The answer is found with a closer inspection of the cash flow statement. Notice that included in the Cash Inflow section of the cash flow statement is off farm income. The \$16,000 of off farm income that Mrs. Doe earns more than offsets the \$13,390 of family living expense (Owner labor found in the outflow section). Also, since depreciation is a non-cash expense, it does not show up in the cash flow statement.

## What is the bottom line?

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The bottom line from a business standpoint is the farming operation lost \$15,310 in 2002, but because Jane Doe had off-farm income that exceeded the loss plus what the family spent for living, the family's cash position grew. In effect, Jane's job subsidized the family's farming operation.

## Where do we go from here?

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The next step in analyzing the financial position and performance of the farming operation is to calculate the appropriate financial measures and ratios. The following calculations are based on the financial statements (BBS = Beginning balance sheet, EBS = Ending balance sheet, IS = Income statement, and CFS = Cash flow statement) from the John and Jane Doe case example dated 1/1/2003.

### 1. Current Ratio (*EBS*)

$$\begin{aligned} &= \text{Total current assets} \div \text{total current liabilities} \\ &= 13,776 \div 3,124 \\ &= \mathbf{4.406} \end{aligned}$$

A current ratio of 4.4 indicates that the Does' operation has 4.4 times the amount of current assets as it has current liabilities and that it should have no problem paying its current financial obligations with the current assets on hand.

### 2. Working Capital (*EBS*)

$$\begin{aligned} &= \text{Total current assets} - \text{total current liabilities} \\ &= 13,766 - 3,124 \\ &= \mathbf{\$10,642} \end{aligned}$$

A positive working capital indicates that the Does have funds available to purchase inputs and inventory items even if all current liabilities were paid off. Additionally, by looking at the balance sheet, it is clear that most of the current assets are cash, making the operation very liquid.

### 3. Equity-to-Asset Ratio (*EBS*)

$$\begin{aligned} &= \text{Total farm equity} \div \text{total farm assets} \\ &= 70,804 \div 95,994 \\ &= 0.7376, \quad (\times 100) \\ &= \mathbf{73.76\%} \end{aligned}$$

With an equity-to-asset ratio substantially above 50%, the Does are in a strong equity position. In effect, the Does own about 74% of their business.



**4. Debt-to-Asset Ratio (cost) (EBS)**

$$\begin{aligned} &= \text{Total farm liabilities} \div \text{total farm assets} \\ &= 25,189 \div 95,994 \\ &= 0.2624, \quad (\times 100) \\ &= \mathbf{26.24\%} \end{aligned}$$

With a debt-to-asset ratio of 26%, the Does' creditors are contributing substantially less than 50% of the operations total assets. It should be noted the debt-to-asset ratio and the equity-to-asset ratio are the inverse of one another.

**5. Debt-to-Equity Ratio (EBS)**

$$\begin{aligned} &= \text{Total farm liabilities} \div \text{total farm equity} \\ &= 25,189 \div 70,804 \\ &= 0.3558, \quad (\times 100) \\ &= \mathbf{35.58\%} \end{aligned}$$

The Does' debt-to-equity ratio of 35.6% indicates they supply considerably more capital to the business than their creditors. With equity nearly three times as great as debt, the lender should view the Does' equity position favorably.

**6. Return on Assets**

$$\begin{aligned} \text{ROA} &= \frac{\begin{array}{l} \text{Net farm income from operations (IS)} \\ + \text{Farm interest expense (IS)} \\ - \text{Value of unpaid operator and family labor and management (CFS)} \end{array}}{\text{Average total farm assets (BBS and EBS)}} \\ &= \frac{-15,310 + 2358 - 13,390}{(98,217 + 95,994) \div 2} \\ &= \frac{-26,342}{97,106} = -0.2713, \quad (\times 100) \\ &= \mathbf{-27.13\%} \end{aligned}$$

The Does' rate of return on assets of -27.13% indicates that the assets of the farm business do not generate sufficient income to be profitable and make a contribution to operator and family labor and management. Even without the consideration of operator and family labor and management, the rate of return on assets would be negative. This calculation re-

enforces what was learned by examining the cash flow statement. Without Mrs. Doe's non-farm income, the farming operation could not exist in the future.

## 7. Return on Equity

$$\begin{aligned}
 \text{ROE} &= \frac{\text{Net farm income from operations (IS)} - \text{Value of unpaid operator and family labor and management (CFS)}}{\text{Average total farm equity (BBS and EBS)}} \\
 &= \frac{-15,310 - 13,390}{(70,114 + 70,804) \div 2} \\
 &= \frac{-28,700}{70,459} = -0.4073, \quad (\times 100) \\
 &= \mathbf{-40.73\%}
 \end{aligned}$$

The Does' rate of return on equity of -40.7% indicates that the Does lost 40.7% of the value of the equity they have invested in the operation. Compared with even the most conservative rate they could earn on a bank CD (for example 2%), they are giving up a lot of potential income for the privilege of farming.

## 8. Asset Turnover Ratio

$$\begin{aligned}
 &= \frac{\text{Gross farm revenues (IS)}}{\text{Average total farm assets (BBS and EBS)}} \\
 &= \frac{18,569}{(98,217 + 95,994) \div 2} \\
 &= \frac{18,569}{97,105} = 0.1913, \quad (\times 100) \\
 &= \mathbf{19.13\%}
 \end{aligned}$$

The asset turnover ratio measures how efficiently farm assets are being used. The Does' ratio indicates their assets only turnover 19.13% per year. While this may be low, relatively speaking, it is in the range for agricultural operations.

## 9. Operating Expense Ratio

$$= \frac{\text{Total operating expense} - \text{interest} - \text{depreciation expense (IS)}}{\text{Gross farm revenue (IS)}}$$

$$\begin{aligned}
&= \frac{33,879 - 2,358 - 3,629}{18,569} \\
&= \frac{27,892}{18,569} = 1.5021, \quad (\times 100) \\
&= \mathbf{150.21\%}
\end{aligned}$$

The Does operating expense ratio of 150% indicates that their gross farm income is not enough to offset their operating expenses. Since a relatively efficient range would be 40 to 60 percent, the Does are well below average in terms of operating efficiency.

#### 10. Depreciation Expense Ratio

$$\begin{aligned}
&= \frac{\text{Depreciation expenses (IS)}}{\text{Gross farm revenue (IS)}} \\
&= \frac{3,629}{18,569} = 0.1954, \quad (\times 100) \\
&= \mathbf{19.54\%}
\end{aligned}$$

The Does' depreciation expense ratio indicates that it takes almost 20% of their gross farm revenues to cover depreciation expenses. This suggests that they may have some trouble making planned and timely replacements of assets (equipment).

#### 11. Interest Expense Ratio

$$\begin{aligned}
&= \frac{\text{Total farm interest expense (IS)}}{\text{Gross farm revenue (IS)}} \\
&= \frac{2,358}{18,569} = 0.1270, \quad (\times 100) \\
&= \mathbf{12.70\%}
\end{aligned}$$

The Does' interest expense ratio indicates that it takes almost 13% of their gross farm revenues to cover interest expenses. In general, ratios below 15% are said to be acceptable. However, it should be kept in mind that Jane Doe's off-farm income is financing the operation in part. If that off-farm income did not exist, the Does would likely be forced to borrow more money and this ratio could be substantially higher.

## 12. Net Farm From Operations Ratio

$$\begin{aligned} &= \frac{\text{Net farm income from operations (IS)}}{\text{Gross farm revenue (IS)}} \\ &= \frac{-15,310}{18,569} = -0.8245, \quad (\times 100) \\ &= -82.45\% \end{aligned}$$

As expected, because net farm income is negative, the ratio is also negative, indicating the operation is not profitable. The previous four ratios added together equal to 100 percent.

<b>Operating Expense Ratio</b>	<b>150.21%</b>
<b>Depreciation Expense Ratio</b>	<b>19.54%</b>
<b>Interest Expense Ratio</b>	<b>12.70%</b>
<b>Net Farm From Operations Ratio</b>	<b>-82.45%</b>
<b>Total</b>	<b>100.00%</b>

## Summary

The Does' financial position is currently good as evidenced by their debt-to-equity ratio of 35.6%. This ratio indicates that they are not heavily leveraged and their lender should view additional borrowing favorably. Additionally, their equity increased in the year 2002. However, the question is, "how did equity grow when the farming operation experienced a loss?" By analyzing their financial statements, the answer is clear. The farming operation has problems with profitability and the only thing that kept the operation going was Mrs. Doe's off-farm income. If the farming operation continues to lose money, equity is in danger. Another question that must be addressed is, what if Mrs. Doe lost her job? The farming operation would then be forced to become profitable and somehow, the family living expense of \$13,390 would have to be covered.

At this point, the Does should closely examine their farming operation and evaluate each commodity that is produced to determine which one is making money and which is losing money. They should then focus on those commodities that are profitable.