

Ratios & Measurements

Agricultural Business Management

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In the last few decades, much progress has been made to standardize financial statements in agriculture. This allows for ratios and measurements commonly used in other industries, to become standard in the farmer's financial world. Now the individual farmer can measure and understand the strengths and weaknesses within his financial life, and to benchmark himself with others in his peer group.

The Center for Farm Financial Management at the University of Minnesota has been a key player in this evolution. The FINPACK software developed by them is a leader in the farming industry. The paragraphs written here apply to the financial statements and ratio analysis produced by the FINPACK software. Other good financial software and paper forms products produce information that is similar.

With good financial statements, excellent measurements can be made in: Liquidity, Solvency, Profitability, Repayment Capacity and Efficiency. A Balance Sheet is necessary to measure "Liquidity" and "Solvency". In order to measure "Profitability", "Repayment Capacity" and "Efficiency", a good accrual adjusted Income Statement is also needed.

Liquidity:

Liquidity measurements deal with the upper part of the Balance Sheet (the relationship of the Current Assets to the Current Liabilities). By definition, Liquidity is concerned with the ability of the farm business to generate sufficient cash flow for family living, taxes, and debt payments. "Current Farm Assets" include cash, and those items that you will convert into cash in the normal course of business, usually within one year. "Current Farm Liabilities", include those items that need to be paid within one year. In simple terms, the "Current Assets" are needed to pay the "Current Liabilities". Could we expect that one can repay \$120,000 in Current Liabilities, if he has \$200,000 of Current Assets available to convert to cash? It is pretty safe to say that yes he can, and it looks like he would have a cushion of \$80,000 remaining.

Two common "Liquidity" measurements are the

"Current Ratio" and "Working Capital". The "Current Ratio" is calculated by dividing the Current Assets by the Current Liabilities. Using the former example of \$200,000 of Current Assets divided by the \$120,000 of Current Liabilities, we calculate the "Current Ratio" to be 1.67. What this really means is that for every dollar of current debt, he has \$1.67 of current assets to pay it with. That should work. Commonly accepted ranges state that a Current Ratio greater than 1.7 is "Strong"; a 1.7 to 1.1 would fall in the "Caution" range; and less than 1.1 would be "Vulnerable". Our 1.67 Current Ratio in this example would be in the middle to strong range.

"Working Capital" is not a ratio, but is a measurement of dollars. It is calculated by subtracting the "Total Current Liabilities" from the "Total Current Assets". In our example, we said that he has a "cushion" of \$80,000 (\$200,000 minus \$120,000). That is his "Working Capital". There is no standard acceptable dollar amount of "Working Capital". We need to look at your Working Capital figure and think in terms of "adequacy". Is an estimate of your income taxes liability listed as a current liability on your balance sheet? (It is good to have it listed.) If not, you need working capital to cover that. Are your property taxes listed as a current liability? (It is good to have them listed.) If not, you need working capital to cover them, also. How much family living must come from the farm? In some cases, all of it must. In other cases none of it has to. These items help to define how adequate the working capital is. Remember the definition of "Liquidity" is the ability of the farm business to generate sufficient cash flow for family living, taxes and debt payment. If the bills pile up faster than they can be paid, or the operating loan has to be refinanced because it will not get paid off, liquidity is not sufficient. Does that mean that you are broke? No! In fact you could be very wealthy, but just not "liquid" enough.

Would "Working Capital" of \$80,000 be adequate for your farm? It may be, or it may not be. A recent revision to the FINPACK software adds a new measurement to determine the adequacy of "Working Capital", by computing the "Working Capital to Gross Income Ratio". By comparing the

level of "Working Capital" to a farm's annual "Gross Income", it puts some perspective into how adequate the "Working Capital" is. A farmer that has a "Working Capital to Gross Income Ratio" of 8% will rely heavily on borrowed operating money, because he will run out of his own "Working Capital" early in the year. A farmer that has a "Working Capital to Gross Income Ratio" of 26% will rely on borrowed money during the year, but not as heavily and not as soon. This measurement is too new to have established benchmarks (adequate, weak, etc.). However, it is the opinion of this author that a "Working Capital to Gross Income Ratio" should be at least 25% to be considered adequate.

Remember that your "Balance Sheet" is a snap-shot of your financial condition on a given day. Each day your Balance Sheet will change as you conduct business, pay bills, harvest crops, etc. Many of the business actions that you conduct each day affect your "Current Ratio" and "Working Capital". A few of these are:

Business Action:

	<u>Current Ratio:</u>	<u>Working Capital:</u>
Sell Current Assets to pay Current Debt	<i>Increase</i>	<i>No Change</i>
Sell Current Assets to accelerate Long-Term Debt	<i>Decrease</i>	<i>Decrease</i>
Sell Long-Term Asset to pay Current Debt	<i>Increase</i>	<i>Increase</i>
Sell Current Asset (exp. grain) and keep as cash	<i>No Change</i>	<i>No Change</i>
Buy Current Asset with Short-Term Loan	<i>Decrease</i>	<i>No Change</i>
Buy Current Asset with Long-Term Loan	<i>Increase</i>	<i>Increase</i>
Buy Long-Term Asset with Short-Term Loan	<i>Decrease</i>	<i>Decrease</i>
Buy Long-Term Asset with Cash	<i>Decrease</i>	<i>Decrease</i>
Refinance Short-Term Loan into Long-Term Loan	<i>Increase</i>	<i>Increase</i>

If your actions decrease your "Current Ratio", is that bad? Possibly, but maybe not. It depends on what it was before and what it will be afterwards. If your intended purchase will decrease your "Working Capital", is that bad? Possibly, but maybe not. Again, it depends on how adequate it was before, and what it will be afterwards.

If you refinance short-term debt (Current Liability) into a longer-term debt, will that improve your "Current Ratio" and "Working Capital"? Yes and Yes. Is that good? It will improve the numbers and ratios, and make life more comfortable, at least for a while. However, this is a real good time to perk up and look

at the situation. What is the reason that this short-term debt is so large that it needs re-structuring? If it is due to an infrequent, explainable force (exp. "got hauled out, and insurance was inadequate" or "lost a lot of pigs due to disease that hopefully will not happen again"), but otherwise the operation has had sufficient net profits, then the refinancing should be beneficial in both the short-run and the long-run. However, if this operating loan has been growing over the years because the profits have not been sufficient to provide the living, pay the taxes, and service the debt, then this liquidity problem is just a symptom of another problem. See *Financial Management Series #2-Income Statement*. To refinance without fixing the problem will give you temporary relief, but it is not the long-term cure. Now, you have a new longer-term loan that has a new annual payment (principal portion of term debt is a "Current Liability") that you did not have before. If the payments in the past were excessive, they will be just that much heavier now. Yes, the old ugly, growing, operating loan is gone, but just wait. It will return.

Solvency:

Solvency, by definition, is the ability to pay off all debts if the business were liquidated. Solvency ratios deal with the relationship of the Total Assets, the Total Liabilities, and the Net Worth. Three standard Solvency Ratios are: "Debt to Asset Ratio"; "Equity to Asset Ratio" and "Debt to Equity Ratio". Each ratio is listed as a percentage.

The "Debt to Asset Ratio" is calculated by dividing the Total Debt by the Total Assets. A figure of 44% would mean that the debt equals 44% of the assets. Another way of saying this is that for every one dollar of assets that you have, you have forty-four cents worth of debt.

The "Equity to Asset Ratio" is calculated by dividing the Total Equity by the Total Assets. A figure of 56% would mean that your equity (net worth) equals 56% of the assets. Another way of saying this is that for every one dollar of assets that you have, you are contributing 56 cents of it, in the form of your net worth.

When you add the "Debt to Asset Ratio" percentage to the "Equity to Asset Ratio" percentage, they will always equal 100%. By looking at these ratios together, you could verbalize and say "of all the assets that I control, my creditors are furnishing 44% of the capital (debt) and I am furnishing 56% of the capital (equity).

The third "Solvency" ratio listed above is the "Debt to Equity Ratio". It is calculated by dividing the Total

Debt by the Total Equity. This ratio is sometimes called the “Leverage Ratio”, in that it looks at how your equity capital is leveraged by using debt capital. It compares the relationship of the amount of debt to the amount of equity (net worth). This “Debt to Equity Ratio” is more sensitive than the “Debt to Asset Ratio” and the “Equity to Asset Ratio” in that it jumps (or drops) in bigger increments than the other two do, given the same change in assets and debt. The balance sheet that gave us the 44% debt and 56% equity ratios would calculate out to a Debt to Equity Ratio of 78.6%. It is saying that for every one dollar of Net Worth you have, there is 78.6 cents of Debt.

The FINPACK Balance Sheet shows these solvency ratios listed in two columns, “Cost” and “Market”. That is because the Balance Sheet has the assets listed in a “Cost” column and a “Market” column. The ratios have been calculated on each. Since the “Cost” column has the assets listed as “cost, less depreciation”, the dollars of value on machinery, breeding stock, land, etc., may not resemble their true value. For that reason one would focus mainly on the solvency ratios in the “Market” column.

The FINPACK Balance Sheet also calculates “Deferred Tax Liability” and lists it along with the other debts. Because of that, it produces two sets of Solvency Ratios: “with Deferred Liabilities” and “excluding Deferred Liabilities”. The ratios that “exclude Deferred Liabilities” may be the most meaningful.

Having debt allows you to control more assets than you would if your capital (equity) was financing all of the assets. Understanding this concept could lead the un-informed person to believe that the more debt you have, the more assets you control, and the bigger and better things will be. The informed person, however, understands that renting someone else’s money comes at a cost, just as renting someone else’s land comes at a cost. In the case of renting money, the rent is called “interest”. There are times when the rent is fairly reasonable. There have been times in the past, and likely the future, when the rental cost of money is extremely high. This leaves the individual that has a lot of debt (highly leveraged) quite vulnerable to any interest rate changes - the reason you want to lock low rates in for a long time, if you can.

It is important for you to be aware of what your “Debt to Asset Ratio” is now. It is equally important to look at the trends of what it has been doing over years. It is commonly believed that a “Debt to Asset Ratio” less than .3 (30% debt) should be comfortable; between .3 and .6 (30% to 60% debt) is a medium to

heavy load; and over .6 (60% debt) becomes heavy, and if high enough, impossible to service.

Just as your business actions affect your “Liquidity” daily, they also affect your “Solvency”. The same examples that we looked at when discussing “Liquidity” are listed here, along with their effects on your “Net Worth”, and your “Debt to Asset Ratio”:

<u>Business Action:</u>	<u>Net Worth:</u>	<u>Debt to Asset Ratio:</u>
Sell Current Assets to pay Current Debt	No change	Decreases
Sell Current Assets to accelerate Long-Term Debt	No change	Decreases
Sell Long-Term Assets to pay Current Debt	No change	Decreases
Sell Currents Assets (exp. grain) and keep as cash	No change	No change
Buy Current Asset with Short-Term Loan	No change	Increases
Buy Current Asset with Long-Term Loan	No change	Increases
Buy Long-Term Asset with Short-Term Loan	No change	Increases
Buy Long-Term Asset with Cash	No change	No change
Refinance Short-Term Loan into Long-Term Loan	No change	No change

In these examples, “Net Worth” is pretty stubborn. It does not change as you buy or sell assets. It increases when you make more profit than you spend for consumption and income taxes, and it decreases when profits are insufficient. “Net Worth” changes if the value of your assets change. It increases if assets are inherited or gained by a gift. It decreases if assets disappear.

The “Debt to Asset Ratio” increases when assets are purchased with borrowed money and decreases when assets are sold and the debt is repaid. If “Solvency” is a problem, fixing it usually requires the sale of assets, and repayment of debt. These decisions often result in soul searching. Many come with tax ramifications. One needs to be careful that the “factory” does not leave you, when the assets are sold.

Profitability:

Four measures of profitability are: “Rate of Return on Farm Assets”; “Rate of Return on Farm Equity”; “Operating Profit Margin” and “Net Farm Income”.

“Rate of Return on Farm Assets” can be thought of as an interest rate your farm earned in the past year, on all money invested in the business. In the

FINPACK analysis, there is a “Cost” measurement and a “Market” measurement. The “Cost” measurement represents the actual return on the average dollar (average of the beginning of year and the end of the year) invested in the business. The “Market” measurement can be looked at as the opportunity cost of investing money in the farm, instead of alternate investments. It is commonly thought that a “Rate of Return on Farm Assets” (cost) greater than 8% is strong; one between 4% and 8% is thought to be in the caution range; and one that is less than 4% is considered to be vulnerable.

“Rate of Return on Farm Equity” is the interest rate your equity (net worth) in the business earned in the past year. Again in the FINPACK analysis, there is a “Cost” measurement and a “Market” measurement. The “Cost” measurement represents the actual rate of return to the amount of equity capital you have invested in the farm business. The “Market” measurement can be compared to the returns available if the assets were liquidated and invested in alternate investments. A return (cost) greater than 10% is thought to be strong; one between 3% and 10% is in the caution range; and less than 3% is considered to be vulnerable.

An important study can be made by comparing your “Return on Assets” to your “Return on Equity”. If your “Return on Assets” is higher than your average interest rate paid on borrowed money, your “Return on Equity” will be still higher. This indicates a positive use of financial leverage, meaning that your loans are “working for you”. If your “Return on Assets” is lower than your average interest rate, then your “Return on Equity” will be still lower. This indicates a negative financial leverage, meaning that your loans are “not working for you” at this time.

“Operating Profit Margin” is a measure of the operating efficiency of the business. It indicates the average percentage operating profit margin per dollar of farm production. It measures how effectively you are controlling operating expenses relative to the value of output. Low prices, high operating expenses, or production problems are all possible causes of a low operating profit margin. An Operating Profit Margin (cost) greater than 25% is considered strong; one 25% to 15% is considered in the caution range; and one less than 15% is considered to be vulnerable. (By itself, the Operating Profit Margin is not adequate to explain the level of profitability of your business, but is used along with another ratio to produce the “Rate of Return on Farm Assets”.)

“Net Farm Income” is your measurement of farm

profits. In the FINPACK analysis, there is a “Cost” measurement and a “Market” measurement. The “Net Farm Income” figure in the “Cost” column is the figure (profit or loss) generated by the accrual adjusted Income Statement. The figure in the “Market” column is the Net Farm Income, plus the change in market valuation of assets that were adjusted (inflation or deflation) on the year-end balance sheet.

Repayment Capacity:

Repayment Capacity is measured by the “Term Debt Coverage Ratio” and the “Capital Replacement Margin”.

“Net farm income”, plus “non-farm income” must cover family living, income taxes and social security taxes, and then cover the payments on term (intermediate and long-term) loans. The “Term Debt Coverage Ratio” measures the ability to meet these payments. If anything is left over after the payments are made, that is the “Capital Replacement Margin”.

“Term Debt Coverage Ratio” is expressed as a percentage. A figure of 100% would indicate that the payments could be met, but with nothing to spare. A figure less than 100% indicates that the ability to make these payments was less than adequate. A figure of greater than 100% indicates that the payments could be made, and there was some room to spare. In the FINPACK analysis, there is a “Cash” measurement and an “Accrual” measurement. The figure shown under the “Cost” column shows the repayment capacity generated by the “Net Cash Farm Income” (no inventory changes involved). The figure shown under the “Accrual” column shows the repayment capacity generated by the Net Farm Income (the profit figure that includes the changes in inventory – the more meaningful of the two). A “Term Debt Coverage Ratio” greater than 140% is considered strong; one in the 110% to 140% range is considered to be in the caution range; and one less than 110% is considered vulnerable (less than 100% is inadequate).

“Capital Replacement Margin” is the amount of money remaining after all operating expenses, taxes, family living and debt payments have been accounted for. It is the cash generated by the farm business that is available for financing the purchase of capital replacements such as machinery and equipment. Again, the FINPACK analysis produces a “Cash” measurement and an “Accrual” measurement. The “Cash” measurement is the margin when inventory changes are not included. The “Accrual” measurement is the margin generated by the Net Farm Income (including the inventory).

The “Accrual” measurement of “Capital Replacement Margin” is the more meaningful of the two.

If the “Term Debt Coverage Ratio” is greater than 100%, then the “Capital Replacement Margin” (dollars left over after the payments are made) is a positive number. (That is good.) If the “Term Debt Coverage Ratio” is less than 100%, then the “Capital Replacement Margin” is a negative number. (Not good).

Efficiency:

Five efficiency measures produced by FINPACK are: “Asset Turnover Rate”; “Operating Expense Ratio”; “Depreciation Expenses Ratio”; “Interest Expense Ratio”; and “Net Farm Income Ratio”. Other financial software and paper forms products will generate similar measurements.

Asset Turnover Rate (Market) is a measure of the efficiency of using capital. It is the amount of gross production per dollar of investment. Neither the asset turnover rate nor the operating profit margin (discussed earlier) are adequate to explain the level of profitability of the business, but when used together, they are the building blocks of the farm’s level of profitability. (Operating Profit Margin x Asset Turnover Rate = Rate of Return on Assets)

The other four efficiency measurements can be thought of as pieces of the same pie. The “Operating Expense Ratio”, the “Depreciation Expense Ratio”, the “Interest Expense Ratio” and the “Net Farm Income Ratio” reflect the distribution of gross income. When added together, they will always equal 100%.

You could look at these four together, while asking yourself “OK, I had gross income of so much, where did it all go?” The biggest share likely went to the pay the operating expenses, some went to depreciation, some went to pay interest, and you got

to keep the rest (net profit). These four measurements show where your income went. The following grid gives some guidance as to what is strong, weak, etc.

	Strong	Caution	Vulnerable
Operating Expense Ratio	<60%	60 to 80%	>80%
Depreciation Expense Ratio	< 5%	5 to 15%	> 15%
Interest Expense Ratio	< 5%	5 to 10%	> 10%
Net Farm Income Ratio	> 20%	20 to 10%	< 10%

As a farmer gains in understanding his own financial statements, ratios and measurements, he will become less and less financially vulnerable. That is important. After all, it is his financial life.

FINBIN is an excellent source of farm financial and production data from thousands of farms in several states. It was developed and is maintained by the Center for Farm Financial Management at the University of Minnesota. It is available on the Internet at: www.finbin.umn.edu.

Caution: This publication is offered as educational information. It does not offer legal advice. If you have questions on this information, contact an attorney.