



Agricultural Finance



Understand Financial Statements and Identify Sources of Farm Financial Risk

By analyzing a complete set of your farm's financial statements you can identify sources and amounts of financial risk. To discover and measure financial risk you will:

- ◆ Describe a complete set of financial statements and their interconnectivity
- ◆ Describe and measure solvency
- ◆ Describe and measure liquidity
- ◆ Describe and measure profitability
- ◆ Calculate a farming operations overall financial risk

In this document we will describe what makes up a complete set of financial statements and we will discover ways to recognize, assess and score the financial risk associated with a case study farm situation.

Describe a Complete Set of Financial Statements and Their Interconnectivity

Understanding financial statements is critical in analyzing financial risk. Knowing how to read financial statements and recognize the information that they are revealing is the important first step in assessing financial risk. To have the complete financial picture of a farm business one must have a complete set of statements. Having some of the statements and not others will give only a partial picture of the farm's financial situation.

A1-1. The Opening Net Worth Statement

The opening net worth statement can be seen below in Figure A1-1.

Opening Balance Sheet or Net Worth Statement			
January 1, 2012			
Assets		Liabilities	
Current Assets		Current Liabilities	
Cash	10,000	Operating Loan	100,000
Accounts Receivable	25,000	Accounts Payable	30,000
Inventory For Sale (Grain, Livestock, Hay)	250,000	Accrued Interest	15,000
Inventory For Production (Seed, Feed, Supplies)	50,000	Current Portion of the Term Debt - CPTD	30,000
Total Current Assets	335,000	Total Current Debt	175,000
Intermediate Assets		Intermediate Liabilities	
Breeding Livestock	150,000	Loans > 1 yr < 10 yrs	
Machinery	850,000	5 Year Term Loan	80,000
Quota	800,000	100,000	
		Loan - CPTD	
Total Intermediate Assets	1,800,000	Total Intermediate Debt	80,000
Long Term Assets		Long Term Liabilities	
Buildings	500,000	Loans > 10 years	
Land	1,500,000	20 Year Term Loan	190,000
		200,000	
		Loan - CPTD	
Total Long Term Assets	2,000,000	Total Long Term Debt	190,000
Total Assets	4,135,000	Total Debt	445,000
		Equity (Net Worth)	
		Contributions (+)	40,000
		Withdrawals (-)	- 30,000
		Open Retained Earnings	300,000
		Current Earnings	65,000
		Close Retained Earnings	365,000
		Equity (Net Worth)	3,690,000

Figure A1-1 The Opening Net Worth Statement

There are four main financial statements in a complete set. For the purposes of this document we will call them the opening net worth statement, the income and expense statement, the cash flow statement, and the closing net worth statement. One needs all of these, for a specific period of time, to get the whole financial picture of a farming operation for that time period.

Other names for the Net Worth Statement (assets at market value) are:

- Balance Sheet (assets at book value)
- Statement of Affairs (assets at book value)
- Statement of Assets and Liabilities (assets usually at book value)

The net worth statement contains three main sections: assets, liabilities (or debt), and equity (or net worth). The statement is always in balance (hence the name Balance Sheet). The left side – assets, equals the right side – liabilities (debt) plus equity (net worth).

Assets include cash, equipment, machinery, livestock, buildings and land. Other assets include anything of value that the business owns but may be used by others, such as land or machinery that is leased to a third party. Assets are listed in order of expected realization, and are grouped into current or long-term categories. Assets such as cash, inputs to be used in the current production cycle, feed for sale, and market livestock are examples of current assets. Assets that are used over many production cycles or are of a durable nature are generally listed as capital or long-term assets. Assets can also be classed in a middle category as “intermediate assets.” Intermediate assets generally have a useful life greater than one year or one production cycle, but not more than ten years. Examples of intermediate assets would include breeding livestock, machinery, and quota.

Liabilities are obligations incurred by the business, including obligations arising from a past transaction to be paid in the future. Current liabilities are those that are due within the current fiscal period, operating cycle, or current year. Intermediate liabilities are liabilities with amortization periods longer than one year, but not longer than ten years. Long-term liabilities are liabilities with maturity longer than one year from the date of the balance sheet or beyond the normal operating cycle or fiscal year. An example of a long-term liability is a twenty-year mortgage (in year 18 it is still classified as a long term loan as it is based on the original loan agreement). Liabilities are listed in descending order of expected discharge.

Owner’s equity, or net worth, is the owner’s residual claim in the business and is equal to assets minus liabilities. Owner’s equity is increased by the accumulated net income of the business (retained earnings) and the owner’s contributions, and decreased by business losses and owner withdrawals.

The term “owner’s equity” is most often used on financial statements of sole proprietorships. A similar term “partners’ capital” is used to indicate the ownership interests of partners in a partnership. “Shareholders’ equity” is used to show the ownership interest of an incorporated entity.

A balance sheet is a systematic organization of everything owned and owed — at a given point in time.

Cost versus Current Market Value

There is often some debate over whether assets should be valued at historical cost or current market value. There are merits to both methods. Historical cost reports the value of assets at an amount of money that was actually paid to obtain the asset minus accumulated depreciation. Current market value reports asset values that reflect the changes in the assets as general price levels have changed overtime.

In practice, historic cost values are most often used, and are the accepted industry practice. This is the method used for tax accounting. A disadvantage of the historic cost method is that the values shown on

the balance sheet do not always give a true indication of the value of the resources employed in the business, which may result in inaccurate measures of the efficiency of these assets. However, the current market value method suffers from fact that market values are not always readily available, especially for infrequently traded assets, and that such values may also be subject to market volatility.

For the purposes of this document, and the generally accepted practice in Ag Lending, we will be valuing assets at market value. All of the Ag industry financial ratio benchmarks that we will be using are set up based on market value of assets. So to compare our case study information to these benchmark ratios we must use market values for the assets.

Interconnectivity of the Financial Statements – Opening Net Worth Statement

To properly understand a set of financial statements one must understand how the statements are interconnected. One statement will have information that is used by another statement in the “set”. The opening net worth statement contains the opening inventory values, accounts receivable, accounts payable, and accrued interest that is used by the accrued income statement. It also provides the depreciable asset values that are used in the calculation for depreciation on the accrued income statement. The opening net worth statement has the opening cash balance used by the cash flow statement, and the current portion of the term debt used by the cash flow statement. Under the equity section of the net worth statement is the closing retained earnings that are used by the closing net worth statement as the opening retained earnings.

Interconnectivity of the Financial Statements – Closing Net Worth Statement

The closing net worth statement contains the closing inventory values, accounts receivable, accounts payable, and accrued interest that is used by the accrued income statement.

A1-2. The Income and Expense Statement

The income statement reflects revenues, expenses, and asset amortization, as well as gains and losses of certain assets over a period of time. The main purpose of the income statement is to indicate the income and profitability of the business over a period of time, which can be one month, three months, a year or some other time period.

The income statement has three main sections: revenue, expenses, and net income.

Income statements for farm businesses are usually prepared on an annual basis. In addition, under the Canadian Income Tax Act, farms can file income tax returns based on cash accounting systems. While this is useful for tax management purposes, income statements produced by the cash method of accounting, unadjusted for items such as prepaid expenses or inventory changes, for example, may give a false indication of the financial performance of the farm business.

For example, farm businesses usually grow crops and produce livestock on an annual basis, but the expenses and revenues associated with crops and livestock are not always incurred in the same year. There exists the potential for a mismatch of revenues and expenses. For example, feeders may be purchased in the fall, fed over the winter, and sold the next year. But the purchase costs of the animals are usually expensed in the year of purchase, and the revenue from the sale of the feeders is usually recorded in the year of sale, when each of these transactions occurs. Similarly, feed for the cattle feeder operation

may be purchased and expensed in December, but fed over the next few months. This would result in inaccurate accounting information for farms with a December 31st year-end.

Accrual accounting requires that the revenues and expenses be matched to the economic events to which they are related so that the actual financial performance of the business for a specified period of time can be accurately reported. A cash income statement, without making accrual adjustments, cannot provide this information.

Another example is deferred storage tickets received for grain sold at the end of December, and using the storage ticket to purchase fertilizer in December for use next year. Cash accounting methods and Income tax rules allow revenue from deferred grain sale to recognize when the deferred ticket matures in the new year, while at the same time recognizing the fertilizer expense in December. Without making accrual adjustments, income statements prepared using the cash method does not provide a true picture of the operation's profitability because:

- ◆ Some of the revenue from sales may represent production from the previous year or fiscal period;
- ◆ Not all of the production from the year or fiscal period may be sold in that same year or fiscal period;
- ◆ The expensing of inputs such as fertilizer may be expensed in the year or fiscal period in which it was purchased, not the year or fiscal period it is used.

Farm clients file their income tax on an annual basis under the cash accounting income and expense method. Although this cash statement does not provide an accurate reflection of the profitability of the farm operation it provides a good starting point for building the accrued income and expense statement. The cash revenue and expense amounts stated on the income tax income and expense statement, and then accrual adjustments are made to the cash income and expense amounts to calculate the accrued net income.

Figure A1-2 shows an example of an Accrued Income and Expense Statement. In this statement cash revenue is entered as a lump sum. This revenue could be broken down and shown in detail if required. The adjustments to cash revenue to calculate accrued revenue are for accounts receivable and inventories. The opening amounts for these items are collected from the opening net worth statement. The closing amounts of these accrual adjustment items are brought in from the closing net worth statement. The adjustment is minus the opening amounts and plus the closing amounts as the opening inventories and receivables were generated in the previous accounting period. The closing amounts were generated in the accounting period being reported in these statements. Once the overall accrual adjustment is calculated (\$70,000) it is added to the cash revenue received (\$250,000) to calculate the accrued revenue for the period of \$320,000.

Cash expenses are also entered as a lump sum in this statement. These cash expenses could be broken down and shown into detail if required as well. The accrual adjustments to the cash expenses are for accounts payable, supplies inventory for production, accrued interest, and depreciation. Again the opening amounts for these items are gathered from the opening net worth statement, and the closing amounts from the closing net worth statement.

The adjustment for payables and accrued interest is minus the opening plus the closing amounts for these items. Again the opening amounts were generated in the previous accounting period, and the closing amounts were generated in the accounting period being reported. For the supplies inventory for production the adjustment is the opposite. We add the opening supply inventory and subtract the closing. The opening supply inventory was used in production in the accounting period being reported whereas the closing supply inventory will be used in the production of the next year's products.

There are two ways to calculate depreciation for accounting purposes. The first is based on allowable capital cost allowance for taxation purposes and called the "taxation" method. This amount is calculated based on the cost of the depreciable item, minus previously claimed depreciation, and times the percentage amount allowed by Canada Revenue Agency for that class of depreciable asset. The allowable depreciation amount is different for motorized and non-motorized equipment, and for buildings.

The second calculation for depreciation is called the "management depreciation" method. It is based on the current market value of a depreciable asset. The farm manager makes a decision on how often they would like to replace the piece of equipment or building and the depreciation rate is calculated accordingly. Usually for equipment a rate of 8-12 % is used which indicates that the farmer would like to completely replace his equipment line every ten years or so.

Income and Expense Statement				
January 1, 2012 to December 31, 2012				
Revenue				
Cash Revenue				250,000
Accrual Adjustments				
Opening (-)		Closing (+)		
Accounts Receivable	25,000	Accounts Receivable	35,000	
Inventory For Sale	250,000	Inventory For Sale	300,000	
Breed Livestock	150,000	Breeding Livestock	160,000	
Opening Adjustment	425,000	Closing Adjustment	495,000	70,000
Total Accrued Revenue:				320,000
Expenses				
Cash Expenses				230,000
Interest Expenses included in cash expenses				28,925
Accrual Adjustments				
Opening (-)		Closing (+)		
Accounts Payable	30,000	Accounts Payable	15,000	-15,000
Accrued Interest	15,000	Accrued Interest	17,500	2,500
Plus (+) Supply	50,000	Minus (-) Supplies	60,000	-10,000
Opening Adjustment	5,000	Closing Adjustment	-27,500	-22,500
Depreciation:				110,000
Total Accrued Expenses:				317,500
Total Cash Net Income:				20,000
Total Accrued Net Income:				2,500

Figure A1-2 Accrued Income and Expense Statement

For buildings a depreciation rate of 4-5 % is commonly used, which would replace the buildings every 20 – 25 years. In this document, and the method most commonly used in farm finance, we will use the management depreciation method.

Under both methods the depreciation paid is a non-cash amount. It is the amount of funds that should be taken out of the cash flow and invested each year to use to replace buildings and equipment as is required. However this investment is seldom made and the depreciation expense amount is usually used for other cash flow requirements. Living costs and debt servicing are usually the main uses for the depreciation funds. Because the funds are used for other purposes the farm business usually has to borrow to replace buildings and equipment.

In this example the cash expenses were \$230,000. \$20,000 of these cash expenses were for interest payments (the importance of separating out the interest expenses will be shown later in the debt servicing calculations and in some of the financial ratios that will be calculated later in this document). The overall accrual adjustments for accounts payable, accrued interest, and supply inventory totaled a negative - \$ 22,500. Depreciation was calculated by the management depreciation method at 10% on equipment and 5% on buildings. This amounted to \$ 110,000 in depreciation expense for this example. The result was \$ 317,500 in total accrued expenses for the year.

Subtracting the accrued expenses of \$ 317,500 from the accrued income of \$ 320,000 results in accrued farm income for the year of \$ 2,500. This compares to \$ 20,000 on a cash basis in this example. In other examples, and in real business practice, the difference in the amounts can be significantly greater. Cash net income is usually calculated to be near zero or a loss for income tax purposes. This cash income amount does not provide for much profit, or as we will calculate later, much for debt servicing capacity. This is one of the main reasons to use the accrual method of accounting for debt servicing calculations. And sometimes the cash statement shows higher net income than was actually achieved if inventories carried into the accounting period had to be sold to meet cash flow requirements.

As can be seen from the description above, it is very important to use the accrual method of accounting to calculate profitability in a farming operation. It is very important to know how to make the accrual adjustments to the cash statements received from your accountant. A phrase to express to help you remember how to do the accrual adjustments is “Minus the beginning, plus the ending, except for supplies”.

Interconnectivity of the Financial Statements - Income and Expense Statement

The income and expense statement is interconnected with all of the other financial statements in “A Set of Financial Statements”. As was mentioned under the interconnectivity of the net worth statements the income and expense statement receives accrual adjustment information from both the opening and closing net worth statements for the fiscal accounting period being reported. The after tax accrued net income or loss from the income and expense statement is used by the closing net worth statement as the current earnings adjustment made to the opening retained earnings to calculate the closing retained earnings for the fiscal period being reported.

The income and expense statement provides information for the Cash Flow Statement, which is the third important financial statement in the “Set of Financial Statements”. It provides the cash flow statement with information to calculate the cash generated from operations and the tax paid, which has cash flow implications.

A1-3. The Cash Flow Statement

This statement is also known as the Statement of Changes in Financial Position

Statement of Changes in Financial Position

A statement of changes in financial position reports the sources and uses of cash in a business. The statement of changes in financial position (SCFP) is needed to show the effect of operating, financing, investing, and personal activities on cash over the fiscal period. For example, the sale of a tractor is not shown on an income statement but has an effect on the cash flow of the business (although gains or losses on sales of such assets would be shown on the income statement). It is important to note that the SCFP is not a projected cash flow statement; the SCFP is an historic account of the cash flows through the business, while cash flow projection is an estimate of the changes in financial position for a projected fiscal period.

The four main sections of the SCFP are:

1. Cash flows from operating activities
2. Cash flows from investing activities
3. Cash flows from financing activities
4. Cash flows from personal activities

Cash Flows from Operations

Cash flows from operations are the revenues generated and expenses incurred from the normal day-to-day operation of the farm business, as reported on a cash, not an accrual, basis. Remember, the SCFP is designed to provide information about the cash requirements of the business and to help manage cash resources in the business. Hence accrued income and expenses must be converted back to cash income and expenses before these values can be recorded in the SCFP. As well, non-cash values such as depreciation or amortization on machinery need to be added back into net income. The income statement and beginning-of-period and ending-of-period balance sheets provide these values. The beginning and ending balance sheets are also required in constructing cash flows from investing and financing activities.

A process for calculating net cash flows from operating activities starting with an accrued income and expense statement is shown here:

$$\begin{aligned} &\text{Accrued Net Income} + \text{Amortization (Depreciation) expenses} - \text{Increase in current assets} + \text{Decrease in} \\ &\text{current assets} + \text{Increase in current liabilities} - \text{Decrease in current liabilities} \\ &= \text{Net cash flow from operating activities} \end{aligned}$$

Or you may simply use the cash income from the farming operations income tax statement, and subtract the cash expenses from the farm's income tax statement. Remember to remove the Mandatory and Optional Inventory Adjustments, and the Capital Cost Allowance amounts from the cash expense amount on the income tax statement. This cash income minus these cash expenses, are the farm's cash from operations for the year.

The statement of changes in financial position, and/or the cash flow statement can report actual results for an historical fiscal period, or projected results for a future projected fiscal period.

Figure A1-3 illustrates a projected Cash Flow Statement. The information carries through from the example we have been working with, and ties in with the net worth statement above and the income and expense statement above. You will note that the opening cash amount is a negative - \$ 90,000 whereas the opening cash on the net worth statement was + \$ 10,000. The reason for this discrepancy is that we must take into consideration the opening operating loan as well. The farming operation has cash in its operating account; however this cash is there by choice and should really be applied towards the operating loan outstanding to save interest costs. The starting cash position is the opening cash amount minus the opening operating loan amount. In this case that works out to \$ 10,000 - \$100,000 = - \$90,000.

The projected cash flow statement is then broken into the four main cash flow categories that generate or use cash, of operating activities, investment activities, financing activities, and personal activities with the farming business.

Cash Flow Statement	
January 1, 2012 to December 31, 2012	
Cash on hand January 1, 2012:	-90,000
Cash From Operating Activities	
+ Cash Revenue	250,000
- Cash Expenses	-230,000
Cash From Operating Activities:	20,000
Cash From Investment Activities	
+ Capital (Investment) Items Sold / Traded	150,000
- Capital (Investment) Items Purchased	-300,000
Cash From Investing Activities:	-150,000
Cash From Financing Activities	
+ New Term Loan Principal Borrowed	150,000
- Term Loan Principal Repaid	-60,000
Cash From Financing Activities:	90,000
Cash From Personal Activities	
+ Contributions	40,000
- Withdrawals	-30,000
Cash From Personal Activities:	10,000
- Tax Paid	-10,000
+ or - Accounts Payable Differential	-15,000
+ or - Accounts Receivable Differential	-10,000
Closing Cash December 31, 2012:	-155,000

Figure A1-3 The Cash Flow Statement

In figure A1-3 you will note that the cash income reported on the income and expense statement above is shown as the cash income from operations amount in the cash from operating activities below which is \$250,000. The cash expenses from operating activities from the aforementioned income and expense statement above is \$230,000. It is shown as a negative number as this amount was a use of cash. Cash income minus cash expenses for the period being reported resulted in cash from operations amount of \$20,000 for the fiscal period.

Cash Flows from Investing Activities

Cash flows from investing activities include the purchase or sale of machinery, equipment, and long-term investments such as land, buildings or other long-term financial assets. For example, buying land or machinery represents a use of funds; selling land or machinery represents a source of funds. Other sources of cash include cashing in term investments to use for cash flow purposes. Other uses of cash include payments to purchase shares in other companies, or payments in the form of loans made to others, for example, loaning an employee \$30,000 to purchase a vehicle.

In our example in Figure A1-3 above we have the farmer trading in an old combine and purchasing a new combine. They receive \$150,000 in trade-in value on the old combine, which is a source of funds to purchase the new combine. They are then purchasing the new combine for \$300,000, which is shown as a negative number as it is a use of funds. This transaction has generated a negative cash amount from investing activities figure of - \$ 150,000 because the new combine cost this much more than was received as a trade-in value on the old combine.

Cash Flows from Financing Activities

Cash flows from financing activities arise from transactions between the business and its owner(s) or creditors. Financing activities include borrowing and repaying the principal amount on outstanding loans, on both short and long-term debt. Cash inflows include new loans or proceeds from issuing shares, and cash outflows result from repayments of loans or other credit arrangements, and dividend payments to shareholders.

In our Figure A1-3 example above, we had a farmer purchasing a new combine and trading in his old combine. This left them with a shortfall in cash to complete the transaction of \$ 150,000. Under the financing activities section of the cash flow statement we have provided for that shortfall. The farmer took out new term loan proceeds of \$ 150,000 as a source of funds to pay for the deficit generated under the investing activities. In the use of funds section of the financing activities we have the principal payments that are to be made during the projection period of \$ 30,000 as the current portion of the old debt plus a \$ 30,000 principal payment on the new combine loan for the projected year. Total principal payments for the upcoming year are \$ 60,000. This amount is subtracted from the source of funds to generate a surplus of funds under financing activities for the period of \$ 90,000.

Cash Flows from Personal Activities

Every farmer has personal activities with their farm business. In fact they should be maintaining separate Financial Institution accounts for business and personal activities to enable simpler accounting of business and personal transactions undertaken during a fiscal period. Any personal activities done with the farm business that use or provide cash are accounted for on the cash flow statement under personal activities. Sources of funds under this section are called “Contributions” and uses of funds under this section are called “Withdrawals”.

In the example shown in Figure A1-3, we see contributions being made of \$ 40,000 and withdrawals being made of \$ 30,000. The contribution in this case is from off farm income. The farmer is depositing all net proceeds from their off farm job into the business account as a contribution. The withdrawals shown are for the farm families’ everyday living costs over and above any cash wages that may have been paid to the family members under operating activities. The net benefit of personal activities on this farm for the projected period is \$ 10,000. This contribution of cash is used in the farming operations for the year.

Other Activities that Generate or Use Cash

In Figure A1-3 you will note a section where other activities that affect cash are reported. In other cash flow or SCFP statements the cash from operations amounts could be after tax. They may have already had the cash implications for accounts receivable and accounts payable accounted for. In this cash flow statement we have shown these adjustments in a separate section to illustrate their cash flow implications.

Cash income tax paid is of course a use of cash. In the example above \$ 10,000 was paid by the farm in income tax, and is shown as a negative number as it was a use of funds.

Accounts receivable can also be a use of cash, or a source of cash. The accounts receivable adjustment made for each fiscal period is plus the beginning and minus the ending. Usually beginning receivables are received as cash during the fiscal period. The ending receivables in a projected statement have been reported as cash income and thus must be subtracted in the accounts receivable adjustment, as the cash had not been received. Normally on a SCFP statement you will see an adjustment for an increase in receivables as a negative adjustment to cash, and a decrease in receivables as a positive adjustment to cash, for the fiscal period being reported.

In the Figure A1-2 example above opening receivables were \$ 25,000 and closing receivables were \$ 35,000. The cash flow adjustment for accounts receivable is plus the opening and minus the ending. There was an increase of \$ 10,000 in receivables for the period and this shows up in the Figure A1-3 cash flow statement as a negative - \$ 10,000, or in other words as a \$ 10,000 use of funds for the period being reported.

Accounts payable is usually a source of cash to obtain goods and services from a supplier. In the cash flow statement the adjustment may be a use of funds or a source of funds for the period being reported depending on what happened. Beginning payables are usually paid for during the course of a fiscal period and ending payables are a source of funds for the fiscal period being reported. Thus the cash flow adjustment shown on a SCFP for accounts payable is minus the beginning amounts as these used cash during the period, and plus the closing amounts as these were a source of cash for the fiscal period being reported. You will see an adjustment for an increase in payables as a positive adjustment to cash, and a decrease in payables as a negative adjustment to cash, for the fiscal period being reported.

In the Figure A1-2 example above opening payables were \$30,000 and closing payables were \$15,000. The cash flow adjustment for accounts payable is minus the opening and plus the ending. In this example therefore there was a decrease of \$ 15,000 in payables for the period. This shows up in the Figure A1-3 cash flow statement as a negative - \$ 15,000, or in other words as a \$15,000 use of funds for the period being reported.

Reporting of a Businesses Cash Flow Results or Cash Flow Projections

Cash flow statements may be reported in one-page summaries, or in a multi-page detailed analysis. Cash flow for a fiscal period in the SCFP is usually a summary on one page in the set of financial statements being reviewed. Projected cash flows may also be reported in a one page annual summary. To be more accurate however one should do a monthly cash flow analysis. One of the main functions required in reviewing financial statements for management purposes, is calculating what the operating loan requirements will be for the farming operation in the upcoming year.

Farm businesses usually require large amounts of cash in the spring for crop planting purposes, and have large sources of funds in the fall from cash crop sales. Feedlot operations usually require large sums of cash to purchase feeder cattle in the fall and receive large amounts of cash in the spring when the feeder cattle are sold. Both of these examples illustrate that farming operations traditionally need operating funds at some points during their business cycle. By doing a monthly assessment of their cash flow requirements you will note the month with the largest shortfall amount and the months with the largest surplus amounts.

Knowing this information will allow you to get pre-approved and provide your farm with the operating funds they will require for the upcoming projection year. You will also note the months that there will be surplus funds in which to schedule their loan payments. The ABA (Agricultural Business Analyzer) program will do a projection and credit proposal for your farming operation. As part of the ABA program entries you should be completing a monthly cash flow statement. You can download ABA at the following website:

[http://www1.agric.gov.ab.ca/\\$Department/softdown.nsf/main?openform&type=ABA&page=information](http://www1.agric.gov.ab.ca/$Department/softdown.nsf/main?openform&type=ABA&page=information)

Interconnectivity of the Financial Statements – Cash Flow Statement

The statement of changes in financial position, or SCFP, in an historical basis provides a report of the cash transactions for the fiscal year that was recently completed. In this scenario the information on the opening net worth, closing net worth, and income and expense statement is known. In this case the SCFP statement receives its opening cash flow balance from the opening net worth statement. The cash income and expenses from operations for operating activities are collected from the income and expense statement.

Investment activities for the year will show up on the closing net worth statement, and information details on these activities will have to be gathered from the borrower to complete the investing activities section of the SCFP. As well you will have to get the details on any financing that was received to help out with the investing activities undertaken. These new loans will show up on the closing balance sheet. Once the details are known on the financing activities this section of the SCFP can be completed.

Tax paid during the year for last years tax owing will be known and accounted for on the SCFP. The cash implications of opening and closing accounts receivable and payable will be accounted for under the operating activities of the SCFP statement. Once all of these activities have been accounted for on the SCFP the closing cash balance calculated should match the balance in the FI operating account minus the operating loan balance as of the farms' fiscal year end date. These balances will be reported on the closing balance sheet.

When one is completing a projection for the upcoming year the cash flow statement is very important. For the projection period we will have the closing net worth statement for the previous year. This becomes the opening net worth statement for the projection year. Operating activities are estimated in the production plans and summarized in the projected income and expense statement. The cash implications of these activities are reported in that section of the projected cash flow statement. Projected capital purchases and sales are reported in the investing activities section and financing activities, new loans being advanced and loans being repaid are reported on those pages. There should be sections in the cash flow statement to show monthly withdrawals for family living costs and contributions to the farm. The cash flow allocation for income tax is applied to the proper month, and an annual adjustment is made for closing accounts payable and receivable.

Once all of the entries mentioned in the paragraph above have been made, the pro-forma, or closing, net worth statement for the projection period can be calculated by the financial analysis software you are using. In this example we mentioned using the ABA (Agricultural Business Analyzer) template to create a projected production and expansion plan for the farm. This software financial projection program can be downloaded from the Ropin' the Web Alberta Agriculture website. However, it is important to note that the opening net worth statement information, the projected income and expense statement information, and an accurate and detailed monthly cash flow statement is required for the ABA program to be able to do all of the calculations necessary to produce a closing net worth statement for the projection period.

A1-4 The Closing Net Worth Statement

A complete set of financial statements includes both an opening and a closing net worth statement. These are called the “Book End” statements as they enclose between them the income and expense statement, and the cash flow statement for the fiscal period being reported.

The closing net worth statement contains all of the same information as the opening net worth statement. The only difference is that it is reporting the asset, liability, and equity balances as of a different point in time - the closing date for the fiscal period being reported.

Figure A1-4 contains the closing net worth statement for the example we have been following.

Interconnectivity of Financial Statements – Closing Net Worth Statement

As was mentioned above, all of the financial statements in a “set of financial statements” are interconnected. The closing net worth statement is the final financial statement of the set. In a past fiscal year reporting period we would have the information on hand to complete all of the sections of the closing net worth statement and we would use the accrual adjustment information on the accrued income and expense statement to calculate accrued net income. This income and expense statement would also provide us with the depreciation amounts we require to complete the after depreciation closing net worth statement.

We would use the difference between the term debt in the opening statement and the closing statement as the financing activities undertaken during the year to complete that portion of the cash flow statement. The difference between the closing capital asset values and the opening capital asset values would be the investment activities that were undertaken during the year, and that section of the cash flow statement would be completed. We would have documented amounts for the cash contributions and withdrawals for the period to complete the personal activities section of the cash flow statement. Cash farm tax paid would be known, as would the accounts payable and receivable adjustment amounts for the cash flow statement.

The opening cash balance for the farm would be known, and once the adjustments mentioned in the paragraph above were made on the cash flow statement the cash balance at the bottom should equal the amount in the operating account as of the closing net worth statement date. For historical periods the facts needed to complete the financial statements should be known, but it is different for a projected set of financial statements.

In a projected set of financial statements only the net worth statement information at the start of the projection period is known (Figure A1-1). The rest of the statements will be an estimation of amounts expected based on what has happened in the past, and is expected to happen in the upcoming year. In the example we have been following we entered expected income and expense

Closing Balance Sheet or Net Worth Statement			
December 31, 2012			
Assets		Liabilities	
Current Assets		Current Liabilities	
Cash	0	Operating Loan	155,000
Accounts Receivable	35,000	Accounts Payable	15,000
Inventory For Sale (Grain, Livestock, Hay)	300,000	Accrued Interest	17,500
Inventory For Production (Seed, Feed, Supplies)	60,000	Current Portion of the Term Debt – CPTD	60,000
Total Current Assets	395,000	Total Current Debt	247,500
Intermediate Assets		Intermediate Liabilities	
Breeding Livestock	160,000	Loans > 1 yr < 10 yrs	
Machinery	915,000	New Combine Loan	90,000
Quota	800,000	4 Year Term Loan	60,000
		80,000	
		Loan – CPTD	
Total Intermediate Assets	1,875,000	Total Intermediate Debt	150,000
Long Term Assets		Long Term Liabilities	
Buildings	475,000	Loans > 10 years	
Land	1,500,000	19 Year Term Loan	180,000
		190,000	
		Loan – CPTD	
Total Long Term Assets	1,975,000	Total Long Term Debt	180,000
Total Assets	4,245,000	Total Debt	577,500
		Equity (Net Worth)	
		Contributions (+)	40,000
		Withdrawals (-)	- 30,000
		Open Retained Earnings	365,000
		Current Earnings	-7,500
		Close Retained Earnings	357,500
		Equity (Net Worth)	3,667,500

Figure A1-4 The Closing Net Worth Statement

information into a projected production plan, which was summarized in a projected income statement for the upcoming year (Figure A1-2). We also completed a cash flow statement with the expected cash changes from operating, investing, financing, and personal activities for the farm for the upcoming year. Once this information has been entered the closing net worth statement can be produced by a template, program like ABA or through manual calculations.

The closing cash balance for the period is reported at the bottom of the cash flow statement. Closing inventory values are taken from the production planners for the upcoming year. Closing accounts payable and receivable were estimated and entered into the accrued income and expense statement. Closing

amounts for the accrued interest were estimated, and or calculated by a projection template (like ABA). The current portion of the term debt was estimated, and or calculated by a projection template.

Changes to capital assets were reported in the investing activities section of the cash flow statement. New loans, and loan repayments made were reported in the financing activities section of the cash flow statement. With this information the closing capital account, and loan account, balances can be calculated and reported on the closing net worth statement. You will note that the farm in the example lost equity by going from \$ 3,690,000 to \$ 3,667,500 over the course of the year.

With assets at market value in a net worth statement equity can increase without a profit being generated by the farm. Capital assets like land can increase in market value by more than an operating loss, and the equity of the net worth statement will increase because assets minus liabilities equals equity. It is still very important to track your farms' profitability, as you will not want to borrow money if your farm is not that profitable but has good equity. For this reason a section in the ABA financial analysis template has been made under equity, for current and retained earnings, to track historical profitability even though the net worth statements are based on market values.

With a solid understanding of the information that financial statements report, and how financial statement information is interconnected, one can advance to the next step in assessing financial risk, which is analyzing the financial statements.

Describe and Measure Solvency

Financial risk can be broken down into 3 main financial management parameters: solvency, liquidity, and profitability. Once the measure within each of these three financial parameters has been assessed, the overall financial measure of exposure to financial risk in a farming operation can be determined. In this section we will describe and measure solvency, the first financial management measurement parameter.

Solvency is defined as having enough value in the form of assets in your business to cover all of the liabilities of the business. Based on the accounting equation that $\text{assets} = \text{liabilities} + \text{equity}$, this definition means that a business has positive equity. When a businesses' equity becomes negative it is said to be insolvent. Bankruptcy is just around the corner for an insolvent business if it does not generate enough cash flow from income, or other sources, to meet its debt requirements in a timely manner.

The solvency of a business at any point in time is shown on their net worth statement. Solvency is measured from the information shown on the net worth statement. As was stated above, a farm having enough assets to cover its liabilities is solvent. The degree of solvency must be measured, as some farm businesses are more solvent than others. The degree of solvency necessary for your farm business to be successful is of paramount importance to know when deciding whether or not you should go forward with another agricultural credit application.

The degree of solvency in a business is measured by the relationship between the assets, liabilities and equity of a business at a given point in time. By subtracting liabilities from assets you calculate the amount of equity in a business. The larger the number is for the equity amount the better off is the business. But everything is relative. Larger businesses need more equity to remain viable than does a smaller business. For this reason solvency is usually measured by ratios.

There are three main ratios used to measure solvency: the solvency ratio, the net worth ratio, and the leverage ratio. The solvency ratio is calculated as follows:

$$\text{Solvency Ratio} = \frac{\text{Total Farm Liabilities}}{\text{Total Farm Assets}}$$

The net worth ratio is calculated as follows:

$$\text{Net Worth Ratio} = \frac{\text{Total Farm Equity}}{\text{Total Farm Assets}}$$

The leverage ratio is calculated as follows:

$$\text{Leverage Ratio} = \frac{\text{Total Farm Liabilities}}{\text{Total Farm Equity}} \text{ or } \frac{\text{Debt}}{\text{Equity}}$$

In Canada the net worth ratio and the leverage ratio are the most common ratios used to measure solvency. It is important to note that no matter which one of these ratios one uses; they are measuring exactly the same thing – the solvency of a business.

In Figure A1-1 the total assets were \$ 4,135,000, the total liabilities were \$ 445,000, and the total equity was \$ 3,690,000.

By doing a little bit of math we find that the solvency ratio is: 0.11; the net worth ratio is: 0.89; and the leverage ratio is 0.12. You will note that the solvency ratio plus the net worth ratio will equal 1 as liabilities plus equity = assets. Again, all of these ratios reveal the same degree of solvency in the farm business. But is the degree of solvency good, weak, or not good for the long- term survival of the farm?

To determine the answer to this question one must compare the solvency ratios to industry benchmarks for agriculture. Each financial institution has their own solvency benchmarks that they follow, and others like Dr. David Kohl have published ratios that they feel are necessary to ensure the long-term survival of a farm business. As a financial management specialist, with many years of experience in Ag lending, I have my own feelings on this subject as well. It also depends on the type of farm enterprises one is running on their farm. Supply managed industries can carry higher financial risk and survive in the long-term as their income is secure and frequent.

For the purposes of this document we will be using the solvency ratios suggested by Dr. David Kohl and Troy Wilson, from “Understanding Key Financial Ratios and Benchmarks” in Business Tools Bulleting from 1997, for the “Good” solvency classification, and my experience for the “Caution” and “Not Good” classification.

The benchmark measures for solvency are shown in the Benchmark Ratios Table in the ABA Template. This template automatically colors ratio cells the traffic light colors of red, yellow and green which state that the ratio at that level is a high, medium, or low measure respectively.

The benchmarks for the solvency ratios are as follows:

Solvency ratio - < 0.3 is good, 0.3 – 0.45 is caution, and > 0.45 is not good

Net Worth Ratio - > 0.7 is good, 0.7 – 0.55 is caution, and < 0.55 is not good

Leverage Ratio - <0.42 is good, 0.42 – 0.82 is caution, and > 0.82 is not good

Again, all of these ratios indicate the same degree of solvency. Most financial institutions use the leverage ratio to measure solvency. For this reason we will use this ratio as our solvency measure for this document. In our example in Figure A1-1 the leverage ratio is 0.12 which is “Good” or a low measure

because it is < 0.42. For the closing net worth statement in Figure A1-4 the leverage ratio is 0.11, which is also good. You will note that the ratio has dropped over the course of the year, which means that it has improved. Lower leverage ratios mean a lower solvency measure.

The farm in the example we have been following has a great leverage ratio and thus low solvency risk. What about the other financial risk tests?

Describe and Measure Liquidity

The second financial management measure is for liquidity. Liquidity is defined as having enough current assets on hand to cover all of the current liabilities on hand at any given point in time. This information is reported on the net worth statement. If a farm business cashed in all of its current assets will it have enough to pay off all of its current liabilities? If it does, the farm is said to be in a liquid position.

As was the case with solvency, the amount of liquidity is also important for the long-term survival of a farm business. One measure for liquidity is the amount of working capital a farm business has on hand at any given point in time. Working capital is calculated as follows:

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

In the example in Figure A1-1 the current assets were \$ 335,000 and the current liabilities were \$ 175,000. With the formula above we find that the working capital is \$160,000. Is this good for a large feedlot operation, or for a small farm? As was the case for the solvency test we must have something to compare this amount to. Dr. Kohl has a “California Working Capital Ratio” which is calculated by dividing working capital by gross farm expenses. He states that this ratio should be > 0.50 which means one should have enough working capital on hand to cover approximately 6 months worth of expenses.

The more common test that Financial Institutions use to calculate liquidity is done with the Current Ratio. The current ratio is calculated as follows:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

In Figure A1-1 the current assets divided by the current liabilities was \$ 335,000 / \$ 175,000, which meant that the current ratio for this farm at this time was 1.91. Is this good or bad? Again we must compare this number to industry benchmarks. The benchmarks suggested by Dr. Kohl are as follows:

> 1.50 is low risk, 1.0 – 1.50 is medium risk, and < 1.0 is high risk

Comparing our result to the benchmarks indicates that this farm has a low liquidity measure at this point in time. Figure A1-4 has a current ratio of 1.60. This ratio has dropped over the course of the projected year from 1.91. This is due to the current principal portion of the new loan, and the increased operating loan balance in the current liabilities. This farm is still doing okay in the area of the liquidity measure, as 1.60 is at the low measure benchmark level.

Table A1-1. Opening Net Worth Statement Ratios:

Current Ratio = CA / CL	1.91
Leverage Ratio = L / E	0.12
Net Worth Ratio = E / A	0.89

Table A1-2. Closing Net Worth Statement Ratios:

Current Ratio= CA / CL	1.60
Leverage Ratio= D / E	0.16
Net Worth Ratio= E / A	0.86

As can be seen from the tables above, the example farm lost a little ground over the past year, but is doing okay in the solvency and liquidity financial management parameters. What about the third financial measure of profitability?

Describe and Measure Profitability

Profitability is reported on the income and expense statement. Basically, the accrued net income is the profit a farm has generated for the fiscal period being reported. As was mentioned earlier when discussing the income and expense statement, it is very important to use the accrued income and expense statement to calculate profit and not a cash statement.

In Figure A1-2 we see that the farm generated accrued revenue of \$ 320,000 and had accrued expenses of \$ 317,500 for an accrued net income, or profit, of \$2,500 before tax. The farm paid \$ 10,000 in income tax for the year, so the after tax profit was a negative - \$ 7,500. This is not good...or is it okay?

Profit is the dollar value obtained by calculating net farm income. Profitability measures the size of the profit relative to the gross, and net, capital invested in the business. Profitability ratios are used to compare the performance or efficiency of a business to a set of established standards (or benchmarks) for the industry or sector, or by comparing one business against others. The gross capital of a business is the total assets, and the net capital in a business is the total equity the farm owner has in his business.

Profitability risk is measured in ratios the same as solvency and liquidity risk. The profit generated by the business is compared to the total assets, and the total equity of the business. The ratios most commonly used to measure profitability are called Return on Assets, and Return on Equity. Return on Assets is calculated as:

$$= \frac{\text{NFI} + \text{Interest Expense} - \text{Unpaid Operator \& Family Labour}}{\text{Total Farm Assets}}$$

$$= \text{Return to Assets} / \text{Total Farm Assets}$$

Return on Equity is calculated as:

$$= \frac{\text{NFI} - \text{Unpaid Operator \& Family Labour}}{\text{Total Farm Equity}}$$

$$= \text{Return to Farm Equity} / \text{Total Farm Equity}$$

For the example farm we have been following the $\text{ROA} = 2,500 + 31,425$ (cash interest plus the accrued interest adjustment) / 4,245,000 = 0.008 and the $\text{ROE} = 2,500 / 3,667,500 = 0.0006$. Both are very low. ROA benchmarks for good profitability are > 0.05 - 5% (from Dr. Kohl), and good ROE is > 0.07 = 7%. Both examples had no Unpaid Operator &/or family labour.

By comparing to industry benchmarks, this farm has low profitability. Does this mean that this farm should not take on any additional debt?

To answer this question we must use a different profitability measure. All financial institutions, that are assessing credit applications, test for a profitability measure by doing a debt servicing analysis of the credit applicant. At the start of this document we talked about two important questions that arise when making a decision whether or not to apply for a loan. The first was “Can my farm repay this loan on schedule?” We answer this question by doing a debt servicing analysis of the farm’s repayment ability.

Table A1-3

Debt Servicing Analysis		
Total Accrued Net Income:		2,500
Plus (+) Depreciation		110,000
Plus (+) Interest Expense		35,925
Plus (+) Off Farm Income		40,000
Minus (-) Living Costs		-30,000
Minus (-) Farm Income Taxes Paid		-10,000
Debt Servicing Capacity (DSC):		148,425
Debt Servicing Interest:	35,925	
Debt Servicing Principal:	60,000	
Debt Servicing Requirements (DSR):		95,925
Budget Surplus:		52,500
Debt Servicing Ratio: DSC / DSR:		1.55
Efficiency Ratio = (T.Exp. - Depr.- Int.)/Gross Revenue:		0.54

Table A1-3 illustrates a debt servicing analysis of the example farm that we have been following in this Document. Debt servicing analysis is broken down into two main sections. The first is debt servicing capacity or DSC and the second is debt servicing requirements or DSR.

DSC is calculated as follows:

Debt Servicing Capacity = Accrued Net Farm Income + Depreciation Expense + Interest Expense + Off-Farm Income – Family Withdrawals – Farm Income Tax Paid

Debt Servicing Requirements is calculated as follows:

DSR = Total Accrued Interest Expense + Total Term Loan Principal Payments (for a fiscal year).

In Table A1-3 the DSC = \$ 148,425 and the DSR = \$ 95,925. The difference between these numbers is the Budget Surplus, which in this case was \$ 52,500.

Is this good, medium, or bad? It is good that we have a positive budget surplus of \$ 52,500. This surplus has to cover depreciable asset replacement, future growth, retirement and the kids’ education amongst other things. This surplus is relative. This may be okay for a small farm, but to low for a large farm. Again we must break this information down into a ratio to compare to industry benchmarks to evaluate the profitability (in this case measured by the debt servicing ratio) measure presented by this farm.

The debt-servicing ratio is calculated as follows:

$$\text{Debt Servicing Ratio} = \frac{\text{Debt Servicing Capacity}}{\text{Debt Servicing Requirements}}$$

In the example in Table A1-3 the DSC was \$ 148,425 and the DSR was \$ 95,925. These numbers result in a Debt Servicing Ratio of 1.55.

Industry benchmarks for this ratio vary from one financial institution to another, but generally the following benchmarks apply:

> 1.5 is low risk, 1.1 – 1.5 is medium risk, and < 1.1 represents high risk

Based on these benchmarks the farm in our example has good debt servicing ability. So we have answered the question. They probably can repay their credit on schedule. This farm would be able to take on a little more debt without getting into serious financial difficulty.

Table A1-3 displays another important ratio called the efficiency ratio. Financial efficiency is defined as the amount of expense money it takes to generate a dollar of revenue. It is calculated as follows:

$$\text{Efficiency Ratio} = \frac{\text{Gross Accrued Farm Expenses} - \text{Depreciation} - \text{Interest Expense}}{\text{Gross Accrued Farm Revenue}}$$

The benchmarks suggested by Dr. Kohl for this ratio are:

< 0.65 is good, 0.80 – 0.65 is caution, and > 0.80 is not good

For more information on financial statements and analyzing financial statements please go to the following website:

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/econ2198](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/econ2198)

In our example in Table A1-3 the farm had an efficiency ratio of 0.54, which is excellent. The high depreciation amount, and high valued assets, resulted in the farms' profitability being very low. However, based on the three main financial measure tests that we calculated we are able to determine that this farm would be able to take on a little more long term debt.

What is the overall financial risk associated with this farming operation?

Calculate a Farming Operations Overall Financial Risk

In this Module we discussed the important information reported in, and interconnectivity of, a complete set of financial statements. Once we understood the financial statements we analyzed them for financial measures. We broke the financial measures down into three main groups: solvency, liquidity, and profitability (debt servicing). Benchmarks were given to quantify the measure relative to these three financial parameters. Which financial parameter is most important?

This question can be debated at length. For the purposes of this document we will state that they are all equally important. The example that we followed throughout this document had good ratios for solvency, liquidity, and profitability (through the debt servicing analysis). The overall financial risk related to this farm is easy to calculate – it is low. Each financial measure showed low risk. This is not always the case.

Farms generally have low solvency and higher liquidity and profitability measures. A low measure in one of the parameters should offset higher measure in another area. Table A1-4 shows a simple overall financial risk rating method.

Table A1-4

Farms' Overall Financial Risk Rating:		Rating
Closing Current Ratio	1.60	1
Closing Leverage Ratio	0.16	1
Closing Debt Servicing Ratio	1.55	1
Ratings: Current Ratio: <1.0 = 3, 1.0-1.5 = 2, >1.5=1; Leverage Ratio: >1 = 3, 0.42-1.0 = 2, < 0.42 = 1; Debt Servicing Ratio: <1.1 = 3, 1.1-1.5 = 2, >1.5 = 1.		3
Overall Farm Risk Rating: <=4 Good; 5-6 Caution; >=7 Not Good		

Points are awarded based on the financial risk apparent in the ratio when compared to industry benchmarks. 1 point was awarded for low measure, 2 points for medium measure, and 3 points for a high measure. The current ratio, leverage ratio, and debt-servicing ratio were all low level measures in this example and the farm risk rating was good at 3.

Table A1-5

Farms' Overall Financial Risk Rating:		Rating
Closing Current Ratio	1.34	2
Closing Leverage Ratio	0.11	1
Closing Debt Servicing Ratio	1.05	3
Ratings: Current Ratio: <1.0 = 3, 1.0-1.5 = 2, >1.5=1; Leverage Ratio: >1 = 3, 0.42-1.0 = 2, < 0.42 = 1; Debt Servicing Ratio: <1.1 = 3, 1.1-1.5 = 2, >1.5 = 1.		6
Overall Farm Risk Rating: <=4 Good; 5-6 Caution; >=7 Not Good		

The farm example in Table A1-5 has more variation in their financial measure ratios and consequently a higher financial risk rating than the farm in Table A1-4. The farm in Table A1-5 should not be taking on any additional debt with the low 1.05 debt-servicing ratio, and a higher overall financial risk rating. They should be monitoring their financial ratios and performance very closely month to month. A slight slip in crop yields or calf prices could require this farm to ask for a restructuring of their loans to survive.

The objective of this document was to assist you in understanding and evaluating financial statements.

If you have any questions or comments on the content of this document please contact Ron Lyons at ron.lyons@gov.ab.ca