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Ag Decision Maker

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Understanding Double Entry Accounting

F arm families have traditionally used the single entry (often referred to as cash) method of accounting for their farm business. This is a relatively simple method of accounting where items are listed as income or expenses when cash transactions occur. For example, grain is recorded as income when it is converted to cash, that is, sold and delivered. Also, production inputs like seed, feed and fertilizer are recorded as expenses when they are paid for rather than when they are used or ordered.

The single entry method of accounting does a poor job of recording the true profitability of a business within or between accounting periods. For example, crops can be sold in a year other than when they are grown and expenses can be paid in the year before or after the inputs are used.

To correct this problem, cash accounting uses an adjustment where inventories of production inputs and inventories of crops and livestock are taken at the beginning and end of the accounting period (e.g. calendar year) to adjust the income statement to a form of accrual accounting. The inventories shift production inputs and inventories of crops and livestock into the year in which they are used or produced rather than when they are purchased or sold.

Double entry accounting goes a step further. Every time an income or expense transaction occurs and an entry is made, the net worth statement is updated at the same time.

The two financial statements encompassed in double entry accounting are the net worth statement (also called the balance sheet or equity statement) and the income statement (also called the profit and loss statement). Actually the income statement becomes part of the net worth statement, as described below.

Traditionally, in single entry accounting, the net worth statement is only prepared or updated at a specific point in time. Often this is the beginning of a new year. The net worth statement is usually not updated again until the following year. In double entry accounting, the net worth statement is updated every time an entry is made. So the balance sheet changes from being a static financial statement (updated only periodically) to a dynamic financial statement that is always current.

In double entry accounting, the net worth statement is constructed using *cost basis* values rather than *market* values. This means that assets are valued at their original cost (adjusted for depreciation) rather than their current market value. So net worth or equity only increased or decreases as a result of profit or loss from the business, or from a non-business cash infusion or withdrawal.

With single entry accounting, the profit or loss for the accounting period is transferred from the income statement to the balance sheet when a new balance sheet is prepared, usually on January 1. With double entry accounting, the income statement is part of the equity section of the net worth statement, so net worth is updated every time an entry is made. As a result, the equity portion of the net worth statement increases or decreases every time revenues or expenses are posted. Noncash income, such as grain placed into storage, can be entered when harvest is completed. Noncash expenses, such as depreciation, are usually entered at the end of the accounting year.

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Net Worth Statement (Balance Sheet)

In its standard format, assets are listed on the left side of the net worth statement and liabilities and equity are listed on the right side. The statement balances (hence the balance sheet title) because the assets on the left side equal liabilities plus equity on the right side.

$$Assets = Liabilities + Owners\ Equity\ (net\ worth)$$

This equation is the foundation for accounting. If this equation or balance doesn't hold true, then an error has occurred.

- **Assets** - An asset is a resource owned by the business from which future economic benefits are expected to flow to the business. In short, something that adds value to your business.

- **Liabilities** - A liability is a present obligation of the business arising from past events. It is a claim against the business. Meeting these claims will result in an outflow from the business. In short, it is something that subtracts from the value of the business.

- **Owner's Equity (net worth)** - By manipulating the equation above, it also holds true that assets less liabilities equals owner's equity, as shown below. Owner's equity is what remains after the liabilities (claims against the business by outsiders) are subtracted from assets. Owner's equity is the owner's claim against the business.

$$Assets – Liabilities = Owners\ Equity\ (net\ worth)$$

If assets exceed liabilities, the business is *solvent* (has sufficient assets to meet the claims against the business by outsiders). If liabilities exceed assets the business is *insolvent* (cannot meet the financial claims by outsiders against the business).

T Accounts

Double entry accounting utilizes "T" accounts. The name of the account is listed on the top of the T. The debit is always listed on the left side of the account and the credit is always listed on the right side. Actually the words *left* and *right* could be substituted for debit and credit.

Name of Account	
Debit	Credit

A basic rule of double entry accounting is that an amount that is entered as a debit must also be entered as a credit in a different account. For example, a $2,000 entry as a debit in account one is also entered as a credit in account two. This keeps the books "in balance".

Account One	
Debit	Credit
$2,000	

Account Two	
Debit	Credit
	$2,000

The amounts can be split among two or more accounts, but the total amount entered as debit must always equal the total amount entered as credit.

Account One
Debit   Credit
$3,000

Account Two
Debit   Credit
$1,000

Account Three
Debit   Credit
        $2,000

Account Four
Debit   Credit
        $2,000

Asset Accounts

A debit in an asset account will *increase* the account balance. Conversely, a credit in an asset account will *decrease* the account balance.

Account 1
Debit   Credit
+   -

Example Transaction 1

For example, a farmer purchases $1,000 of seed corn and writes a check for the amount. The Cash asset account is credited (decreased) by $1,000 and the Seed Corn Inventory asset account is debited (increased) by $1,000. This results in a $1,000 decrease in Cash and $1,000 increase in Seed Corn Inventory.

Cash
Debit (+) Credit (-)
        $1,000

Seed Corn Inventory
Debit (+) Credit (-)
$1,000

Likewise the farmer purchases $2,000 of fertilizer. The Cash asset account is credited (decreased) by $2,000 and the Fertilizer Inventory asset account is debited (increased) by $2,000. The result is a $2,000 decrease in Cash and a $2,000 increase in Fertilizer Inventory.

Cash
Debit (+) Credit (-)
        $2,000

Fertilizer Inventory
Debit (+) Credit (-)
$2,000

Example Transaction 2

The seed corn is held in inventory until it is planted. At that time the Seed Corn Inventory asset account is credited by $1,000 and the Growing Corn asset account is debited by $1,000. The seed corn is no longer in inventory but part of the growing corn crop. The balance in the Seed Corn Inventory account is now zero.

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Seed Corn Inventory

Debit (+)	Credit (-)
$1,000	***$1,000***
	0

Growing Corn

Debit (+)	Credit (-)
$1,000	

</div>

Example Transaction 3

The fertilizer is moved from the Fertilizer Inventory asset account to the Growing Corn asset account when the fertilizer is applied. In the example below, $2,000 of fertilizer is applied. Assuming this was the amount of fertilizer previously in the Fertilizer Inventory Account, this asset account is now reduced to zero. The Growing Corn asset account is now $3,000.

<div align="center">

Fertilizer Inventory

Debit (+)	Credit (-)
$2,000	***$2,000***
	0

Growing Corn

Debit (+)	Credit (-)
$1,000	
$2,000	
$3,000	

</div>

Example Transaction 4

When the corn is harvested and placed in storage, the entire amount in the Growing Corn asset account is credited and the Corn Inventory asset account is debited. The Growing Corn asset account is reduced to zero and the Corn Inventory asset account contains the value of the corn based, not on market value of the corn, but on the cost of the production inputs invested in growing the crop.

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Growing Corn

Debit (+)	Credit (-)
$3,000	***$3,000***
	0

Corn Inventory

Debit (+)	Credit (-)
$3,000	

</div>

Also note that through this entire process the *total* asset value has not changed. In every entry, when an individual asset account is increased, another asset account is decreased by the same amount, leaving the total value of the assets unchanged. The value of the corn is not changed to its market value until the corn is sold.

At this time, profit (loss) is generated and transferred to the income statement portion of the equity account.

Liability Accounts
Contrary to an asset account, a debit in a liability account will *decrease* the account. Conversely, a credit in a liability account will *increase* the account.

Assets	**Liabilities**
Account 1	Account 2
Debit Credit	Debit Credit
+ -	- +

Example Transaction 5
Using the example above, assume that the seed corn is purchased on *account* rather than by using cash. Once again the Seed Corn Inventory asset account is debited and *increased*. But now the Accounts Payable liability account is credited and also *increased*.

Seed Corn Inventory	Accounts Payable
Debit (+) Credit (-)	Debit (-) Credit (+)
$1,000	*$1,000*

Using the equation "Assets – Liabilities = Equity", note that when the Seed Corn Inventory asset account is increased, the Accounts Payable liability account is also increased by the same amount. So the increase in assets is offset by an equal increase in liabilities, leaving equity unchanged.

Example Transaction 6
When the seed corn is paid for, the Accounts Payable liability account is debited (*decreased*) and the Cash asset account is credited (*decreased*). The Accounts Payable liability account is now zero.

Cash	Accounts Payable
Debit (+) Credit (-)	Debit (-) Credit (+)
$1,000	*$1,000* $1,000
	0

Once again the two entries offset each other leaving equity unchanged.

Equity Accounts
The equity accounts are structured similar to the liability accounts. Debiting an equity account *decreases* the account and crediting it *increases* the account. Several types of equity accounts can be created. For example, retained earnings is an equity account that contains profits from previous years that are kept in the business.

<table>
<tr><td align="center">**Asset Accounts**</td><td></td><td align="center">**Liability Accounts**</td></tr>
<tr><td align="center">Debit</td><td align="center">Credit</td><td align="center">Debit</td><td align="center">Credit</td></tr>
<tr><td align="center">+</td><td align="center">-</td><td align="center">-</td><td align="center">+</td></tr>
</table>

	Equity Accounts	
	Debit	Credit
	-	+

Income Statement

The Income Statement records revenues and expenses and shows the profits (losses) generated by the business. The formula for the income statement is shown below.

$$Revenues\ (income) - Expenses = Profit\ (Loss)$$

Instead of a document separate from the net worth statement, the income statement is part of the equity section of the net worth statement. Revenues increase equity and expenses decrease it. So expenses debit (decrease) the equity account and are listed on the left side, and revenues credit (increase) the equity account and are listed on the right side.

	Asset Accounts			**Liability Accounts**	
	Debit	Credit		Debit	Credit
	+	-		-	+

	Equity Accounts	
	Expense (Debit)	Revenue (Credit)
	-	+

However, in addition to being part of an equity account, revenue is also a category of accounts. For individual revenue accounts, a debit *decreases* the account and a credit *increases* it. So, *crediting* a revenue account *increases* revenue which subsequently *increases* equity because a revenue account *increases* the equity account. Conversely, *debiting* a revenue account *decreases* revenue which subsequently *decreases* equity.

Likewise, in addition to being part of the equity account, expense is also a category of accounts. For individual expense accounts, a debit *increases* an expense account and a credit *decreases* it. So, debiting an expense account *increases* expenses which subsequently *decreases* equity because an expense account debits (*decreases*) the equity account. Also, *crediting* an expense account *decreases* expense which subsequently *increases* equity.

	Asset Accounts			**Liability Accounts**	
	Debit	Credit		Debit	Credit
	+	-		-	+

	Equity Accounts			
	Expense Accounts (-)		**Revenue Accounts (+)**	
	Debit	Credit	Debit	Credit
	+	-	-	+

Example Transaction 7

Continuing the example from above, when the corn in the Corn Inventory asset account is sold, the following transactions occur. First the production expense of $3,000 (seed and fertilizer) that has been carried forward into the Corn Inventory asset account is credited and this account becomes zero. (Note that the corn in the Corn Inventory account is valued at its cost of production rather than market value.) The Corn Expense account that is one of the Expense Accounts that is part of the Equity Account is debited. This *increases* the expense account that, in turn, *decreases* the equity account.

Corn Inventory		Corn Expense	
Debit (+)	Credit (-)	Debit (+)	Credit (-)
$3,000	*$3,000*	*$3,000*	
0			

Next, the sale value of the corn (e.g. $5,000) is debited to the Cash asset account and credited to the Corn Sales revenue account. So both the cash and corn sales accounts increase by $5,000.

Cash		Corn Sales	
Debit (+)	Credit (-)	Debit (-)	Credit (+)
$5,000			*$5,000*

The result is that total assets increase by $2,000 because $3,000 of corn inventory is converted to $5,000 of cash, and equity is increased by $2,000 because $3,000 of expenses and $5,000 of revenue are posted to the Equity Account. The balance in the net worth statement is maintained. Both assets and equity are increased by $2,000.

Example Transaction Summary

A layout of all of the transactions and their respective T accounts is shown below. The number of the transaction is shown in parenthesis so you can follow the progression of how the transactions occurred.

	Assets		**Liabilities**	

Cash

Debit (+)	Credit (-)
$5,000 (7)	$1,000 (1,6)
	$2,000 (1)
	$3,000

Accounts Payable

Debit (-)	Credit (+)
$1,000 (1,6)	$1,000 (1,5)

Seed Corn Inventory

Debit (+)	Credit (-)
$1,000 (1,5)	$1,000 (2)

Equity

Expenses (-)	Revenues (+)

Corn Expense

Debit (+)	Credit (-)
$3,000 (7)	

Corn Sales

Debit (-)	Credit (+)
	$5,000 (7)

Fertilizer Inventory

Debit (+)	Credit (-)
$2,000 (1)	$2,000 (3)

Growing Corn

Debit (+)	Credit (-)
$1,000 (2)	$3,000 (4)
$2,000 (3)	
$3,000	

Corn Inventory

Debit (+)	Credit (-)
$3,000 (4)	$3,000 (7)

The debits and credits offset each other in all of the transactions. In the first six transactions there is no change in equity. Only in the last transaction (7) does equity (net income) change (increase by $2,000).

Assets	**Equity**
	Expenses **Revenue**

Cash

Debit (+)	Credit (-)
$5,000	$3,000
$2,000	

Corn Expense

Debit (+)	Credit (-)
$3,000	

Corn Revenue

Debit (-)	Credit (+)
	$5,000

The Net Worth Statement is still in balance because equity (cash) is increased by $2,000 and assets (cash) are also increased by $2,000.

Assets	**Equity**

Debit (+)	Credit (-)
$2,000	

Debit (-)	Credit (+)
	$2,000

Capital Assets

Capital assets such as machinery, equipment and facilities are assets with an economic life of more than one accounting period. So, its cost is spread over more than one accounting period. This is recorded with an asset account called a *contra-asset* account. A contra-asset account always accompanies a capital asset account. It is used to accumulate the decrease in value or depreciation of a capital asset. This allows the annual depreciation to be transferred to an expense account. It is called a contra-asset account but it *decreases* the value of the asset. Although it is an asset account, it is structured like an expense account with the debit side decreasing the account and the credit side increasing the account.

For example, when a capital asset such as an item of machinery is purchased, it is placed in an asset account (e.g. Machinery). To record annual depreciation of the capital asset, a contra-asset account is set up called Machinery Depreciation. The *net* amount of the two accounts is the remaining value of the machine (undepreciated balance).

<u>Machinery</u>
Debit	Credit
+	-

<u>Machinery Depreciation</u>
Debit	Credit
-	+

Example Transaction 8

Assume a new tractor is purchased for $100,000 with the payment made in cash.

<u>Machinery</u>
Debit (+)	Credit (-)
$140,000	

<u>Cash</u>
Debit (+)	Credit (-)
	$140,000

Example Transaction 9

For simplicity, assume the tractor's depreciation method is straight-line over seven years with no salvage value. So annual depreciation is $20,000 ($140,000 / 7 yrs. = $20,000). At the end of the first year the Machinery Depreciation contra-asset account is credited for $20,000 and the Machinery Depreciation Expense equity account is debited for $20,000. The remaining value of the tractor is the difference between the Machinery asset account and the Machinery Depreciation contra-asset account or $120,000 ($140,000 - $20,000 = $120,000). This continues until the end of seven years when the tractor is completely depreciated, or until the tractor is sold or otherwise disposed of.

<u>Machinery Depreciation</u>
Debit (-)	Credit (+)
	$20,000

<u>Machinery Depreciation Expense</u>
Debit (+)	Credit (-)
$20,000	

Example Transaction 10

If the tractor is sold for $90,000 at the end of four years, the Machinery asset account is credited for $90,000 and the Cash asset account is debited for $90,000, leaving $50,000 in the Machinery asset account.

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Machinery

Debit (+)	Credit (-)
$140,000	*$90,000*
$50,000	

Cash

Debit (+)	Credit (-)
$90,000	

</div>

At this time, $80,000 of depreciation has accrued in the Machinery Depreciation contra-asset account (4 years x $20,000 = $80,000). However, the tractor only decreased in value by $50,000 ($140,000 - $90,000 = $50,000) from the time it was purchased until it was sold. To account for this, the Machinery Depreciation contra-asset account is debited by $30,000 and Machinery Depreciation Expense equity account is credited by $30,000. *Debiting* the Machinery Depreciation contra-asset account *decreases* this account to the actual $50,000 of depreciation that accrued on the tractor. *Crediting* the Machinery Depreciation Expense equity account *decreases* depreciation expense by $30,000. This offsets $30,000 of the $80,000 of depreciation expense posted over the previous four years and results in the actual amount of $50,000 depreciation expense posted to the Expenses account of the Equity account. The remaining value of the tractor should be, and is, zero because it was sold. This is shown by the difference between the Machinery Asset account of $50,000 and the Machinery Depreciation contra-asset account of $50,000.

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Machinery Depreciation			Machinery Depreciation Expense	
Debit (-)	Credit (+)		Debit (+)	Credit (-)
$30,000	*$80,000*			*$30,000*
	$50,000			

</div>

Example Transaction Summary

A layout of all of the capital asset transactions and their respective T accounts is shown below. The number of the transaction is shown in parenthesis so you can follow the progression of how the transactions occurred.

The net result of all of the transactions is that the Machinery Deprecation contra-asset account of $50,000 off-sets the remaining value of $50,000 in the Machinery asset account and the net amount of Machinery Depreciation Expense of $50,000 is offset by a $50,000 decrease in Cash asset account.

Assets		**Equity**		
		Expenses (-)		**Revenues (+)**
Cash		Machinery Depreciation Expense		
Debit (+)	Credit (-)	Debit (+)	Credit (-)	
$90,000 (10)	$140,000 (8)	$20,000 (9)	$30,000 (10)	
	$50,000	$20,000		
		$20,000		
Machinery		$20,000		
Debit (+)	Credit (-)	$50,000		
$140,000 (8)	$90,000 (10)			
$50,000				
Machinery Depreciation				
Debit (-)	Credit (+)			
$30,000 (10)	$20,000 (9)			
	$20,000			
	$20,000			
	$20,000			
	$50,000			

So, in the final analysis, Assets have decreased by $50,000 and Equity has also decreased by $50,000, the actual amount of decrease in the value of the tractor, and leaving the Net Worth Statement in balance.

Assets		**Equity**		
		Expenses (-)		**Revenues (+)**
Cash		Machinery Depreciation Expense		
Debit (+)	Credit (-)	Debit (+)	Credit (-)	
	$50,000	$50,000		

Accounting Journal

The accounting journal is where each transaction is initially illustrated with a specific entry. The entries are recorded so that each account involved in the transaction is listed with the accompanying amount. Depending on the transaction, the amounts are listed as debits or credits. The debited amounts are listed first and the credited amounts last. Remember that the total debit amount must equal the total credit amount.

Below is a listing of the example transactions outlined above as they would appear in the accounting journal.
Listing of Example Transactions

Example Transaction 1		
Account	**Debit Amount**	**Credit Amount**
Seed Corn Inventory	$1,000	
Cash		$1,000
Fertilizer Inventory	$2,000	
Cash		$2,000

Example Transaction 2		
Account	**Debit Amount**	**Credit Amount**
Growing Corn	$1,000	
Seed Corn Inventory		$1,000

Example Transaction 3		
Account	**Debit Amount**	**Credit Amount**
Growing Corn	$2,000	
Fertilizer Inventory		$2,000

Example Transaction 4		
Account	**Debit Amount**	**Credit Amount**
Corn Inventory	$3,000	
Growing Corn		$3,000

Example Transaction 5		
Account	**Debit Amount**	**Credit Amount**
Seed Corn Inventory	$1,000	
Accounts Payable		$1,000

Example Transaction 6		
Account	**Debit Amount**	**Credit Amount**
Accounts Payable	$1,000	
Cash		$1,000

Example Transaction 7		
Account	**Debit Amount**	**Credit Amount**
Cash	$5,000	
Corn Sales		$5,000
Corn Expense	$3,000	
Corn Inventory		$3,000

Example Transaction 8		
Account	**Debit Amount**	**Credit Amount**
Machinery	$140,000	
Cash		$140,000

Example Transaction 9		
Account	**Debit Amount**	**Credit Amount**
Machinery Depr. Expense	$20,000 x 4 = $80,000	
Machinery Depreciation		$20,000 x 4 = $80,000

Example Transaction 10		
Account	**Debit Amount**	**Credit Amount**
Cash	$90,000	
Machinery		$90,000
Machinery Depreciation	$30,000	
Machinery Depr. Expense		$30,000

General Ledger

Each transaction is initially entered in the accounting journal at the time of the transaction. The individual transactions that have been recorded in the accounting journal are periodically posted to the general ledger to show the current balance of the various accounts. The general ledger contains all of the accounts and the balance amounts for each account. A computer-based accounting program will automatically post transactions to the general ledger.

For example, return to the first example transaction where a farmer purchases $1,000 of seed corn and writes a check for the amount. The farmer would have entered the transaction in the accounting journal as shown below.

Example Transaction 1		
Account	**Debit Amount**	**Credit Amount**
Seed Corn Inventory	$1,000	
Cash		$1,000

Periodically, after several accounting journal entries are entered, the farmer will post the journal entries to the general ledger. Assume there is currently nothing in the Seed Corn Inventory asset account but there is $10,000 in the Cash asset account. The amounts in the journal will be transferred to the ledger as shown below. As a result of the posting, the Seed Corn Inventory asset account will contain $1,000 of seed corn and the Cash asset account will contain a balance of $9,000.

Example Transaction 1

For example, a farmer purchases $1,000 of seed corn and writes a check for the amount. The Seed Corn Inventory asset account is debited (increased) by $1,000 and the Cash asset account is credited (decreased) by $1,000. This results in a $1,000 increase in seed corn inventory and a $1,000 decrease in cash.

<div align="center">

Seed Corn Inventory

Debit (+)   Credit (-)

$1,000   0

</div>

Cash

Debit (+)	Credit (-)
$10,000	**$1,000**
$9,000	

Once again, with every debit there must be a credit. So, at any time you should be able to add up all of the debits and all of the credits in the general ledger and they should be equal. This is called a *trial balance*. If they are not equal, an error has occurred since the last time you did a trial balance. So, you will need to re-view the entries since the last trial balance to find the error.

Which System should I Use?

The best system for you will depend on your individual situation. Below are some of the advantages and disadvantages of each system.

Single Entry (cash) Accounting
Advantages
- Simple – accounting entries limited to recording cash transactions (except for capital assets)
- Provides information for income taxes purposes
- Is familiar to the agricultural community.

Disadvantages
- Limited ability to track financial performance through the year.
- Limited ability to do financial analysis.
- Does not provide net worth analysis (unless balance sheet is updated independently)

Double Entry Accounting
Advantages
- Net worth statement is always up-to-date
- Same data builds both the income statement and the net worth statement.
- Accrual adjustments are made automatically
- Provides access to current and detailed financial information throughout the year to track financial perfor-mance and conduct financial analysis.

Disadvantages
- More complex and time consuming than cash account.
- Is an unfamiliar system to most agricultural producers.
- Many of the traditional "tax" adjustments methods used in cash accounting (e.g. purchasing inputs in the previous year, delayed payment of grain sales, cannot be used)

As a general rule, single entry accounting may be best if you have a simple business and your main purpose for keeping records is for income tax purposes. Conversely, if you have a complex business and want to perform financial analysis throughout the year, the double entry system may be best. If you just want to do year-end financial analysis, single entry accounting with accrual adjustments at the end of the year may be preferred.