

Ninth Edition

FARM MANAGEMENT

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FARM MANAGEMENT, NINTH EDITION

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PREFACE

Farms and ranches, like other small businesses, require sound management to survive and prosper. The continual development of new agricultural technologies means that farm and ranch managers must stay informed of the latest advances and decide whether to adopt them. Adopting a risky, unproven technology that fails to meet expectations can cause financial difficulties or even termination of the farm business. On the other hand, failing to adopt profitable new technologies will put the farm business at a competitive disadvantage that could also prove disastrous in the long run. In addition, changing public policies regarding environmental protection, taxes, and income supports can make certain alternatives and strategies more or less profitable than they have been in the past. Finally, changes in consumer tastes, the demographic makeup of our population, and world agricultural trade policies affect the demand for agricultural products.

The continual need for farm and ranch managers to keep current and update their skills motivated us to write this ninth edition.

This book is divided into six parts. Part I begins with the chapter “Farm Management Now and in the Future.” It describes some of the technological and economic forces driving the changes we see in agriculture. By reading this chapter, students will find an incentive to study farm management and an appreciation for the management skills modern farm managers must have or acquire. Part I concludes with an

explanation of the concept of management and the decision-making process, with an emphasis on the importance of strategic planning and decision making.

Part II presents the basic tools needed to measure management performance, financial progress, and the financial condition of the farm business. It discusses how to collect and organize accounting data and how to construct and analyze farm financial statements. Data from an example farm is used to demonstrate the analysis process in the chapter on farm business analysis.

Part III contains three chapters on basic microeconomic principles and cost concepts. The topics in this part provide the basic tools needed to make good management decisions. Students will learn how and when economic principles can be used in management decision making, along with the importance of the different types of economic costs in both the short run and the long run. Economies and diseconomies of size and their causes are discussed.

Practical use of budgeting as a planning tool is emphasized in Part IV. The discussion includes chapters on enterprise, partial, whole farm, and cash flow budgets. The format and use for each type of budget, sources of data to use, and break-even analysis techniques are discussed in detail.

Topics necessary to further refine a manager’s decision-making skills are included in Part V. Farm business organization and transfer,

risk control, income tax management, investment analysis, and enterprise analysis are discussed. The chapter on income tax management has been updated with the latest changes available. The chapter on investment analysis includes a discussion of the concepts of annual equivalent and capital recovery values. The final chapter discusses how to separate the whole-farm analysis into profit centers and cost centers.

Part VI discusses strategies for acquiring the resources needed on farms and ranches, including capital and credit, land, human resources, and machinery. The human resource chapter includes sections on improving managerial capacity and bridging the cultural barriers that may be encountered in managing agricultural labor.

The authors would like to thank the instructors who have adopted the previous edition for their courses and the many students who have used it both in and out of formal classrooms. Your comments and suggestions have been carefully considered and many were incorporated in this edition. Suggestions for future improvements are always welcome. A special thanks goes to the McGraw-Hill reviewers for their many thoughtful ideas and comments provided during the preparation of this edition.

New to this edition:

- 2 new tables
- 68 revised tables
- 6 new figures
- 10 revised figures
- 5 new boxes
- 11 revised boxes
- 10 new glossary terms

Updated material about:

- Example farm (I. M. Farmer) throughout
- Farm Financial Standards Council guidelines
- Enterprise budget examples
- Partial budgeting examples
- Whole-farm budgeting example
- Cash flow budget example
- Crop insurance rules

- USDA commodity programs
- Land values and farm rental rates
- Agricultural labor laws
- Federal income tax brackets and rates

New or expanded discussion of:

- Biosecurity and farm records
- Double-entry accounting
- Sources of Federal tax revenue
- Federal income tax rules for depreciation, tax-free exchanges, exemptions, and credits
- Tax rules by form of business organization
- Trusts for passing on assets
- Service centers such as grain marketing
- True cost of credit
- Credit scoring to set interest rates
- Employee evaluation instrument
- Joint machinery ownership
- Present and future value factor formulas in Appendix

INSTRUCTOR RESOURCES

Instructors, are you looking for additional resources? Be sure to visit www.mhhe.com/kay9e for the Instructor's Manual (which includes the answers to the end-of-chapter questions), Lab Exercises, an Electronic Testbank, and accessible PowerPoint Presentations.

Access is for instructors only and requires a user name and password from your McGraw-Hill Learning Technology Representative. To find your McGraw-Hill representative, go to www.mheducation.com and click the dropdown for "Support & Contact," select "Higher Education," and then click the "GET STARTED" button under the "Find Your Sales Rep" section.

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©Patricia Duffy

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MEASURING MANAGEMENT PERFORMANCE

Two points were made in Chapter 2: (1) setting goals is important and (2) control is one of the functions of management. In Part Two we will describe how to measure and analyze profit and other financial characteristics of a farm or ranch business. Results of the analyses will allow the manager to determine how well and to what degree the financial goals are being met.

This discussion is also related to the control function of management. Control is a monitoring system used to assess whether the business plan is being followed and how well the farm is meeting the goals of the plan. Many of the same records needed to measure profit and the financial status of the business are also needed to perform the control function of management. The records provide a method of measuring not only how well the business is doing but also how well the manager is doing.

This discussion introduces the need for an information management system for the farm or ranch business. Many choices and options are available in the design and implementation of a system, ranging from the simple to the complex. The best system for any business will depend on many factors, including the size of the business, the form of business organization, the amount of capital borrowed, lender requirements, and what specific financial reports are needed and in what detail.

Chapter 3 discusses the purposes and components of an information management system. The next two chapters cover the most common financial statements. Chapter 4 covers the balance sheet, a financial statement designed to measure the financial condition of a business at a point in time. The related statement of owner equity shows the sources of a farm's net worth.

Chapter 5 introduces the income statement, which provides an estimate of the value of products and services produced during an accounting period and the costs of the resources used to produce them. The accuracy of the reported profit depends on many factors, including the type of record system employed and the effort put forth to keep good records. The proper recording of cash transactions and how they are summarized in the statement of cash flows are discussed, and the difference between cash flows and income/expenses is explained. The emphasis will be on understanding what it takes to accurately measure profit or net farm income. Without an accurate measurement, the effects of past management decisions will be distorted and unreliable information will be used to make future decisions.

The tools developed in Chapters 4 and 5 can be used in the control functions of management. In Chapter 6 financial measures derived from the balance sheet and income statement are combined with some additional analytical measurements to perform a whole-farm business analysis. Measures of the financial strength and profitability of the business can be compared to goals and standards. Areas of strength and weakness can be identified, and specific problems addressed to improve the overall business performance so as to better meet the operator's goals.





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ACQUIRING AND ORGANIZING MANAGEMENT INFORMATION

CHAPTER OUTLINE

Purpose and Use of Records
Farm Business Activities
Basic Accounting Terms
Options in Choosing an Accounting System
Chart of Accounts
Basics of Cash Accounting
Basics of Accrual Accounting
A Cash Versus Accrual Example
Farm Financial Standards Council
Recommendations
Output from an Accounting System
Summary
Questions for Review and Further Thought

CHAPTER OBJECTIVES

1. Appreciate the importance and value of establishing a good farm or ranch accounting system
2. Discuss some choices that must be made when selecting an accounting system
3. Outline the basic concepts of the cash accounting method
4. Present the basic concepts of the accrual accounting method and compare them with cash accounting
5. Review some recommendations of the Farm Financial Standards Council related to choice of accounting method
6. Introduce some financial records that can be obtained from a good accounting system

A business with inadequate records can be likened to a ship in the middle of the ocean that has lost the use of its rudder and navigational aids. It does not know where it has been, where it is

going, or how long it will take to get there. Records tell the manager where the business has been and whether it is now on the path to making profits and creating financial stability. Records

are, in one respect, the manager's *report card*, because they show the results of management decisions over past periods. Records may not directly show where a business is going, but they can provide considerable information that can be used to correct or amend past decisions and to improve future decision making. In that way, records influence the future direction of the business.

For a number of reasons, including the small scale and diverse production systems of most farm businesses, farm and ranch records have not always been totally consistent with the standards that the accounting profession follows for other types of businesses. Financial problems on farms and ranches during the 1980s focused attention on the many different styles and formats of financial reports being used, differences in terminology, and inconsistent treatment of some accounting transactions unique to agriculture.

PURPOSE AND USE OF RECORDS

Several uses for records have already been mentioned. Following is a more detailed and expanded list of the purpose and use of farm records:

1. Measure profit and assess financial condition.
2. Provide data for business analysis.
3. Assist in preparing reports for partners, lenders, landlords, input providers, and government agencies.
4. Measure the profitability of individual enterprises.
5. Assist in the analysis of new investments.
6. Prepare income tax returns.

This is not a complete list of all possible reasons for keeping and using farm records. Other possible uses include demonstrating compliance with environmental regulations, establishing insurance needs, planning and valuing estates, monitoring inventories, dividing landlord/tenant expenses, reporting to partners and shareholders, and developing marketing plans. Good records are also essential for splitting income and expenses in multiple-owner businesses, such as those with absentee landowners, and to assist with profit-sharing distributions and share-lease arrangements. However, the six uses in the list are the more common and will be discussed in more detail.

Box 3-1

Farm Financial Standards Council

The *Farm Debt Crisis* from 1983 to 1987 provided evidence that the farm record-keeping methods and financial analyses of that time were often inadequate or underused. Following the debt crisis, farm financial education increased, leading to growth in the number of available books, farm record systems, and services, but the new methods were generally not standardized. In 1989, the Farm Financial Standards Task Force (FFSTF) was formed to address accounting and record-keeping problems on farms and ranches. Subsequently, they changed their name to the Farm Financial Standards Council (FFSC).

According to the FFSC website, the FFSC is “dedicated to helping farmers by promoting uniform financial reporting and analysis in the ag industry.”

The first report of this group was issued in 1991, with the goal of making farm financial reporting more uniform and technically correct. Since then agricultural educators, accountants, and software vendors have made a significant effort to bring more consistency to formats, nomenclature, and definitions in farm accounting and analysis. In 2006, the FFSC developed a report concerning management accounting guidelines for agricultural producers. The FFSC recommendations are updated periodically. In 2017, updated financial guidelines, as well as an implementation guide for non-accountants, were made available. This chapter and the subsequent chapters of this text generally follow the financial accounting recommendations of the FFSC.

Measure Profit and Assess Financial Condition

These two reasons for keeping and using farm records are among the more important. Profit is estimated by developing an income statement, the topic for Chapter 5. The financial condition of the business as shown on a balance sheet will be covered in detail in Chapter 4.

Provide Data for Business Analysis

After the income statement and balance sheet are prepared, the next logical step is to use this information to do an in-depth business analysis. There is a difference between making *a profit* and having *a profitable* business. Is the business profitable? How profitable? Just *how* sound is the financial condition of the business? The answers to these and related questions require more than just preparing an income statement and balance

sheet. A financial analysis of the business can provide information on the results of past decisions, and this information can be useful when making current and future decisions.

Assist in Obtaining Credit

Lenders need and require financial information about the farm business to assist them in their lending decisions. Following the financial difficulties of the 1980s, agricultural lenders and bank examiners began requiring more and better farm records. Good records can greatly increase the odds of getting a loan approved and receiving the full amount requested.

Measure the Profitability of Individual Enterprises

A farm or ranch may include several different enterprises. It is possible that one or two of the

Box 3-2

Biosecurity and Farm Records

Following a number of high-profile food contamination problems in recent years, interest in food safety grew considerably. The Food and Drug Administration (FDA) is the agency primarily responsible for regulating the U.S. food supply, although the USDA regulates meats, poultry, and egg products. Food contamination can take place at any point along the supply chain, whether on the farm, during processing or packing, or during shipping. Thus, there is a need for product traceability, or the ability to determine where food items were grown, how they were grown, and how and where they were subsequently processed, packed, and shipped.

With a goal of preventing future outbreaks of food borne illness, the Food Safety Modernization Act (FSMA) was signed into law in 2011. The Act requires the FDA to establish minimum science-based standards for the safe production and harvesting of produce. In the event of a food contamination outbreak, it allows the FDA to institute mandatory

recalls with greater public outreach. In addition, it requires food processors to analyze safety risks and put into place preventative measures. The Act also requires increased record keeping for enhanced traceability, and it contains provisions designed to improve the safety of food imports. Other products are regulated under the Federal Meat Inspection Act, the Poultry Products Inspection Act, and the Egg Products Inspection Act.

Because of disease concerns, especially following the discovery of the mad cow disease in Washington state in 2003, there is increased interest in tracking livestock and poultry. The National Animal Identification System (NAIS) was implemented by the USDA in 2004. The long-term goal is to allow identification within 48 hours of all livestock and premises that have had contact with a disease of concern. NAIS is currently a voluntary program at the national level, but some states have made parts of the program mandatory.

enterprises are producing all or most of the profit, and one or more of the other enterprises are losing money. A record system can be designed that will show revenue and expense not only for the entire business but also for each enterprise. With this information, the unprofitable or least profitable enterprises can be eliminated, and resources can be redirected for use in the more profitable ones.

Assist in the Analysis of New Investments

A decision to commit a large amount of capital to a new investment can be difficult and may require a large amount of information to do a proper analysis. The records from the past operation of the business can be an excellent source of information to assist in analyzing the potential investment. For example, records on the same or similar investments can provide data on expected profitability, expected life, and typical repairs over its life.

Prepare Income Tax Returns

Internal Revenue Service (IRS) regulations *require* keeping records that permit the proper reporting of taxable income and expenses. This type of record keeping can often be done with a minimal set of records not adequate for management purposes. A more detailed management accounting system can produce income tax benefits. It may identify additional deductions and exemptions, for example, and allow better management of taxable income from year to year, reducing income taxes paid over time. In case of an IRS audit, good records are invaluable for proving and documenting all income and expenses. Chapter 16 expands on managing information for income tax purposes, while the present chapter will focus on accounting practices for managerial purposes.

FARM BUSINESS ACTIVITIES

In designing a farm accounting system, it is useful to think of the three types of business activities that must be incorporated into the system. Figure 3-1 indicates that an accounting system must be able to handle transactions relating not only to the *production* activities of the business but also to the *investment* and *financing* activities.

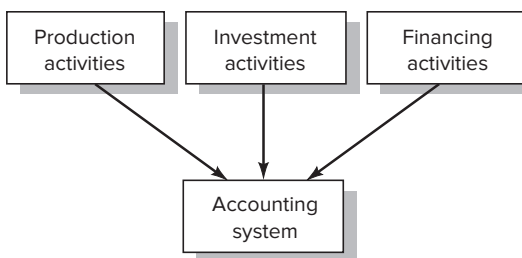


Figure 3-1 Farm business activities to be included in an accounting system.

Production Activities

Accounting transactions for production activities are those related to the production of crops and livestock. Revenue from their sale, and other farm revenue such as government program payments and custom work done for others, would be included here. Expenses incurred in producing that revenue—such as feed, fertilizer, chemicals, fuel, interest, and depreciation—are also part of the production activities that need to be recorded in the accounting system.

Investment Activities

Investment activities are related to the purchase, depreciation, and sale of long-lived assets. Examples would be land, buildings, machinery, orchards, vineyards, and breeding livestock. Records kept on each asset should include purchase date, purchase price, annual depreciation amount, book value, current market value, sale date, sale price, and gain or loss when sold.

Financing Activities

Financing activities are all transactions related to borrowing money and paying interest and principal on debt of all kinds. This includes money borrowed to finance new investments, operating money borrowed to finance production activities for the year, and accounts payable at farm supply stores.

Dividing the farm business activities into these three types illustrates the broad range of transactions that should be recorded in any accounting system. It also shows some inter-

relations among these activities. Interest expense comes from financing activities, but it is a production or operating expense. Depreciation results from investment in a depreciable asset, but it is also a production or operating expense. Therefore, a good accounting system must be able not only to record all the various types of transactions but also to assign them to the appropriate activity and enterprise of the operation.

BASIC ACCOUNTING TERMS

A person does not need an accounting degree to keep and analyze a set of farm or ranch records. However, some knowledge of basic accounting and accounting terminology is useful. One must fully understand and use any accounting system and accurately communicate accounting information to others. The following terms and definitions provide the foundation to understand the material in the remainder of this chapter and those that follow. Other terms will be defined as they are introduced.

Account payable—an expense that has been incurred but not yet paid. Typical accounts payable are for items charged at farm supply stores where the purchaser is given 30 to 90 days to pay the amount due.

Account receivable—revenue for a product that has been sold or a service provided but for which no payment has yet been received. Examples would be custom work done for a neighbor who has agreed to make payment by the end of next month or grain sold on a deferred payment contract.

Accrued expense—an expense that accrues or accumulates daily but has not yet been paid. An accrued expense has typically not been paid because the due date or payment date is in the future. Examples are interest on loans and property taxes.

Asset—any item of value, tangible or financial. On a farm or ranch, examples

would be machinery, land, bank accounts, buildings, grain, and livestock.

Credit—in accounting, an entry on the right-hand side of a double-entry ledger. A credit entry is used to record a decrease in the value of an asset or an increase in a liability, an owner equity, or an income account.

Debit—an entry on the left-hand side of a double-entry ledger. A debit entry is used to record an increase in an asset or expense account and a decrease in a liability or an owner equity account.

Expense—a cost or expenditure incurred in the production of revenue.

Inventory—the physical quantity and financial value of products produced for sale that have not yet been sold. Farm or ranch examples would be grain in storage, or livestock ready for sale or that could be sold at the time the inventory is taken.

Liability—a debt or other financial obligation that must be paid in the future. Examples would include loans from a bank or other lending institutions, accounts payable, and accrued expenses.

Net farm income—revenue minus expenses. It is also the return to the owner's equity capital, unpaid labor, and management.

Owner equity—the difference between business assets and business liabilities. It represents the net value of the business to the owner(s) of the business.

Prepaid expense—a payment made for a product or service in an accounting period before the one in which it will be used to produce revenue.

Profit—revenue minus expenses minus opportunity costs. Also equal to net farm income minus opportunity costs.

Revenue—the value of products and services produced by a business during an accounting period. Revenue may be either cash or noncash.

OPTIONS IN CHOOSING AN ACCOUNTING SYSTEM

Before anyone can begin entering transactions into an accounting system, several decisions must be made about the type of system to be used. A number of options are available, which generally fall into the following areas:

1. What accounting period should be used?
2. Should it be a cash or an accrual system?
3. Should it be a single- or double-entry system?
4. Should it be a basic or complete accounting system?
5. Should analysis be done only for the whole farm, or for each enterprise?

It is often difficult to make certain types of changes in an accounting system once one is established and users are familiar with it. Therefore, considerable thought should be given and advice obtained when making the initial selection of an accounting system.

Accounting Period

An accounting period is a period of time, such as a quarter or a year, for which a financial statement is produced. Under a *calendar-year* accounting period, all transactions occurring between January 1 and December 31 of each year are organized and summarized into financial reports. By contrast, *fiscal-year* accounting uses a 12-month period that may begin on any date. Accounting can be done on a fiscal-year basis for management as well as income tax purposes. When a shorter period is chosen, such as quarterly reporting, everything should still be consolidated into annual reports.

It is generally recommended that a firm's accounting period follow the production cycle of the major enterprises and end at a time when business activities are slow. For most crop production activities and some livestock, a December 31 ending date fits this recommendation, so most farmers and ranchers use a calendar-year accounting period. However,

winter wheat, citrus crops, and winter vegetables are examples of crops where intensive production or harvesting activities may be under way around December 31. These producers may want to consider a fiscal-year accounting period that ends after harvesting is completed. Large dairies and commercial feedlots with continuous feeding activities would have a difficult time finding a month when business transactions are much slower than any other month. They could just as well use any convenient accounting period.

CHART OF ACCOUNTS

A chart of accounts lists and organizes all accounts used by the accounting system. It includes the broad categories of assets, liabilities, equity, revenue, and expenses, each with subaccounts and perhaps other subaccounts under those. For example, repairs would be a subaccount under expenses and could have its own subaccounts for building and machinery repairs. The number of accounts will vary from business to business depending on size, number of enterprises, needs of the manager, and many other factors. More accounts allow for a more detailed analysis but require more time and accounting knowledge.

Each account is typically assigned a number to assist in tracking accounts. These numbers are assigned from a range of numbers allotted to each broad category. For example, all assets may be assigned numbers between 100 and 199, liabilities 200 to 299, and so forth. This type of numbering system allows the person making entries to quickly find, organize, and track accounts. When choosing account names, it may be useful to look at IRS Schedule F, Form 1040, used to report farm income and expenses for income tax purposes. If the chart of accounts contains the same names as Schedule F, it is easy to transfer amounts from the accounting system to Schedule F.

Table 3-1 is an example of a basic chart of accounts for a farm business. Many more accounts would be necessary for a large business with multiple enterprises, because such a

TABLE 3-1 **Example Chart of Accounts**

Account	Description	Type
Asset-related accounts		
1010	Cash on hand	Cash
1020	Checking account	Cash
1100	Accounts receivable	Accounts receivable
1200	Inventory—crops	Inventory
1300	Inventory—market livestock	Inventory
1400	Prepaid expense	Other current assets
1470	Other current assets	Other current assets
1500	Equipment	Fixed assets
1510	Building	Fixed assets
1600	Inventory—breeding livestock	Fixed assets
1690	Land	Fixed assets
1710	Accumulated depreciation	Accumulated depreciation
Liability-related accounts		
2000	Accounts payable	Accounts payable
2420	Current portion long-term debt	Other current liabilities
2480	Other current liabilities	Other current liabilities
2600	Noncurrent liabilities—land	Noncurrent liabilities
2740	Other noncurrent liabilities	Noncurrent liabilities
Equity-related accounts		
3000	Retained earnings	Equity
3010	Contributed capital	Equity
3020	Valuation equity	Equity
Revenue-related accounts		
4020	Sales crops	Income
4080	Sales livestock	Income
4100	Government payments	Income
4200	Other income	Income
5000	Gain/loss on sale of assets	Income
Expense-related accounts		
6400	Crop expense	Expenses
6500	Livestock expense	Expenses
6600	Depreciation expense	Expenses
6750	Feed and grain expense	Expenses
6760	Repairs	Expenses
7010	Property taxes	Expenses
7050	Insurance expense	Expenses
7100	Interest expenses	Expenses
7900	Other expense	Expenses

business would need a detailed financial management analysis.

Cash Versus Accrual Accounting

This topic will be covered again when discussing income taxes in Chapter 16. However, the discussion here will be restricted to accounting for management purposes and not for income taxes. While the concepts are the same in either case, the advantages and disadvantages of each accounting method may be different, depending on the use for management or income tax purposes. The basics of cash and accrual accounting will be discussed in later sections of this chapter.

Single Versus Double Entry

With a single-entry cash system, only one entry is made in the books to record a receipt or an expenditure. Sale of wheat would have the dollar amount recorded under the *Grain Sales* column in the ledger. A check written to pay for feed would have the amount entered under the *Feed Expense* column. The other side of the transaction is always assumed to be cash, which changes the balance in the checking account. In practice, the checkbook register might be thought of as the other entry, but one not included in the ledger.

A double-entry system records changes in the values of assets and liabilities as well as revenue and expenses. There must be equal and offsetting entries for each transaction. This system will result in more transactions being recorded during an accounting period, but it has two important advantages:

1. Improved accuracy, because the accounts can be kept in balance more easily
2. The ability to produce complete financial statements, including a balance sheet, at any time, directly from data already recorded in the system

The improved accuracy of double-entry accounting comes from the two offsetting entries, which means that *debits* must equal *credits* for each

transaction recorded. It also means that the basic accounting equation of

$$\text{Assets} = \text{Liabilities} + \text{Owner Equity}$$

will be maintained. The double-entry system maintains the current values of assets and liabilities within the accounting system, allowing financial statements to be generated directly from the accounting system without any need for outside information.

Whole Farm Versus Enterprise Accounting

Most farm and ranch record systems summarize income, expenses, and profits for the entire farm. Managers can then evaluate the performance of the business compared to past years and other farms. However, if the farm produces multiple products, it is helpful to know which ones contribute most to the overall profitability. Dividing the business into individual enterprises or profit centers allows the manager to identify areas that are generating a satisfactory return and those that need to be improved or discontinued. Chapter 18 discusses enterprise analysis in more detail.

Basic Versus Complete System

The most basic and simple accounting system would be one that is manual and uses cash accounting only. A complete system would be computerized with capabilities for both cash accounting for tax purposes and accrual accounting for management purposes. It would also be able to track inventories, compute depreciation, track loans, perform enterprise analysis, and handle all employee payroll accounting.

Between these two extremes are many possibilities. For example, a simple basic system can be maintained on a computer with any one of a number of personal finance software programs available. The next step up would be any of several small business accounting programs that can be used for farm accounting by changing the account

Box 3-3**Double-Entry Accounting: Equal and Offsetting Transactions**

In double-entry accounting, every transaction is entered twice. For every debit, there is an equal and offsetting credit and vice versa. It is easy to fall into the trap of thinking all debits are bad and all credits are good, but accounting procedures make no such distinction. A debit is simply an entry on the left side of the ledger, while a credit is an entry on the right side.

Debits record increases in asset accounts or expense accounts, but decreases in liability or owner equity accounts. Credits record decreases in the value

of asset accounts and increases in liabilities, equity, or income accounts. For example, a checking account balance is an asset account where a debit is an increase and a credit is a decrease in the account balance. The receipt of cash from crop sales would be recorded in the debit column of the checking account balance and the same amount would be recorded in the credit column of a crop sales account.

Although a complete treatment of double-entry accounting is beyond the scope of this chapter, a few common examples follow.

Receive income from a crop sale

Account	Debit (\$)	Credit (\$)	Comment
1010 Cash	12,000		Increase in asset
4020 Crop sales		12,000	Increase in income

Write a check for farm insurance

Account	Debit (\$)	Credit (\$)	Comment
7050 Insurance Expense	9,320		Increase in expense
1010 Cash		9,320	Decrease in asset

Borrow operating capital

Account	Debit (\$)	Credit (\$)	Comment
1010 Cash	15,000		Increase in asset
2010 Operating loan		15,000	Increase in liability

Depreciate machinery

Account	Debit (\$)	Credit (\$)	Comment
6601 Depreciation expense—pickup	3,000		Increase in expense
6602 Depreciation expense—tractor	8,000		Increase in expense
1710 Accumulated depreciation		11,000	Decrease in asset

Pay account at feed store

Account	Debit (\$)	Credit (\$)	Comment
2001 Account at County Feed	1,200		Decrease in liability
1010 Cash		1,200	Decrease in asset

names. These programs can do either cash or basic accrual accounting. Most are inexpensive but relatively powerful programs that often do a good job of *disguising* the fact that the user is dealing with debits and credits. Very little accounting knowledge is needed to use these programs and to get useful and accurate output.

Most farmers and ranchers desiring a complete system use computer software accounting programs written specifically for agricultural use. These programs use agricultural terminology and are designed to handle many of the situations unique to agriculture such as accounting for raised breeding livestock, government farm program payments, operating loans, and quantities of product sold or in inventory. Many also allow the user to maintain both cash and accrual records for each year within the same program. This makes it easy to pay income taxes on a cash basis while still having complete accrual records for making management decisions. Some companies sell a basic program along with a number of optional add-on modules. This allows the user to become familiar with the program and its basic output without being overwhelmed by its complexity. Later, modules for inventory, depreciation, payroll, and production records can be added as needed or desired.

How complete the accounting system should be for any given farm business will depend primarily on the answers to three questions:

1. How much accounting knowledge does the user have?
2. How large and complex is the farm business and its financial activities?
3. How much and what type of information is needed or desired for management decision making?

The lack of accounting training should not deter farmers and ranchers from using one of the more complete software accounting programs. Many of them require only a limited knowledge of accounting. Additional accounting information is available in the form of self-help manuals, adult education courses, and community college

courses. The price of the more complete and therefore more expensive farm accounting programs may include some training on using that specific software program as well as free technical assistance for a time.

The larger the farm business, the more the enterprises involved, the more the employees hired, the more the depreciable assets owned, and the more the money borrowed, the more the need for a complete accounting system. Accounting programs that compute depreciation, track inventories, generate budgets, reconcile checks, and complete employee payrolls as part of the accounting system become increasingly necessary and useful. Users who begin with a basic accounting system often find additional output useful and perhaps needed. This is one advantage of beginning with a complete system or one that can be easily upgraded.

BASICS OF CASH ACCOUNTING

The term *cash* in the name is perhaps the best description of this accounting method. With only a few exceptions, no transaction is recorded unless cash is spent or received.

Revenue

Revenue is recorded only when cash is received for the sale of products produced or services provided. The accounting period during which the products were produced or the services provided is not considered when recording revenue. Revenue is recorded in the accounting period when cash is received regardless of when the product was produced or the service provided.

Cash accounting can and often does result in revenue being recorded in an accounting period other than the one in which the product was produced. A common example is a crop produced in one year, placed in storage, and sold the following year. Any accounts receivable at the end of an accounting period also result in cash being received in an accounting period after the product was produced or the service provided.

Expenses

Cash accounting records expenses in the accounting period during which they are paid, that is, when the cash is expended. The accounting period in which the product or service was purchased is not considered. Expenses can therefore be recorded in an entirely different year or accounting period than the one in which the purchased product or service generated a product and related revenue. Items may be purchased and paid for late in one year but not used until the next, and items used in one year may not be paid for until the following year. The first case is an example of a prepaid expense, and the latter of an account payable. An accrued expense such as interest is another example. Here, an item (borrowed money) is being used in one year, but the cost of that item (interest) will not be paid until the next year when the annual payment is due.

There is one major exception to the rule that only cash expenses are recorded in a cash accounting system. Although depreciation is a noncash expense, it is generally considered an expense when using cash accounting.

Advantages and Disadvantages

Cash accounting is a relatively simple, easy-to-use system that requires very little knowledge of accounting. It also has some definite advantages for many farmers and ranchers when computing taxable income for income tax purposes.

However, these advantages are offset by one major disadvantage. As noted, it is common to have revenue and expenses recorded in a year other than the year the product was produced or the expense was used to produce a product. Therefore, neither the revenue nor the expenses may have any direct relation to the actual production activities for a given year. The result is an estimated profit that may not truly represent the profit from the year's production activities.

This inability of cash accounting to properly match revenue and expenses within the same year that the related production took place is a major disadvantage of this method. Compared to

the true profit, the profit shown by cash accounting can be greatly distorted. It may be overestimated in some years and underestimated in others. If this estimate of profit is then used to make management decisions for the future, the result is often poor decisions.

BASICS OF ACCRUAL ACCOUNTING

Accrual accounting is the standard of the accounting profession. It requires more entries and accounting knowledge than cash accounting. However, it provides a much more accurate estimate of annual profit than does cash accounting.

Revenue

Accrual accounting records as revenue the value of all products produced and all services provided during a year. Whenever the products are produced and sold and the cash received all in the same year, this is no different than cash accounting. The difference occurs when the product is produced in one year and sold in the next, or when cash for a service is not received until a later year. Accrual accounting emphasizes that the value of a product or service should be counted as revenue in the year it was produced, no matter when the cash is received.

The handling of inventories is a major difference between cash and accrual accounting on farms and ranches. Accrual accounting records inventories as revenue. A simple example will show why this is important. Assume a farmer produces a crop but places it all in storage for sale the following year, when prices are expected to be higher. In the year of production, there would be no cash sales but presumably some cash expenses. Under cash accounting, there would be a negative profit (loss) for the year. This result is a poor indicator of the results of the production activities for the year and completely ignores the value of the crop in storage.

Accrual accounting includes an estimate of the value of the crop in storage as revenue in the year it was produced. This is done by adding

an inventory *increase* from the beginning to the end of the year to other revenue. An inventory *decrease* is deducted from other revenue. The result is an estimated profit that more accurately describes the financial results of the production activities for the year. In the same manner and for the same reason, any uncollected amounts for services provided (accounts receivable) are also recorded as revenue.

Expenses

One principle of accounting is *matching*. This principle states that once revenue for a year is determined, all expenses incurred in the production of that revenue should be recorded in the same year. The results for items purchased and paid for in the same year are the same for cash and accrual accounting. Differences arise when items are purchased in the year before the one in which they produce revenue (prepaid expenses) or payment is not made until the year after the items are used (accounts payable and accrued expenses).

To match expenses with revenue in the proper year, an accounting entry must cause (1) prepaid expenses to show up as expenses in the year after the item or service was purchased and paid for; (2) accounts payable to be entered as expenses, although no cash has yet been expended to pay for the items; and (3) accrued expenses at year-end to be entered as expenses, although no cash has been expended. A typical example of the latter is interest accrued from the last interest payment to the end of the year. This accrued expense recognizes that the borrowed capital was used to produce revenue in one year, but the next cash interest payment may not be due for several months into the following year.

Advantages and Disadvantages

A major advantage of accrual accounting is that it produces a more accurate estimate of profit than can be obtained with cash accounting.

Related to this is the accurate information it provides for financial analysis and management decision making. These advantages make accrual accounting the standard of the accounting profession and generally required for all corporations selling stock to the public. The latter requirement ensures that potential investors can base their investment decision on the best financial information possible.

The disadvantages of accrual accounting are primarily the additional time and knowledge required to properly use this method. Also, accrual accounting may not be the best choice for all farmers and ranchers to use when calculating their taxable income.

A CASH VERSUS ACCRUAL EXAMPLE

The differences between cash and accrual accounting and the resulting effect on annual profit may be best explained with an example. Assume that the information in the following table contains most of the relevant transactions related to producing a crop in the year 2020. Note, however, that transactions related to the 2020 crop year occur in 3 years. How would these transactions be handled with both cash and accrual accounting, and what would the estimated profit be with each method? Each transaction will be looked at individually, and then the 2020 profit for each method will be calculated.

(a) November 2019

Cash: Increase fertilizer expense by \$20,000. The result is a 2019 fertilizer expense \$20,000 higher than it should be, because this fertilizer will not be used to produce a crop or revenue until 2020.

Accrual: Decrease cash by \$20,000, and increase prepaid expense by the same amount. The result is an exchange of one asset (cash) for another (prepaid expense), with no effect on fertilizer expense for 2019.

(b) May 2020

Cash: Increase seed, chemicals, and fuel expenses each by their appropriate share of \$60,000.

Accrual: Decrease cash by \$60,000, and increase seed, chemical, and fuel expenses each by their appropriate share of \$60,000.

(c) May 2020

Sometime during 2020, the prepaid expense must be converted to fertilizer expense.

Cash: No entry. It has already been counted as an expense.

Accrual: Decrease prepaid expense, and increase fertilizer expense each by \$20,000. The prepaid expense is eliminated, and the \$20,000 fertilizer expense now shows up as a 2020 expense, as it should.

(d) October 2020

Cash: No entry for the drying fuel, because no cash has been expended.

Accrual: Increase fuel expense and increase account payable each by \$5,000. The result places the fuel expense in the proper year (it was used to dry 2020 grain) and establishes a liability, an account payable in the amount of \$5,000.

(e) November 2020

Cash: Increase grain sold by \$100,000.

Accrual: Increase cash by \$100,000 and grain revenue by \$100,000. As a part of this entry, or as a separate entry, grain revenue should be increased by another \$100,000, and inventory (a new asset) also should be increased by \$100,000. These entries result in all \$200,000 of the 2020 grain being included in 2020 revenue, even though cash has been received for only one-half of it.

(f) January 2021

Cash: Increase fuel expense by \$5,000.

Accrual: Decrease cash by \$5,000, and decrease account payable by \$5,000.

This eliminates the account payable but does not increase fuel expense, because that was done in October 2020.

(g) May 2021

Cash: Increase grain revenue by \$105,000.

Accrual: Increase cash by \$105,000, increase grain revenue by \$5,000, and decrease inventory by \$100,000. This sale indicates there was more grain in the bin than was estimated in November 2020, or that the price increased since then. To adjust for either or both of these pleasant outcomes, grain revenue must be increased by \$5,000. Inventory is decreased by the original amount to give it a \$0 balance. It must have a \$0 balance, because all grain has now been sold.

It can be seen from this example that accrual accounting requires more entries and more knowledge of accounting than does cash accounting. However, there are several benefits from this extra work and knowledge. The most important is a more accurate estimate of profit.

Table 3-2 reviews these transactions and discusses how they affect calculation of the 2020 income under cash and accrual accounting. This business produced grain with a value of \$200,000 during 2020 but sold only half of it. The other half was in storage at the end of the year. Expenses to produce this grain totaled \$85,000. However, \$20,000 of this amount was paid in 2019, and \$5,000 was not paid until 2021. A comparison of the 2020 profit under both cash and accrual accounting will show how this distribution of cash revenue and cash expenditures affects profit.

Cash accounting includes only cash receipts and cash expenditures during 2020, so as shown in Table 3-2 there are only two entries. The calculated profit is \$40,000. Accrual accounting, by the use of an inventory change, includes the value of all grain produced in 2020, even though not all was sold. Similarly, adjustments through

TABLE 3-2 Cash Versus Accrual Accounting Example and Effects on 2020 Income

Month and year	Transaction	Cash accounting	Accrual accounting
November 2019	Purchased, paid for and applied fertilizer for 2020 grain crop, \$20,000	Paid cash in 2019 so deducted as an expense in 2019	Used for 2020 crop so deducted as an expense in 2020
May 2020	Purchased and paid for seed, chemicals, fuel, etc., for 2020 crop, \$60,000	Paid cash in 2020 so deducted as an expense in 2020	Used for 2020 crop so deducted as an expense in 2020
October 2020	Purchased and charged to account fuel for drying 2020 crop, \$5,000	No cash paid in 2020 so this is not deducted as an expense in 2020	Used for 2020 crop so deducted as an expense in 2020
November 2020	One half of grain sold for \$100,000. The rest placed in storage with an estimated value of \$100,000	Only revenue received as cash in 2020 is counted toward 2020 income, \$100,000	Full value of 2020 crop is counted toward 2020 income, whether sold or stored, \$200,000
January 2021	Pay bill for fuel used to dry the grain, \$5,000	Paid cash in 2021 so deducted as an expense in 2021	Expense was already accounted for in 2020
May 2021	Remaining grain sold for \$105,000	Cash received in 2021 so this counts as 2021 income	The \$5,000 increase in the value of the grain will count as \$5,000 in 2021 income

the use of a prepaid expense and an account payable record all expenses incurred in producing this grain as 2020 expenses. The result is a profit of \$115,000. This is a much more accurate estimate of what the 2020 production activities contributed to the financial condition of this business than the \$40,000 estimated by cash accounting.

While cash accounting shows a lower profit than accrual accounting in 2020, the opposite may occur in 2021. Assume all grain produced in 2021 is sold at harvest. The result is cash receipts for both half the 2020 grain and all the 2021 crop being received in the same year. Cash accounting would show large cash receipts, only

2020 Income and Expenses			
	Cash accounting	Accrual accounting	
Cash grain sales	\$100,000 (e)	\$100,000 (e)	
Grain inventory increase	N/A	100,000 (e)	
Total revenue		<u>\$100,000</u>	<u>\$200,000</u>
Fertilizer	0	20,000 (c)	
Seed, chemicals, fuel	60,000 (b)	60,000 (b)	
Drying fuel	0	5,000 (d)	
Total expenses		<u>\$60,000</u>	<u>\$85,000</u>
Net farm income (profit)		<u>\$40,000</u>	<u>\$115,000</u>

one year's cash expenses, and therefore, a large profit. Accrual accounting would show the same cash receipts, but this would be offset by an inventory decrease of \$100,000, because no grain is in storage at the end of 2021. The net total revenue would then be only the value of the 2021 grain plus the \$5,000 increase in value from the 2020 grain. Again, accrual accounting would result in a more accurate estimate of what the 2021 production activities contributed to the financial position of the business than would cash accounting.

An alternative to accrual accounting is to follow cash accounting procedures throughout the year, and then make accrual adjustments at the end of the accounting year. Adjustments include adding or subtracting inventories of inputs and products, accounts receivable and payable, and other accrued expenses. The end results for annual gross income, total expenses, and profit will be the same as for accrual accounting implemented throughout the year. Because cash accounting is common on farms and accepted by the Internal Revenue Service for income tax reporting, this hybrid approach to accounting will be explained in more detail in Chapter 5.

FARM FINANCIAL STANDARDS COUNCIL RECOMMENDATIONS

The FFSC report assumes an accrual-based system throughout its discussion and recommendations on financial analysis measures.

But it also recognizes that a large majority of farmers and ranchers currently use cash accounting and will continue to do so for some time. Simplicity, ease of use, and often income tax advantages account for the popularity of cash accounting. Therefore, the FFSC accepts the use of cash accounting during the year but strongly recommends that end-of-year adjustments be made to convert the cash accounting profit to an *accrual adjusted* profit. The latter should then be used for analysis and management decision making.

The type and nature of some of these accrual adjustments may be evident in the cash versus accrual example given. A full discussion of these adjustments and how they should be done will be delayed until Chapter 5.

OUTPUT FROM AN ACCOUNTING SYSTEM

Any accounting system should be able to produce some basic financial reports. Computerized accrual systems can generate many different reports. Figure 3-2 expands on Figure 3-1 to show the possible products from an accounting system. The balance sheet and income statement are shown first, for two reasons. First, they are the two most common reports to come out of an accounting system, and second, they are the subjects of the next two chapters. Some other possible reports are often necessary and useful

Box 3-4

Annual Versus Lifetime Profit

The different results from using cash or accrual accounting only show up in *annual* estimates of profit. Over the full lifetime of the farm business, the *total lifetime* before-tax profit would be the same using either method. The two methods

only serve to divide the total lifetime profit in a different manner among individual years in the life of the business. The total lifetime, after-tax profit could be different because of differences in timing and amounts of annual income tax.

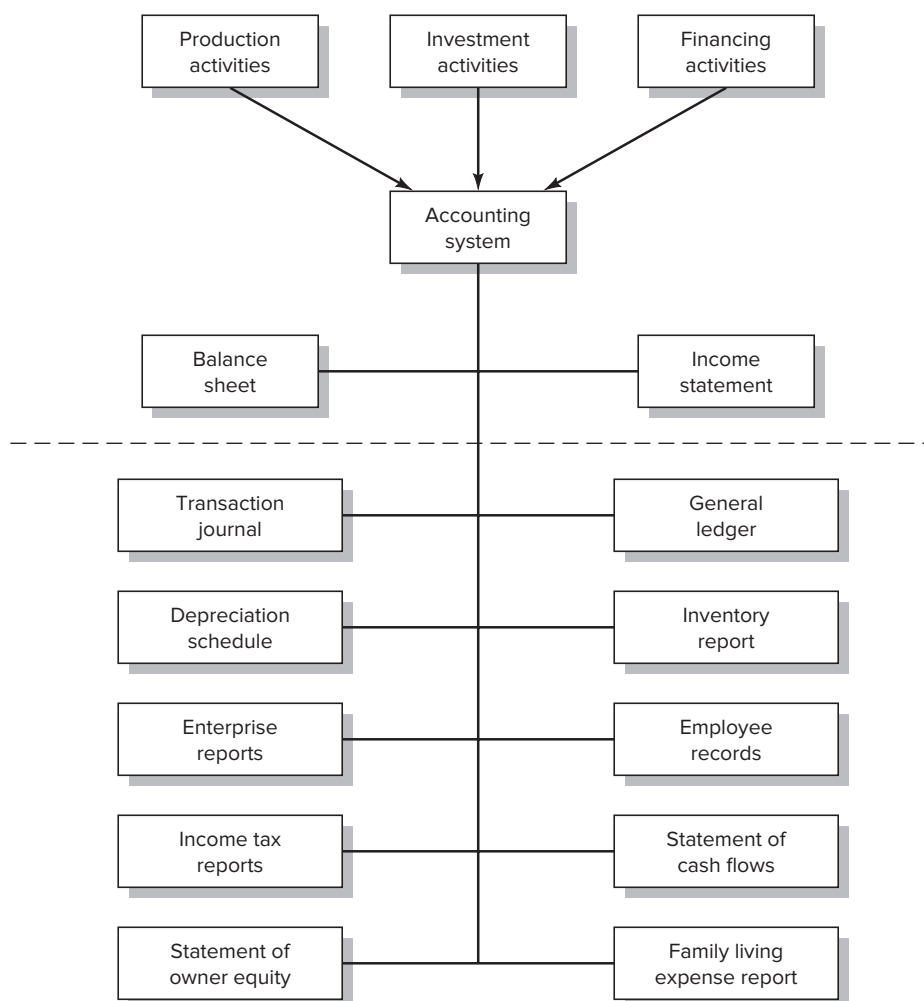


Figure 3-2 Twelve possible reports from an accounting system.

but may not be available from all systems nor widely used.

Balance sheet The balance sheet is the report that shows the financial condition of the business at a point in time. A detailed discussion of this report and its use will be covered in Chapter 4.

Income statement An income statement is a report of revenue and expenses ending with

an estimate of net farm income. This report will be discussed in detail in Chapter 5.

Transaction journal This is a record of all financial transactions, including check and deposit numbers, dates, payees and payers, amounts, and descriptions. A check register is a form of a transaction journal but does not contain all of the above information. This journal is used to make entries into the general ledger and to provide an audit trail.

General ledger The general ledger contains the different financial accounts for the business and the balances in these accounts. Balances in the revenue and expense accounts are used to prepare an income statement, and balances in the asset, liability, and owner equity accounts are used to prepare a balance sheet.

Depreciation schedule A depreciation schedule is a necessary part of any accounting system. Annual depreciation on all depreciable assets must be computed and recorded as an expense before an income statement can be produced. This is true whether a cash or an accrual system is used. Depreciation and the information contained in a depreciation schedule are discussed in detail in Chapter 5.

Inventory report This is a useful report, particularly for large crop farms and livestock operations. It tracks the quantity and value of crops and livestock on hand by recording purchases, sales, births, deaths, amounts harvested, and amounts fed. This report is useful for monitoring feed availability and usage, for developing a marketing program, and for monitoring any inventory pledged as collateral for a loan.

Enterprise reports These look like income statements for each individual enterprise. They are useful for determining which enterprises are contributing the most profit to the business and are therefore candidates for expansion. Enterprises identified as unprofitable become candidates for elimination.

Employee records Any business with employees must keep considerable data related to each employee. This includes not only information such as hours worked but financial data on gross pay, deductions for income taxes and social security, and so forth. Several payroll reports must be filed in a timely manner with both state and federal agencies. All of this payroll-related work can be done by hand, but many computer programs are designed especially to compute and record gross pay, deductions,

and net pay. If the payroll program is part of a general accounting program, all of this information can be automatically entered into the general ledger.

Income tax reports The information from any farm accounting system must be sufficient to prepare the farm tax return. In some systems, it will be necessary to take values from the accounting reports and enter them on IRS Schedule F, Form 1040. It is helpful if the general ledger accounts are named and organized in the same way as the categories on this schedule. Some computer accounting systems can compile and print the tax information in the same format, making it easy to transfer the data. Other programs can duplicate a Schedule F and print a completed return.

Statement of cash flows This statement summarizes all sources and uses of cash during the accounting period and is useful when analyzing the business activities during that period. When prepared monthly, it allows comparison of actual cash flows with budgeted cash flows. It is also important as a source of data when completing a cash flow budget for the next accounting period.

Statement of owner equity Financial transactions during the accounting period will affect the owner equity or net worth of the business. This statement identifies and summarizes the sources of these changes.

Family living expense report While not really a part of the business financial activities, it is desirable to keep detailed records of family living expenses. This is particularly so for any expenditures that may be deductible on income tax returns. Again, this can be done manually or included as part of the farm accounting system, provided care is taken to be sure business and personal records are not mixed. Rather inexpensive computer programs are designed solely for recording, summarizing, and analyzing personal expenses and investments.

SUMMARY

This chapter discussed the importance, purpose, and use of a good information management system as a management tool. Records provide the information needed to measure how well the business is doing in terms of meeting its goals. They also provide feedback so the results of past decisions can be evaluated, as can be the decision-making ability of the manager. Finally, individual farm records are perhaps the single best source of information needed to make current and future decisions.

Any accounting or record system must be able to handle transactions from the production, investment, and financing activities of the farm business. The choices of accounting period, cash or accrual accounting, single- or double-entry accounting, whole farm or enterprise accounting, and a basic or complete system are important. They affect the quantity, quality, and accuracy of the information provided by the accounting system and the time required to maintain the records. The output required or desired from an accounting system also must be considered when making these choices.

QUESTIONS FOR REVIEW AND FURTHER THOUGHT

1. What factors affect the choice of accounting period for farmers and ranchers?
2. How would one construct a balance sheet if the accounting was done using a single-entry cash system?
3. Is it possible to use double entry with a cash accounting system? If so, what are the advantages and disadvantages?
4. Is it possible to use single entry with an accrual system? Why or why not?
5. Check advertising material for several farm accounting software programs. Are they cash or accrual systems? Single or double entry? How many of the 12 reports from an accounting system discussed in this chapter are available from each program? Are any additional reports available?
6. Place an X under the column(s) to indicate whether each business event is a production, investment, or financing activity.

Event	Production	Investment	Financing
Pay cash for tractor repairs	_____	_____	_____
Borrow \$40,000	_____	_____	_____
Pay interest on the loan	_____	_____	_____
Charge \$12,000 of feed	_____	_____	_____
Equipment depreciates	_____	_____	_____
Sell \$35,000 of corn	_____	_____	_____
Purchase pickup	_____	_____	_____
Pay principal on a loan	_____	_____	_____

7. Explain the difference between an account payable and an account receivable.
8. What products might a typical farm or ranch have in inventory at the end of a year?
9. Why are the results from an accrual accounting system recommended for use when making management decisions?

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