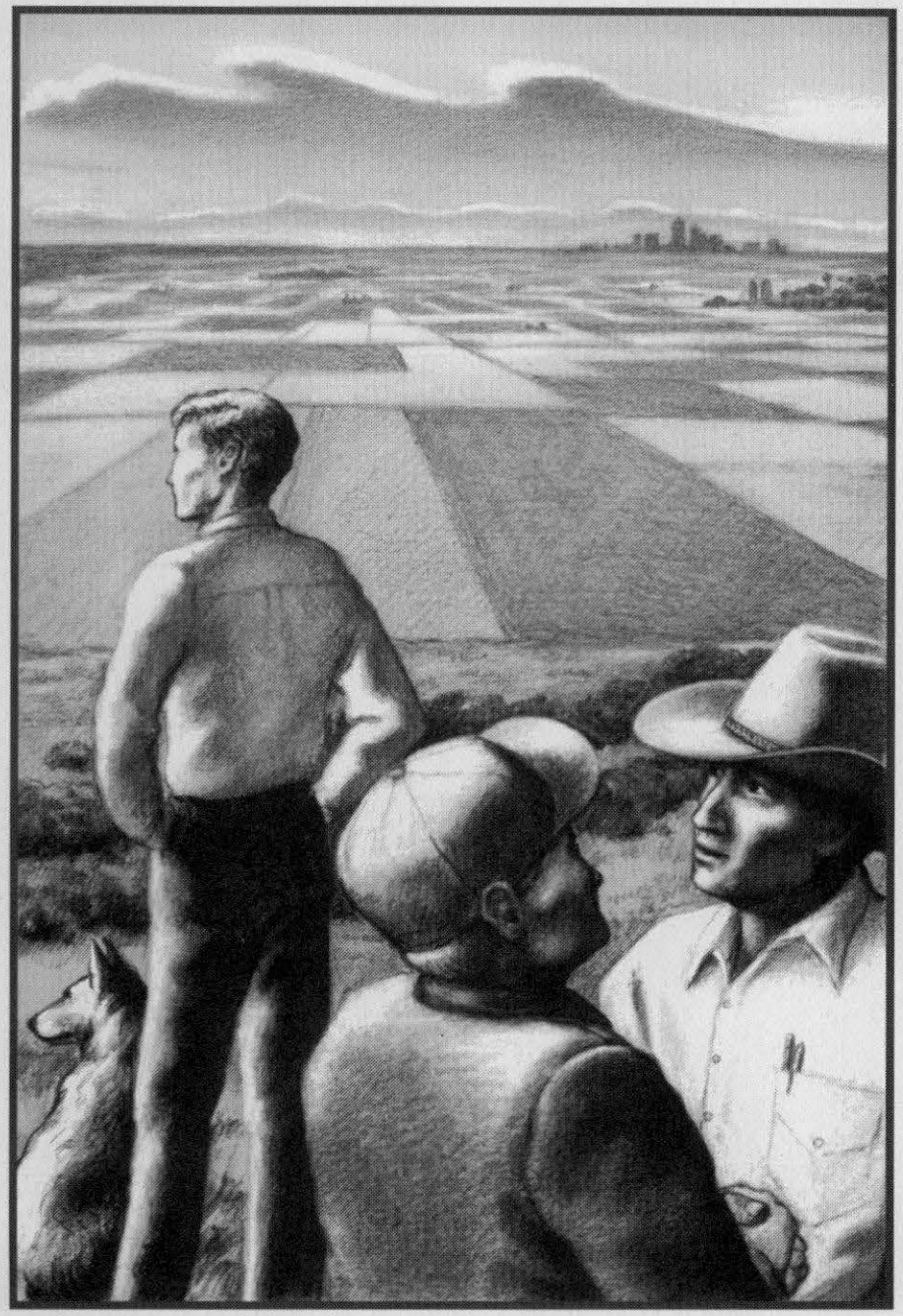
Managing Production and Marketing Systems

Part III in the **6** part series:

Business Management for Farmers



NCR-610C

Acknowledgments

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NCR-610C
July 2000

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Part III in the 6 part series:

Business Management for Farmers

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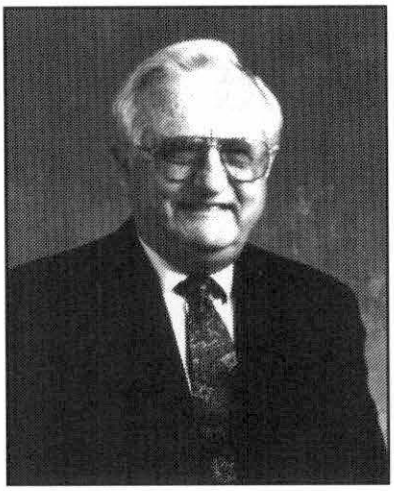

About the author

Kenneth H. Thomas was an extension economist in Farm Management at the University of Minnesota from 1959 to 1992. That this was a very dynamic period in U.S. agriculture is reflected in the wide range of management issues he worked on and wrote about.

During the 1960s and early 1970s he was very involved in helping farm families develop longer range plans for their businesses. In 1973, he coauthored a North Central Region publication that integrated profitability and financial soundness aspects into business planning and analysis.

Beginning in the mid-1970s he began working in and writing about land rental arrangements and the buying and selling of farmland. He also began working in the areas of getting started in farming, business arrangements, and farm estate planning and transfers, coauthoring four regional bulletins on these topics.

As businesses became larger, he began working on personnel management issues and coauthored a regional bulletin on farm personnel management. He also team-taught an agricultural law course at the University of Minnesota, which led to the inclusion of a number of the legal aspects in this series.

As a capstone of his career and as a transition into retirement, he began writing this six-part series, *Business Management for Farmers*. It is his hope that this six year "labor of love" will prove helpful to present and future generations of farmers.

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Preface

"God does not want us to do extraordinary things; he wants us to do ordinary things extraordinarily well" - Anonymous. "...So does your lender!" (added by author).

Overview of Part III

Part III focuses on managing production and marketing systems. Because each farm business is organized differently in terms of these systems, this discussion is quite general yet directional. It is divided into four chapters.

Chapter 1 introduces some economic fundamentals and related planning tools. The fundamentals include cost and production relationships in decision making. Partial budgeting and capital budgeting are the two planning procedures discussed. They are useful in analyzing business adjustments such as those discussed in this Part (Part III) and Part IV.

Chapter 2 covers the management of crop enterprises and related systems. The first four segments focus on managing production aspects. This includes the development of crop enterprise budgets; making short- and long-term decisions/plans; and the implementation, monitoring, and adjustment of these production plans. The focus then shifts to the management of a grain marketing system. This involves the development of a grain marketing plan, followed by its implementation, monitoring and possible adjustment.

Chapter 3 focuses on the management of livestock enterprises. Topics discussed include development of livestock enterprise budgets; making shorter-term livestock-related decisions/plans; developing marketing plans; making longer-term livestock-related decisions/plans; and implementing, monitoring and adjusting these decisions/plans.

Many farmers produce and market livestock under contractual arrangements. Thus, Chapter 4 focuses on the evaluation and/or development of production contractual arrangements. U.S. hog production has been moving quite rapidly toward production under contract.

About the rest of the series

This publication is the third in a planned six-part series written for and dedicated to farm operators and managers in the U.S. Parts I, II, III and IV deal with managing an established farm business. Part V focuses on the issue of getting established in farming, while Part VI deals with planning the late career/retirement years. The series should prove useful not only to managers, but to educators, lenders, consultants and others, including persons considering farming as a career. **A list of chapter headings for parts I, II, and IV-VI is on the inside back cover of this publication.**

Part I, *Developing a Longer Range Strategic Farm Business Plan*, first provides an introduction to the planning process. It then covers evaluating a present business situation and setting tentative life-style and business goals. This is followed by a discussion of the development of a longer range business plan. Information is then provided on how to develop, gain acceptance of, and implement a workable transition plan. Restructuring and/or liquidation of a financially stressed farm business are also addressed.

Part II, *Managing the Overall Ongoing Business*, is divided into three sections. Section I focuses on people skills and legal aspects. Section II discuses financial management aspects including financial planning, security agreements, income tax management, and the use of insurance. Section III discusses the development and/or updating of business arrangements and retirement and estate plans.

Part IV, *Acquiring and Managing Resources*, focuses on the acquisition of land via lease and purchase; the management of machinery systems; and personnel planning and management.

Part V, *Getting Established In Farming*, discusses whether one should consider farming as a career, whether to farm together; starting farming via multi-owner-operator route or partly or mostly on one's own. Part VI, *Planning the Late-Career, Retirement Years*, focuses on life-styles planning, financial security aspects and the transfer of farm assets.

Acknowledgments

Educational materials developed by several persons were used in the development of this part. They are noted by appropriate footnoting. Special thanks were extended to the following:

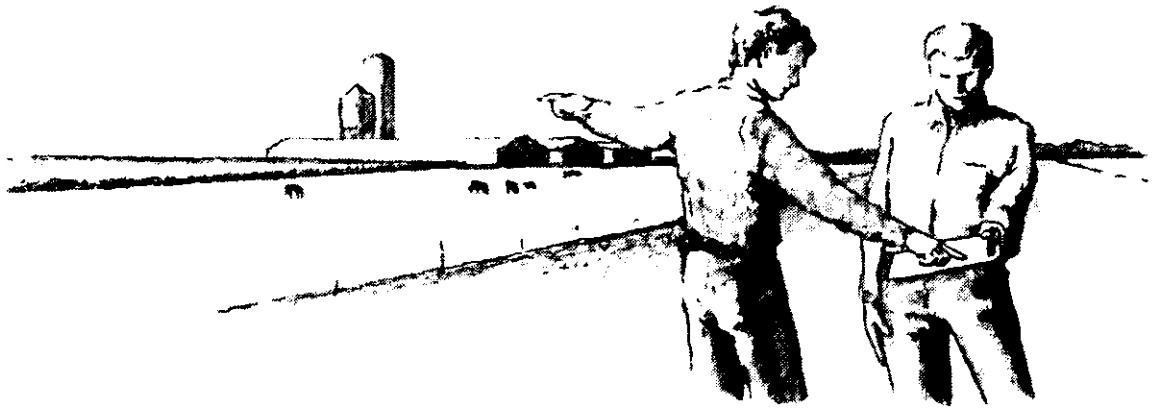
- Professor Emeritus Robert A. Luening of the University of Wisconsin for permission to use selected examples from his earlier writings.
- Richard O. Hawkins, Professor Emeritus, University of Minnesota, for his review and suggestions for all parts of the series. Thanks also to the Center for Farm Financial Management at the University of Minnesota for providing secretarial support for this project.

Finally, the author wishes to thank the North Central Farm Management Extension Committee for their support of this series. Thanks also to the staff at MidWest Plan Service for their expertise in the editing and designing of this publication.

Economic fundamentals and related planning tools

1

- Cost relationships and economic choice
- Production relationships and economic choice
- Related planning tools: Partial budgeting and capital budgeting procedures



A number of economic concepts or fundamentals and related planning tools are involved in analyzing selected business adjustments. This chapter explores various cost relationships and their use in decision making. Some production relationships involved in making production-related decisions also are considered. The chapter closes with a discussion of related planning tools, including partial budgeting and capital budgeting procedures.

Cost relationships and economic choice

An understanding of the cost relationships involved in making business decisions helps determine how costs are computed, which costs are relevant in making a decision, which inputs are to be used, which products are to be produced, and what size the business should be.

Cost relationships in short-run decision making

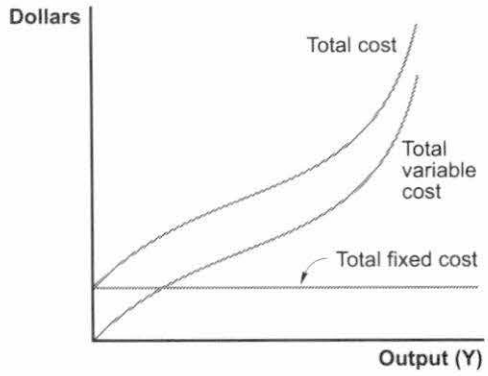
Costs can be categorized in various ways, but the two broad categories, fixed costs and variable costs, are appropriate for most economic analysis in short-run decision making (Figure 1-1). Of course, when fixed and variable costs are added together, the result is the total cost of production of a given enterprise or sector. Distinguishing between fixed and variable costs is important in short-run decision making.

Fixed and variable costs defined; relevant costs in short-run decision making

Figure 1-1 shows that **fixed costs** are costs that do not change with the level of output during a given production period. These costs remain the same whether any output is produced or not. Fixed costs include depreciation on buildings and machinery, real estate taxes on the farm, insurance, cash rent, and interest payments on loans. If an employee is hired on an annual basis, that wage is also a fixed cost. Fixed costs generally remain the same in high-income and in low-income years. However, these costs are fixed only in the short-run. In the long-run, they will likely become variable; see "Cost relationships in long-run decision making."

Variable costs change with the level of output. They are a function of the amount

Figure 1-1. Typical total cost, variable cost, and fixed cost curves.



produced, and are not incurred unless the operator attempts to produce a product. Variable costs include cash outlays for purchased inputs that are usually consumed in one production period. They include seed, fuel, fertilizer, feed, and purchased feeder cattle. This category also includes the value of inputs produced on the farm that have a market value, but are used in the production process during a production period. Homegrown feed and raised feeder stock are examples.

The distinction between fixed and variable costs is important in short-run decision making. If fixed inputs have no alternative use or value, then consider only variable costs in deciding what to produce, how to produce it, and how much to produce in the short-run. For example, if projected returns are greater than the variable costs, production should continue, even though all fixed costs are not covered. The producer is minimizing losses—the loss being less than stopping production. The returns above variable costs will cover part of the fixed costs involved.

Fixed costs and the opportunity cost principle in short-run decision making

In conventional thinking, variable inputs have alternative uses and thus are priced at market or acquisition price. However, fixed inputs have been viewed as having no alternative use in the short-run, and have thus been valued at zero. That is, they should not be a factor in short-run decisions, and production should be continued even though no fixed costs are covered.

Fixed inputs often have a value greater than zero in the short-run. For example, crop machinery can be used with several different crop enterprises. Thus, it is erroneous to assume that fixed costs are zero in deciding to plant soybeans. The equipment could be used to produce corn and/or to do custom work for others. Similarly, land used to grow soybeans could be used to produce corn or be rented out. The farm operator's time and that of key employees may also have an alternative value, such as earnings from off-farm employment, or from other farm enterprises.

Thus, the value of fixed inputs is not zero if it has an alternative use in the short-run. To value the alternative use of a fixed input, a manager must think in terms of its **opportunity cost** (i.e. the most profitable alternative use of the fixed resource). As a result, when making a decision whether to grow a given crop in the short-run, the projected gross income must not only cover variable costs but also the opportunity cost associated with the fixed cost items involved in its production.

Cost relationships in long-run decision making

In the long-run, all inputs are said to be variable. In the absence of fixed costs, there are an infinite number of short-run average total-cost curves (Figure 1-2). The long-run average cost curve is an *envelope* of all short-run cost curves for a given enterprise or business.

Long-run costs and profit maximization

Notice in Figure 1-2, that profit maximizing businesses with unlimited resources would be operating on the long-run average cost curve only to the right of output (a). If marginal revenue declined to MR, the most profitable output would be where marginal revenue is equal to short-run average total costs and long-run average total costs.

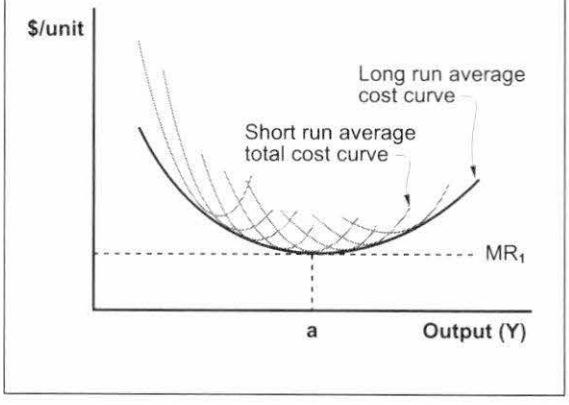
However, if marginal revenues were to increase, the firm would no longer operate on the long-run average total cost curve.

Rather, marginal costs and marginal revenues would be equated, and short-run average total costs would exceed long-run average total costs. The firm might then change the level of fixed inputs and move to a higher level of output where marginal revenue and long-run average total costs are again equal or positioned to the right of point (a).

Long-run average costs: Economies and diseconomies of size

The most economically efficient level of output for a given firm seldom corresponds to the long-run least cost level of production. The only exception is when marginal revenue falls to MR, or at a point (a) in Figure 1-2. However, the least cost of production point is useful when a manager is trying to determine the competitiveness of a firm over time and whether there are economies or diseconomies of size to consider.

Figure 1-2. Short run average total cost curves and long run average total cost curve.



Economies and diseconomies of size—a brief look. In recent years, most U.S. farmers have increased the size of their businesses. These size increases reflect the economic and technological advances for these farmers of moving to the right along the long-run average cost curve. Either economies or diseconomies of size may be experienced with a change in size. In the range of output where long-run average costs are declining, a firm is said to be experiencing **economies of size**. Here, as output expands, costs per unit continue to decline. In the range of output where long-run average costs are increasing, **diseconomies of size** exist.

For most production processes with a U-shaped long-run cost curve, diseconomies of size cause firms to limit expansion to some output *short of producing the output for the whole market or industry.* Thus, competition in many farm enterprises continues even though there has been a substantial increase in average farm size and associated declines in farm numbers.

Economies of size and individual competitiveness varies by enterprises. The ability of various size firms to compete varies by farm enterprises and the relative shape of their long-run average cost curves. For example, the poultry and cattle feeding enterprises are dominated by large units, which means the shape of the industry's long-run average cost curve exhibits economies of size that favor large units. However, cash grain, dairy, and hog enterprises tend to have flatter long-run average cost curves, which permit a wider range of farm sizes to compete.

Thus, the farm manager needs to be concerned with the shape of the industry's long-run average cost curve and his/her own. Failure to do so will likely result in a decline in farm earnings and an eventual exit from farming, or at least from a particular enterprise. For more information on these concepts see Part I, Chapter 3, of this series.

Production relationships and economic choice

Three broad input/output relationships are involved in production.

1. The relationship between single input and the resultant production response.
2. The relationship between the use of two or more inputs and production response.
3. The expected production response from the use of a given amount of resources.

Professor Emeritus Robert Luening, former farm management specialist at the University of Wisconsin, terms these concepts *organized common sense*. Since few farmers will farm long enough to develop a precise production response curve for even a given field or other unit of production, these production relationships are discussed here in very general terms.

Determining the most profitable level of use of a single input

The following is a brief discussion of some basic concepts involved in deciding on the most profitable level of use of a single input. First, the typical relationship between a given input and resultant production is described. Then the process of selecting the most profitable level of input use under an unlimited capital situation, and a limited capital situation is illustrated.

Typical production response to a given input

The typical relationship between a given input and resulting product can be divided into three stages (Table 1-1).

Stage I. Production is increasing at an increasing rate.
Stage II. Production increases but at a decreasing rate (diminishing returns).
Stage III. Production begins to decline as inputs are added.

Note that in the added bushel column, the added bushels for each 20 pounds of added fertilizer reaches a peak of 35 extra bushels at line 3. This is the end of Stage I—a phase when yield response is rising at an increasing rate. Beginning at line 4, the yield increase for each additional 20 pounds of fertilizer begins to decline and reaches a point, at line 9, where an added 20 pounds of fertilizer results in an increase of only one bushel. Thus, lines 4 through 9 demarcate Stage II, *the diminishing return phase*. At line 10, the yield response to an additional 20 pounds of fertilizer actually results in a yield decrease of three bushels. This is Stage III, a phase in which there is a *negative response to an added input*.

Selecting the most profitable level of one input—unlimited operating capital

Assuming a farmer had this information available, the question is: how much fertilizer should be applied to maximize returns? The answer: more than 40 pounds of fertilizer, as yields are still increasing at an increasing rate, but less than 180 pounds of fertilizer, as total bushels begin to decline at that point. If there is *unlimited capital*, then fertilizer would be increased until the *added cost of the extra fertilizer equals the added return from the extra crop produced*.

The Return column of Table 1-1 shows that the return over fertilizer cost reaches a peak of $295 with the application of 140 pounds of fertilizer (line 8). Actually, the exact point where added costs equal added returns occurs somewhere between 140 and 160 pounds of fertilizer. With fertilizer at $3 per 20 pounds and corn at $2 per bushel, line 8 shows a $4 return for $3 spent, and at line 9, $2 back for $3 spent.

Obviously, since a farmer does not control all the factors of growing a crop, the farmer is never sure what the yield response might be. But, a manager must have an intuitive sense that diminishing returns from added resources does occur and, that beyond some point, overall returns are being reduced even though yields still may be increasing.

The buffet table in a restaurant is a classic example of the law of diminishing returns at work. The restaurant owner projects that the average customer will become full before the cost of the food eaten exceeds the buffet price. The manager expects to lose some money when a football player goes through the line and make some money when a petite person passes through. On average, the owner hopes that the average appetite of customers will cost less than the price paid, thus resulting in a profit.

Selecting the profit maximizing level of one input—limited operating capital

To add more reality to decision making, consider the situation involving several enterprises and **limited operating capital** (Table 1-2).

From Table 1-2, a manager with unlimited capital would use $600 of fertilizer on corn, $500 on hay, and $400 on oats. At those levels, the added value of each crop equals the added cost of fertilizer as denoted by the $100 boxes. In this case, returns

Table 1-1. Production response of corn to added units of fertilizer cost.

Line	Fertilizer		Corn			Return	
	Total lb	Total cost	Total bu.	Added bu.	Total value	Above fertilizer	
1	0	0	40	0	$80	$80	
2	20	3	55	15	110	117	Stage I
3	40	6	90	35	180	174	
4	60	9	120	30	240	231	
5	80	12	140	20	280	278	
6	100	15	150	10	300	285	Stage II
7	120	18	156	6	312	294	
8	140	21	158	2	316	295	
9	160	24	159	1	318	294	
10	180	27	156	-3	312	285	Stage III

Source: Adapted from Luening, R.A. and R.M. Klemme, *The Farm Management Handbook*, Interstate Publishers, Inc. Danville, IL, 1991, pages 71 and 72.

Table 1-2. Added value of crops produced with varying levels of fertilizer use.

Line	Fertilizer investment	Added value of crop produced		
		Corn	Hay	Oats
1	1st $100	$300	$325	$250
2	2nd $100	$285	$275	$225
3	3rd $100	$240	$225	$175
4	4th $100	$200	$175	$100
5	5th $100	$200	$100	$75
6	6th $100	$100	$50	$25
7	**Total return from $600 of fertilizer**	**$1,275**	**$1,150**	**$850**

Source: Luening and Klemme, page 75.

would be maximized with these three crops if $1,500 of fertilizer were used.

However, assume a manager has only $600 to spend on fertilizer. Here, the **equimarginal principle** applies. This principle suggests that the manager should allocate a resource (e.g. fertilizer) among its several uses in order to maximize returns. In Table 1-2, the manager would put the first $100 of fertilizer on hay, as it would provide the greatest added value ($325). The next $200 of fertilizer is applied to corn ($300 and $285 added value); the next $100 on hay ($275); the next on oats ($250); and the final $100 on corn ($240). By allocating the $600 of fertilizer in this fashion, a manager would expect a *total net return of $1,675*. This would represent a $400 to $800 increase in returns relative to putting all of the $600 of fertilizer on any one crop (line 7).

Selecting the profit maximizing combination of two (or more) inputs

How does one decide what combination of two or more variable inputs to use? Theoretically, three possible production relationships exist between two inputs:

1. Perfect complements.
2. Perfect substitutes.
3. Imperfect substitutes (Figure 1-3).

Perfect complements

In using many technologies in agricultural production, **perfect complements** of inputs is the rule. These inputs do not substitute for one another and thus must be used in a given relationship. Situation (a), Figure 1-3, shows that with increased use of both inputs x_1 and x_2, output continues to increase.

Perfect substitutes

At the other extreme is two or more inputs being perfect substitutes for each other, (Situation (b), Figure 1-3). The inputs are not used together; but, either one or the other is used. Such a situation might occur in choosing selected crop inputs or feed for livestock. The choice is usually quite simple: Which input is the cheapest?

Imperfect substitutes

For most decisions concerning input combinations, the production relationship is one of **imperfect substitutability**; (Situation (c), Figure 1-3). That is, several combinations of the two inputs can be used to produce a given output. In this case, the least costly combination of inputs to produce a given output will be determined by the relative cost of inputs. For example, if the price of one input increases relative to another, increased amounts of the other input would be used to produce a given output.

Selecting the profit maximizing combination of outputs

The previous discussion has considered the economic concepts involved in determining: (1) how much of a given input to use; (2) how much of an output to produce; and (3) what combination of inputs to use in producing a given output. The next issue is to determine the best combination of outputs, given a fixed amount of resources. This is a common problem in any multi-product business.

Just as in the case of input substitution, three possible output relationships might exist (Figure 1-4).

1. Complementary.
2. Supplementary.
3. Competitive products.

Complementary products

A **complementary product** relationship occurs when increasing the production of one enterprise actually increases the production of another (left diagram (a), Figure 1-4). A common example is the positive effect of corn following alfalfa in the crop rotation. The nitrogen supplied by the legume aids the yield of corn. From a decision standpoint, the manager would continue raising both crops to get the complementary affect, providing that the complementary enterprises are still profitable overall.

Supplementary products

In the case of **supplementary products**, changing the resources allocated to one product has little or no impact on the production

Figure 1-3. Possible production relationships between two inputs.

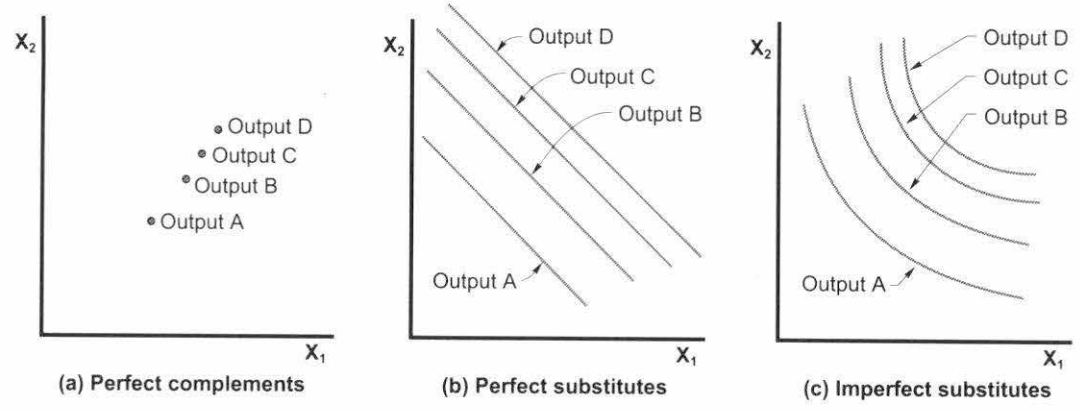
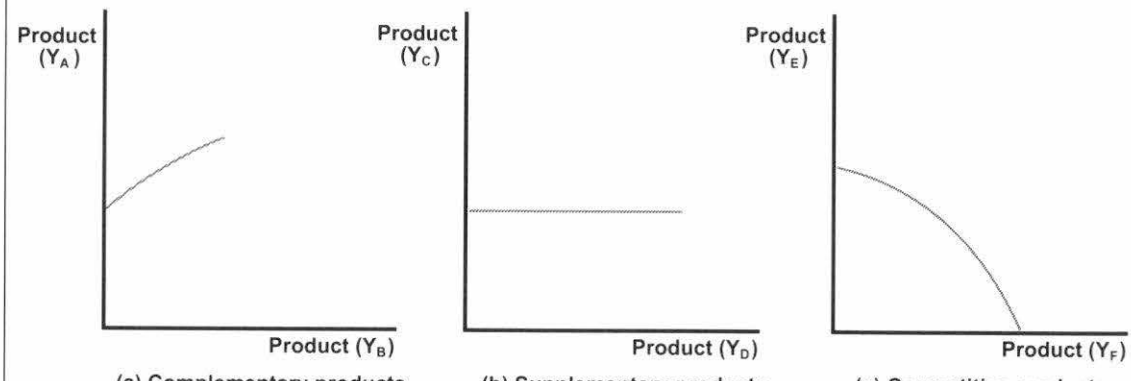


Figure 1-4. Possible production relationships.



of another product (center diagram (b), Figure 1-4). Due to the seasonal nature of crop production in the Midwest, this relationship is rather common. For example, a winter livestock feeding enterprise and various crop enterprises may compete for few, if any, of the same resources.

By taking advantage of such supplementary enterprises, resources that might otherwise be left idle are put to use. The manager must question whether the supplementary enterprise is profitable relative to any variable costs that may be involved, and/or whether the manager's time and other fixed resources could be put to a more profitable use elsewhere.

Competitive enterprises

Most farm enterprises, however, compete for resources, such as land, capital, and labor (right diagram (c), Figure 1-4). Finding the most profitable combination of outputs involves comparing the relative prices of the two products. If the price of one product is higher than the other, then the manager should produce more of that product.

Related planning tools: partial budgeting and capital budgeting procedures

Part I of this series illustrated the use of the whole farm budgeting procedure, FINLRB, and the cash flow budget, FINFLO, in making overall business plans. Partial budgeting and capital budgeting are two other planning procedures that will now be discussed. These tools are particularly useful in analyzing selected business adjustments, such as those discussed in this part of the series (Part III) and in Part IV.

The Partial budgeting procedure

The partial budget is particularly useful in making a quick analysis of the impact of a specific adjustment, such as purchasing a new machine or building; deciding whether to custom hire or own equipment; or in analyzing a new technology for the existing enterprise.

The partial budgeting procedure can be viewed as a balance scale (Figure 1-5). *It focuses on the expected changes in costs and income when making a particular business adjustment.*

On the credits or pluses side, increases in income or reductions in costs are recorded and added together. On the debits or minuses side, reductions in income or increases in costs associated with the adjustment are recorded and totaled. Whether a given adjustment is profitable or not is determined by subtracting the debits from the credits.

Figure 1-5. Example of a partial budget.

Credits/pluses		Debits/minuses	
Added income	$	Reduced income	$
Reduced costs		Added costs	
Total	$	**Total**	$
Total profit/loss (credits - debits)	$		

The partial budgeting format presented in Worksheet 1-1 (pages 11-12) focuses on *changes in both business profits and repayment capacity*. Thus, when credits exceed debits, the adjustment will increase profits and/or improve repayment capacity. If debits exceed credits, the opposite is true.

The analysis is divided into three steps:

Step 1. Estimate changes in income and costs associated with the proposed change.

Step 2. Calculate various profitability measures.

Step 3. Determine the impact of change on cash flows/repayment capacity.

The instructions for developing a partial budget begin on page 9.

The Capital budgeting procedure

The partial budgeting procedure uses a fairly simple analytical approach to the question of the profitability of a given business adjustment. Measures calculated include the average increase in profits and the average return on the added capital invested.

However, as businesses and business adjustments become larger and more varied in terms of the income stream associated with these adjustments, the capital budgeting procedure is becoming more widely used. This technique employs discounting procedures to more accurately determine the effect of variations in cash inflows and outflows on project profitability.

Basic notions involved in capital budgeting

Capital budgeting is particularly helpful in cases where, although the relative profitability of two alternatives is fairly close using conventional procedures, the alternatives may vary in the timing and duration of investments and income. However, capital budgeting should be used only in situations where measurable factors can be quantified with accuracy and when they are of much

greater consequence than the unmeasurable ones. If unmeasurable factors, such as risk or personal preference are important to the final decision, then using the capital budgeting procedure may best be described as "sand papering the rail fence."

The main purpose of the capital budgeting procedure is to reflect the **time value of money**—a consideration that the more traditional payback and return on investment measures developed with partial budgeting ignore. The *time value of money concept is important because, for most, a dollar in hand today is worth more than a dollar at some future date*. Uncertainty, inflation, human impatience, and alternative uses of money are major reasons for preferring a dollar today.

Though each of these factors is a valid reason for placing more weight on today's dollar, the major reason for using discounted cash flow is the **alternative uses of money**. Although a manager could also invest the dollar five years from now, expected future receipts must be discounted back to today's worth to make them comparable to investment outlays made today.

Outline of the capital budgeting procedure

The **internal rate of return** and **net present value methods** are two approaches that use discounted cash flows in evaluating investment proposals. Both of these methods are based on formulating the expenditure proposal in terms of its cash flows and evaluating these cash flows in terms of time values. Thus, capital budgeting involves a three step process.

Step 1. Formulate the problem in terms of cash inflows and outflows.
Step 2. Analyze the investment using the net present value method.
Step 3. Analyze the investment using the investment yield or discounted rate of returns.

A set of instructions for using the capital budgeting procedure accompanies Worksheet 1-2 (pages 12–14). Since the capital budgeting procedure is a complex tool, secure a publication on its use, and possibly use computer programs that feature this procedure.

Instructions for Worksheet 1-1. The Partial budgeting procedure

Step 1. Estimate changes in income and costs associated with the proposed change or project.

Using Worksheet 1-1, first describe the nature of the proposed change. Next, estimate any changes in income resulting from this change. On the left side, list any increases in income that are expected to occur. On the right side, list any decreases in income that may result. Total these amounts at lines 1 and 5, respectively. Normally, these changes in income will affect both profits and cash flows in the same amount, so list the like totals in each column.

Next, estimate likely changes in operating expenses associated with the proposed change. On the left side of the worksheet, estimate likely reductions in operating expenses and any increases on the right side. Total these amounts at Lines 2 and 6. Change amounts should be the same for the profit and cash flow columns, as these are all cash-related expenditures.

Often business adjustments involve changes in annual investment-related costs as well. Such costs may include changes in repair costs and/or insurance. These costs typically affect both profits and cash flows. But, a capital recovery or deprecation charge will affect only profitability, while interest on debt will only affect cash flows. So be careful in allocating such costs between the profit and cash flow columns. Obviously, the proposed change may affect one or both. Total the annual changes in the investment costs at lines 3 and 7.

Finally, add the totals at lines 1, 2, and 3 to determine the total credits or pluses associated with the proposed change (line 4).

Do the same with debit or minuses side at lines 5, 6, and 7, and put the total on line 8. Put the totals for line 8 under line 4 and calculate the changes in net income at line 9.

Step 2. Calculate various profit-related measures.

The absolute change in profits was noted at line 9a on the first page of the worksheet. Step 2, the top of the second page of Worksheet 1-1, provides space for first calculating the return per dollar of added investment. This involves first inserting the change in net income from line 9a in the appropriate space along with the added or change in investment involved. Divide the added investment into the added income to arrive at the **return per dollar of added investment**.

A related calculation—**a break-even analysis**–could also be made at this point. The break-even point is the amount of use needed for the proposed change to break-even with (or be equal to) the present method. Where appropriate, this measure provides the decision maker with some vital information. For example, if the calculated break-even amount is less than the number of units projected in the proposed change, the plan would be profitable. If the calculated units are more than in the proposed plan, the situation is unprofitable. The absolute difference between this calculated break-even amount, compared to the proposed plan, could also provide a *measure of how sensitive* the plan is to a change in the units actually involved.

Step 3. Determine the impact of a change on cash flows/repayment capacity.

Step 3 on the second page of Worksheet 1-1 involves determining whether the increased income from the proposed change will be sufficient to meet *debt repayment demands. The years to repay the added debt approach is presented*. This method involves dividing the added debt to be repaid by the projected net income available for debt servicing, line 3. If the number of years is less than the length of the loan that can be arranged with the lender, then repayment demands will likely be met. If the calculated number of years required is greater than the likely loan period available, income from other sources would be needed to meet repayment demands.

Special note: It is important to note that the above calculations were made *without consideration given to changes in income and social security taxes*. If the proposed adjustment is somewhat marginal at best, then likely tax effects should be considered as part of the analysis. If the project is of considerable size, the manager is referred to Part I, Chapter 4, which discusses detailed cash flow projections.

Worksheet 1-1. The Partial budgeting procedure.

Proposed change: _____

Step 1. Estimate changes in income and cost associated with the proposed change or project.

Credits/pluses
Added income and/or reduced costs with proposed change

Items	(a) Profit	(b) Cash flow
Added income		
_____	$ _____	$ _____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total added returns	(1) $ _____	$ _____
Reduced operating expenses		
_____	$ _____	$ _____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total reduced operating expenses	(2) $ _____	$ _____
Reduced annual investment costs		
Depreciation	$ _____	$ XXX
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Interest on reduced debt	XXX	_____
Total reduced annual investment costs	(3) $ _____	$ _____
Total credits/pluses (1 + 2 + 3)	(4) $ _____	$ _____

Debits/minuses
Reduced income and/or added costs with proposed change

Items	(a) Profit	(b) Cash flow
Reduced income		
_____	$ _____	$ _____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total reduced returns	(5) $ _____	$ _____
Added operating expenses		
_____	$ _____	$ _____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total added operating expenses	(6) $ _____	$ _____
Added annual investment costs		
Depreciation	$ _____	$ XXX
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Interest on added debt	XXX	_____
Total added annual investment costs	(7) $ _____	$ _____
Total debits/minuses (5 + 6 + 7)	(8) $ _____	$ _____

Total credits/pluses	(4) $ _____	$ _____
Total debits/minuses	(8) _____	_____
Total net income (4 -8)	(9a) $ _____	(9b) $ _____

Worksheet 1-1 (continued). Partial budgeting procedure.

Step 2. Calculate various profit-related measures.

- **Determine return on added investment.**

Estimated change in net income (line 9a) ..... (1) $ _____
Total added investment with change ..... (2) $ _____
Return per $ added investment (line 1 ÷ 2) .... $ _____ %

Step 3. Determine the impact of a change on cash flows/repayment capacity.

- **Years to repay added debt.**

Total added debt with change ..... (1) $ _____
Change in estimated net cash income (line 9b) .. (2) $ _____
Years to pay back added debt (1 ÷ 2) ..... (3) _____ **years**

Instructions for Worksheet 1-2—Capital budgeting procedure

Step 1. Estimate investment outflows and net cash inflows.

The capital budgeting procedure deals primarily with cash inflows and outflows. Each investment proposal involves two flows of cash: (1) the net outflow of cash required by the new investment and (2) the net cash inflows resulting from the new investment.

Make sure the information is accurate and in the appropriate incremental form.

Investment cash outflows. In an initial outflow, a manager may add a $40,000 building or machine. A simple situation is where the net investment is equal to this amount. A more difficult problem arises when a machine or facility is replacing an existing one that is not fully depreciated. In the latter case, if the replaced item is sold, reduce the net investment by the sale amount. However, if the replaced item is not sold, ignore it, since it is essentially a sunk cost and is not affecting cash flows.

In determining the net investment, also determine the expected remaining value of the investment at the end of the time period being analyzed. Estimate this amount, plus any working capital that was included as part of the original investment. *Don't subtract this amount directly from the original investment*. This value must be discounted back to the present, as the remaining value of the investment at the end of the investment period is worth less now than the present outlay. Once this remaining investment amount has been discounted, it can be subtracted from the initial investment to arrive at the present value of the net investment outlay for the project (Step 2).

Net cash inflows. Determine the relevant economic benefits of the project stated as cash inflows provided by the investment. Some types of investments, such as replacement and modernization, will probably reduce costs more than they will increase output or income. Expansion projects will likely add to both costs and income, the relevant figure being the resultant net inflow of cash. Thus, the analysis of operating cash

inflows involves a step-by-step review of every revenue and expense category affected by the investment. Will the project bring in more or less cash? The impact of the investment and cash flows on income taxes must also be determined since many investments do increase taxable income. In turn, increased taxes will reduce spendable cash.

Patterns of inflows and outflows over time. Because the time value of money and the discounting of future earnings is so important, make projections of inflows and outflows of cash for each of the time periods under consideration, such as five or ten years. The simplest case to evaluate, of course, is the one where all the investments are made at the beginning and inflows or benefits are equal for all years. In this case, the result of the analysis should be about the same as with the partial budget procedure. However, because most often these inflows are not the same, investigate the impact of an investment on inflows and outflows for each of the years under consideration.

Step 2. Analyze the investment using the net present value method.

There are two common analytical methods that use the time value of money concept: the net present value and the investment yield or discounted rate of return. The net present value method of evaluating investment alternatives involves three stages:

1. Carefully select an appropriate discount factor or desired rate of return. *A guideline for selecting a discount rate is that it might fall between the interest rate one could get by putting the money in a savings account and what one would normally pay if the funds were borrowed.*

2. Compute the present value of the net cash inflow expected if the investment is made and the net present value of the investment outlays.

3. Subtract net present value of the capital outlays from the net present value of the net cash inflows. The difference is the net present value of the investment.

The criterion for accepting an investment using this method is that the net present value amount be positive. If the net present value is positive, the manager would accept the investment alternative as being desirable since an investment with a positive net present value will yield a return greater than the desired rate of return used as the standard in testing the proposal.

In order to directly compare investment projects of differing sizes and economic levels, it is often useful to derive a **present value index**, or ratio of present value of the investment outflows to the present value of the operating cash inflows. This ratio can then be the ranking device used in deciding which investment or business change to select. This index is calculated as follows:

$$\frac{\text{Net present value of inflows}}{\text{Present value of outflows}} = \text{Present value index}$$

Step 3. Analyze the investment with the investment yield or discounted rate of return method.

Rather than setting a desired rate of return factor and then determining whether the net present value is positive or negative, *another approach is to rank investments directly by the individual yields that can be expected from them.* This is the investment yield approach—aiming for the yield that will cause the net present value to be zero.

For investments with uneven cash flows, the yield must be found by trial and error, starting with an assumed rate and determining the net present value as in Step 2. If the resultant net present value is positive, try a higher discount rate; if the result is negative, use a lower discount rate. Once the discounted rate of return is determined, where the net present value approximates zero, make a decision. This involves comparing the desirability of the project by its yield with various other measures such as: (1) the minimum desired rate, (2) the cost of capital, and/or (3) the yield of other projects.

Worksheet 1-2. Capital budgeting procedure.

Step 1. Estimate investment outflows and net cash inflows.

Item	Year 0	1	2	3	4	5
Investment outflows						
Net investment outflows						
Recovery of working capital and remaining value						( )
Net cash inflows						
Total added income						
Total added expenses						
Income over expenses						
Less income tax						
Net cash inflows						

Step 2. Analyze the investment using the net present value method.

Year	Cash outflows (investment)	Net cash inflows	Discounted (%)	Present value Outflows	Present value Inflows
0		XXXX	XXXX		XXXX
1					
2					
3					
4					
5					
			Total		
			Less P.V. outflows		
			Net present value		

$$\text{Present value index} = \frac{\text{Net P.V. inflows}}{\text{Net P.V. Outflows}} = \_\_\_\_ = \_\_\_\_$$

Step 3. Estimate discounted rate of return by trial and error.

Year	Cash outflows (investment)	Net cash inflows	Selected discount rate	Discounted present value Outflows	Discounted present value Inflows
0		XXXX	XXXX		XXXX
1					
2					
3					
4					
5					
			Total		
			Less P.V. outflows		
			Net present value		

Managing crop enterprises and related systems

2

- **Developing crop enterprise budgets—a base plan**
- **Making short-run production-related decisions**
- **Making long-term production-related decisions**
- **Implementing, monitoring, and adjusting crop production plans**
- **Developing grain marketing plans**
- **Implementing, monitoring, and adjusting the marketing plan**

This chapter focuses on managing crop enterprises and related systems. First, it discusses crop enterprise budgets explaining how to make short- and long-term crop production decisions or plans and the process of implementing, monitoring, and adjusting these plans. The discussion then shifts to marketing-related issues, focusing on how to develop a marketing plan for grains and then explaining the process of implementing, monitoring, and adjusting a marketing plan.

Developing crop enterprise budgets—a base plan

An enterprise budget summarizes the expected revenues and expenses and resultant net returns from a given enterprise. The revenue and expenses established in the budget are those expected if particular practices and production systems are used. The budget typically encompasses the entire production cycle, indicating the resources required, the products produced, the costs incurred, and the prices expected or received.

Past farm records, if available, are a good source of data for estimating crop yields and inputs used. Typical enterprise budgets are available from the county extension service. These budgets can be useful when developing the crop budgets, but they do need to be adapted to a specific farm and to ones expectations regarding the future.

Preparing crop enterprise budgets requires a working knowledge of production and cost relationships as discussed in Chapter 1, and an understanding of the production process. Enterprise budgets can be formatted in several ways. One approach is illustrated in Worksheet 2-1 (page 29). *From a decision making standpoint, a good idea is to develop the initial budget based on the present production system–the base plan*. Then, either a partial budget or a revised enterprise budget can be used to reflect the impact of various proposed changes. (See Alternatives 1 and 2 of Worksheet 2-1)

Development of a crop enterprise budget involves a five-step process:

Step 1. Estimate gross returns per acre.
Step 2. Estimate direct costs per acre.
Step 3. Calculate returns over direct costs per acre.
Step 4. Calculate and allocate overhead costs.
Step 5. Calculate total costs and returns over total costs.

A set of instructions for developing a crop enterprise budget accompanies Worksheet 2-1 (pages 27-29).

Making short-run production-related decisions

Crop enterprise budgets can be used in making short-run crop decisions such as those involving the use of variable inputs and short-run enterprise decisions.

Making variable input use decisions

To make variable input use decisions, analyze the current use of inputs such as seed, fertilizer, and chemicals in terms of the likely impact changes in the amount used will have on expected yields and costs. Refer to "Production Relationships and Economic Choice" in Chapter 1, and to recommendations of input suppliers, etc. Use the enterprise budget procedure in Worksheet 2-1 (page 29) to analyze such input changes.

Consider the risks and trade-offs between profitability and environmental concerns in making these input decisions.

Risk considerations in variable input use

The framework for making risky decisions described here is based on the fact that farm managers must choose among alternative actions, the outcomes of which depend on events that are beyond their control. It involves:

- Development of a payoff matrix.
- An assessment of personal probabilities.
- Making the decision.

Developing a payoff matrix

Table 2-1 illustrates the components of a payoff matrix. First, list the decision alternatives—in this case, whether to apply 20, 40, or 60 units of fertilizer. To build the matrix, chart the choices against the possible events—for this example will there be low, normal, or high amounts of rainfall. Then the crop yield in bushels per acre for each combination of decision alternatives and events are estimated. Multiply each yield by the expected net selling price of the crop. Then subtract fertilizer costs per acre from each situation to determine net payoffs.

By itself, a payoff matrix cannot dictate the best decision. But it does provide a convenient guide, summarizing the information to be considered. *By organizing the decision in this way, it is easier to focus on what can be controlled (the alternative actions) and what cannot be controlled (the possible events).* The analysis in this framework involves preparing budgets for each action and event combination. With careful budgeting of all of the possibilities, the actual outcome should be no surprise. Most of the potential outcomes will have been considered before arriving at a decision.

Assessing personal probabilities

Along with the payoff matrix, another valuable tool for considering risk is the use

Table 2-1. Example payoff matrix: Net returns for a fertilizer application decision.

Decision alternatives: Amount of fertilizer to apply

Possible events	Units of fertilizer used		
	20	40	60
Expected rainfall:	Net returns per acre		
Low rainfall	$ 74	$ 70	$ 63
Normal rainfall	116	118	117
High rainfall	134	160	168

of probabilities. Probabilities provide a means of summarizing what one believes and knows about the future. Although the most extensive use of probabilities has been in the area of weather forecasting, there is considerable potential for their use in business management situations.

Probabilities based on a decision maker's personal beliefs about the chances of an event occurring are called **personal probabilities**. In estimating these personal probabilities, decision-makers should consider their own experiences, the opinions of experts, and the available data. Personal probabilities allow decision makers to summarize everything known about a future event with numbers so they can deal with risks explicitly. Techniques have been developed to help managers estimate their personal probabilities. Since this is a complex, changing area of study, contact persons and/or publications specializing in these risk management issues.

Making the decision

The **payoff matrix** guides the budgeting process and summarizes components of the problem, the alternative actions, and the events. Personal probabilities summarize what the manager believes about the future. By combining personal probabilities with a payoff matrix, the farm manager can evaluate the risk associated with the alternatives. These steps help farm managers formalize the process they already use intuitively in making risky decisions. This formal approach provides the discipline to ensure that all available information has been considered.

But it is important to realize that risk analysis does not simplify decision making or eliminate the agony of making difficult choices. More importantly, risk analysis does not eliminate risk, but it can help the farm manager select the right risks to take in the uncertain world of agriculture.

Evaluating trade-offs between profitability and environmental concerns

The trade-offs between profitability and environmental concerns also must be considered. Issues such as erosion; groundwater contamination from nitrates and pesticides; surface water contamination from phosphorus and pesticides; and human safety aspects should be considered when making these input decisions.

The *Planetor* planning procedure, a computer program developed by the Center for Farm Financial Management at the University of Minnesota, is designed to analyze the impact of such changes in input use on both the environment and business profitability. It will help the crop production manager answer these questions:

- Are current practices environmentally sound?
- If not sound, what contributes to the problem?
- If there is a change in production practices, will things improve?
- How will implementing these changes affect the enterprise profit-wise?

For further information on the *Planetor* planning procedure, contact The Center for Farmer Financial Management at the University of Minnesota.

Making short-run crop enterprise decisions

As a result of possible changes in production costs or expected prices, the short-run relative profitability of selected crop enterprises may change. This may result in a change in the most profitable mix of crop enterprises, at least in the short-run. To make these types of decisions, estimate the expected yields and price for each of the crops under consideration. After determining the gross income from each crop, add in the values of any other products relating to each crop. From the resultant gross income, subtract the estimated direct (cash) costs for each crop. The resultant figure is the net margin for each crop.

In making the choice of the most profitable combination of crops, the fundamental rule is to put the most limiting resource to its most profitable use. For example, if unlimited credit is available, then land is likely to be

the most limited resource. Here, the crop with the highest net margin would claim use of all the acres. Of course, there may be other factors, such as timeliness and risk may favor some combination of crops rather than a single crop.

If operating credit is limiting, select the crop with the lowest direct costs associated with it. Multiply the crop's direct costs by the acres available. If there still is credit available, consider using part of the acreage in another crop to make full use of credit available. (Review the equi-marginal principle in "Selecting the profit maximizing level of one input," Chapter 1).

Managing risk with crop insurance

Every year, Midwest crop farmers face the threat of damage to their crops from drought, hail, flood, insects, and other natural disasters. The Federal Crop Insurance Corporation (FCIC) and private crop insurance venders have developed a set of insurance programs to help producers control crop production risk at a reasonable cost.

Crop insurance coverage is not mandatory, but it does provide a financial safety net in case of severe production losses or low crop prices. It provides two important benefits. It ensures a reliable level of cash flow and allows more flexibility in marketing plans. If one can insure some part of the expected production, that level of production can be forward-priced with greater certainty, creating a more predictable level of revenue.

When considering crop insurance, analyze the situation in terms of the following questions:

- What are the major sources of production risk and what type of crop insurance can protect against these risks?
- How much coverage is needed for adequate cash flow to meet debt obligations and other cash commitments?
- Which crop insurance product will best complement the marketing plan?
- What are the costs of the various types of coverage and which offers the best protection for the level of coverage needed?

Some crop insurance alternatives

Table 2-2 provides a comparison of crop insurance plans available to crop producers in Iowa in 1997.

Note of caution: these plans are subject to change and new options are likely. There were *three production risk* plans available. The traditional *Multiple Peril Crop Insurance (MPCI)* plan is still available. Producers can choose to insure crops from 50 to 75 percent of proven yield based on average production history. The range of price elections is from 60 to 100 percent of the FCIC expected market price. There are also provisions relative to prevented and delayed planting situations.

In 1995, FCIC introduced a minimum level of MPCI insurance programs called *Catastrophic Coverage*. Table 2-2 shows that producers can insure their crops at the 50 percent average yield level, with losses paid at the rate of 60 percent of the FCIC expected market price. There is no fee for this coverage, but the producer must pay a $50 processing fee for each crop and farm unit insured.

The *Group Risk Plan* was first offered in 1994. It allows producers the chance to insure against a widespread crop failure at low cost. If the average yield in the county in which the insured crop is located falls below the insured level chosen, the producer receives a payment regardless of the farm's yield. Guarantees up to 90 percent of the long-term county average yield can be purchased with the maximum dollar coverage limited to 150 percent of the expected county yield multiplied by the current FCIC expected market price. Thus, the producer is selecting a gross dollar amount per acre, not a specific price. Premiums vary with the level of protection selected.

One of the drawbacks of these traditional crop insurance programs is that they cover only production losses, while crop revenues received depend on both production and price. There are several new revenue-related programs being tested that take into account variations in both yields and price. Two such programs are noted in Table 2-2. Private insurance companies have also developed a variety of policies designed to supplement the coverage under the traditional Multiple Peril policies.

Table 2-2. Comparison of crop insurance plans.[1]

Characteristic	Multiple peril crop insurance	Catastrophic	Group risk plan	Crop revenue coverage	Revenue assurance
Insures against	Production risk	Production risk	Production risk	Revenue risk	Revenue risk
Yield coverage	50 to 75% of APH[a] yield	50% of APH[a] yield	70 to 90% of county yield	50 to 75% of APH yield	65 to 75% of APH yield
Price coverage	60 to 100% of FCIC[b] price	60% of FCIC[b] price	90 to 150% of FCIC price	Higher of 95% of Feb or harvest futures price	February futures prices less basis
Results on which indemnity is based	Actual yield	Actual yield	County yield	Actual yield and 95% of harvest futures price	Actual yield and harvest FSA[c] posted price
Optional units	Basic and optional	Basic units	Basic units	Basic and optional	Basic, optional enterprise, and farm discounts

[a] Actual production history
[b] Federal Crop Insurance Corporation
[c] Farm Service Agency

1. Prepared by William Edwards, Iowa State University, an unnumbered draft of *Managing Risk With Crop Insurance*, 1997.

Deciding whether to self insure

Regardless of the number and variety of crop insurance plans offered, some producers will elect to self insure. These producers expect to supplement below average revenues with financial reserves such as savings, sales of stored grain or livestock, or short-term borrowing. Being self-insured eliminates the cost of insurance premiums and the need to submit production records. However, financial reserves may not be sufficient to cover large losses. Moreover, assets kept in a liquid form, such as a savings account, often earn a lower return than they would if they were invested elsewhere.

An estimate of a producer's ability to self-insure can be determined by calculating a **liquidity gap**. The liquidity gap is the difference between the total cash flow requirements for a crop and the value of liquid resources available to meet any shortfall in crop revenue. The value of liquid resources can be measured by the farm's available working capital, that is, the difference between current assets and current liabilities at the beginning of the year. These values appear on the farm's balance sheet.

The size of the liquidity gap indicates the minimum level of insurance coverage a producer should consider. However, higher coverage levels may be desirable in order to protect against the risk of losing all the farm's working capital in one year.

With the federal government's movement away from price support and disaster relief programs, crop insurance will become an increasingly important risk management tool. Obviously, more crop insurance options will be offered over time.

Managing risk with alternative land rental arrangements

Renting farmland using the cash rent approach exposes a farm operator to considerable risk. Regardless of what happens to production or market prices, the agreed cash rent must be paid—often one-half of it before production begins.

In areas where crop production is quite variable due to weather and rainfall changes, the *crop share arrangement* is often used. This shifts part of the expenses and variation in crop production to the landowner. Another arrangement designed to share risks and profits is the flexible cash lease arrangement. There are several options to consider. These and other rental arrangements are discussed in Chapter 1, Part IV of this series.

Making longer-term production-related decisions

When planning for the long-term, cost structure, prices, technology, markets, and other factors may cause a shift in enterprise choice, and in the production practices or systems employed. Crop enterprise budgets can be used in making more substantial changes.

Making longer-term crop enterprise decisions

Making long-term decisions relative to which crops to grow and in what combination is a complex process that needs to take into consideration risk, environmental concerns, and profitability. If livestock enterprises are also involved in the plan, the feed needs of the livestock must be considered.

There are two basic concepts or guides to follow in developing a cropping system for a crop-oriented farm. They include:

- The most profitable combination of crops contain high value cash crops and are flexible so it is easy to shift from one crop to another. High value crops that are consistent with soil and water conservation also should be selected.

- View the cropping plan as a guide rather than a blue print to be followed blindly. In order to take full advantage of changing conditions, it is important to monitor the business environment and to make periodic changes in the cropping plan.

Steps in making enterprise decisions

The following is a step-by-step process to use in selecting the combination of crops to be grown:

- Inventory the capabilities of the land resources, climate, soil conservation aspects, and water needs and availability if irrigation is required.

- Identify the alternative crops to be considered, taking into consideration the resources available and the location of the farm relative to markets.

- Determine the need for, and impact of, multiple crops in the rotation. Also, determine the sequence of crops that would best fit the situation.

- Compare the profitability of alternative plans *using enterprise budgets and the partial budgeting procedure.*

- Consider labor requirements. Before deciding which combination of crops to produce, determine the labor requirements in terms of both the total labor required and its distribution over the cropping season. Since timeliness is such an important factor in crop production, the seasonal labor requirements need to be given careful consideration.

- An analysis of the capital requirements of alternative crop combinations should also be determined. For example, will a given crop combination require larger or different machinery? Using the direct costs from the various crop enterprises under consideration, develop a cash flow budget to determine operating capital needs over a given production season. Also consider the risks involved from both a price and yield vantage point.

Risk management considerations in enterprise choice

The above discussion of enterprise decisions has focused on profit considerations. But the relative risk involved needs to be considered. Some possible risk management strategies include:

- **Choosing less risky enterprises**. This involves studying price and production variability of enterprises and choosing those that best fit one's personal and financial risk-bearing ability.

- **Diversification**. Because yields and prices for various enterprises do not always fluctuate together, a combination of enterprises can often produce a more stable income than a single enterprise production system.

- **Dispersing production geographically.** A related risk management strategy would be to disperse crop production geographically to reduce the impact of localized weather patterns. However, the availability of land and the added cost of operating over a larger area often limits the use of this option. A variation of this strategy would be having acreages with some variation in soil type within a more limited geographic area.

Of course, there is always a trade off between risk reduction and profits when considering these options.

Making longer-term production system decisions—a brief look

Enterprise budgets can also be useful as a starting point in evaluating possible long-term changes in production systems. These may include:

- Changes in the tillage system.
- Use of irrigation on selected crops.
- Changes in the crop handling and storage system.
- Introduction of soil conservation measures.
- Soil drainage.

When making these decisions, use partial, whole farm, and/or capital budgeting procedures. When considering several changes in production practices at once, resort to the long-range budgeting procedures discussed in Part I, Chapter 3 of this series.

Since each farm business' cropping situation is unique, volumes could be written on this topic and still not help in particular decision-making process. Thus, the following discussion is general in terms of the decisions to be made and the types of information needed to make decisions.

Analyzing changes in tillage system

With the current emphasis on protecting the environment, there is increased interest in changing tillage systems. To determine the impact of such changes requires consideration of various tillage systems such as conventional, reduced-tillage and no-till systems. Also determine the investments involved and the effect on crop yields and related crop expenses. Consider rotational effects on the relative profitability of the various systems.

Analyzing water-related practices

Water is of critical importance in farming. In some areas, a lack of water may prevent agricultural development. In other areas, such as on flood plains or areas of heavy, poorly drained soils, too much water may be the problem.

Economics of irrigation. When considering an investment in irrigation equipment, gather information regarding the probable yield response to irrigation and estimated fixed and variable costs. The first step in the analysis would be to construct a partial budget for projected average yield with irrigation compared with dryland farming. Also, estimate the likely change in fixed and variable costs associated with this practice.

If yield information is available, check the economic sensitivity associated with various numbers of water applications. The cost of water, energy, and labor must be considered. For example, if additional water does not come at a cost but labor is expensive, more water should be used than if the reverse is true. Higher energy costs, on the other hand, may dictate the use of less water. Seek the optimum combination of water and other inputs for the particular situation.

Before proceeding too far in this decision process, determine one's rights to, and restrictions on the use of ground, stream, and river water.

Analyzing soil drainage as a production practice. Soils in many areas of the Corn Belt require drainage, as there is normally too much water available for optimum yields. Here again, use a partial budget or capital budgeting procedure to determine

the profitability of draining the parcel. Check with the Natural Resource Conservation Service (NRCS) office to determine whether there are environmental restrictions prohibiting the drainage of selected areas of the property.

Table 2-3 illustrates the impact of various per-acre increases in net cash income and per-acre investments in improved drainage will have on the after-tax internal rate of return of the investment.

For example, if the projected increase in net cash income was $60 per acre and the per acre investment in drainage was $450, the after-tax internal rate of return would be about 9 percent (Table 2-3) (See discussion of internal rate of return in "Capital budgeting procedure," Chapter 1). If it takes only $200 to improve drainage, an increase in net income of only about $30 is needed to have the same internal rate of return. If investment costs would rise to $800 per acre, then about a $115 increase in net cash income would be required.

Other production system risk-related decisions

There are several other production-system risk-related decisions that can affect the workability of a system and help manage risks in the process.

- **Machinery-related aspects.** A major concern in crop production is flexibility. Thus, having machinery that, with minor adjustments, can be used with several crops is desirable. Having excess machinery capacity can be critical under adverse weather conditions. Custom hiring certain operations, exchanging work, and/or leasing equipment can also be cost effective and reduce production and harvest risks.

- **Adequate drying and storage facilities.** Having adequate drying and storage facilities will help ease harvest pressures and also provide flexibility relative to the marketing of the crop.

- **Backup labor and management.** Many farm businesses depend upon one or two key people. In crop production, timeliness is so critical that if a person leaves or is disabled, the business can be put into turmoil. Therefore, providing backup labor and management requires the training of replacements, shifting jobs routinely, hiring custom work, or simply working longer hours.

Special note: Because of the complexity of making long-term enterprise and production system decisions, it will often be necessary to use the whole farm planning procedure discussed in Part I, Chapter 3.

Table 2-3. After-tax internal rate of return for alternative levels of per acre drainage improvement investment and increased income [a, b]

Increase in net cash income per acre	Per acre investment in improved drainage				
	$100	$200	$450	$800	$1,200
	Projected internal rates of return				
$20	13.8	6.5	1.8	0.0	-0.8
40	26.9	13.8	5.6	2.3	0.8
60	39.3	20.5	9.1	4.5	2.3
80	51.7	26.9	12.3	6.5	3.8
120	76.4	39.3	18.3	10.3	6.5

[a] Vernon Eidman, *Minnesota Farmland Drainage and Concerns, Minnesota Agricultural Economist*, No. 688, Spring, 1997, page 7.

[b] Analysis assumes that the investments are depreciated over 15 years using the straight line method and the half-year convention, that the marginal tax rate is 38% (federal, state, and social security), and that the land value in year 20 increases by one-half of the drainage investment.

Implementing, monitoring, and adjusting crop production plans

Since each business situation has its unique characteristics and needs, this discussion of implementing, monitoring, and adjusting crop production plans will necessarily be very general and brief.

Implementing cropping production plans

If revised crop production plans involve only *modest changes*, the implementation process should be fairly simple and straightforward. Probably the most important activity is to monitor the revised system to determine whether the plan is being implemented properly and whether the desired result is being achieved.

If, on the other hand, the plan calls for *major changes* in choice of enterprise or production systems, then the implementation phase or process can become much more complex. It may involve gaining control of necessary resources such as land, labor machinery, and buildings as required. Make planned changes in the kind and sizes of crop enterprises if necessary. The plans made in Part I, Chapters 3 and 4, or earlier in this chapter, should be used to guide the implementation process.

Monitoring and adjusting the crop enterprise/production system

It is critical that the manager decide what key aspects of the plan(s) needs to be monitored on a continuing basis *during the year*, before implementing the *crop-related production plan*. This should result in the development of an information system that will provide measurement of the performance for the key aspects of the plan. The focus here should be on identifying the key items, developing a system to measure them, and establishing standards against which to evaluate performance. Also include a system for monitoring what is happening outside the farm gate. Such happenings may also indicate that a change in the basic plan is in order.

Also establish an information system that permits a careful, detailed analysis at year-end (or at the end of a production period). Again, the system needs to focus on the key aspects and provide for the development of a revised or updated plan for the coming production period or year. See discussion of enterprise analysis, Part I, Chapter 3, of this series for ideas for analyzing production enterprises. This would likely include information about the following:

- Cash transactions, including direct expenses and crop sales.
- Inventories of crops and feed as well as unused crop supplies.
- Production records.
- Machinery operating and overhead costs.
- Labor used and related costs.

Developing grain marketing plans

Crop farmers have long been faced with decisions as to which marketing tool to use, when and where to sell, and in what form. These same decisions must still be made. However, the timing of product pricing and the selection of the most appropriate marketing strategy for a particular situation have taken on new and greater significance.

Grain marketing plans take on various forms and degrees of complexity. The simplest, of course, would be to sell the whole crop at one time such as at harvest, or at the beginning of a new tax year. A more detailed plan would be to sell "X" bushels of grain in each month of the year or over some shorter time period. An even more detailed, yet simple, marketing plan is used by a large

Minnesota grain farmer. He uses two pieces of cost information: cost of production and alternative interest charges on stored grain. He also sets two price triggers; the price at which he wants to sell one-half of the crop and the price at which 100 percent would be sold.

This segment, introduces a more complex planning procedure that involves a four step process; it focuses on a cash sales approach to marketing. Hedging and forward contracts are also discussed.

Steps in developing a grain price/ selling plan—cash sales approach

One proposed method of developing a cash sales approach to a grain marketing plan involves four steps:

Step 1. Estimate the quantity and quality of production to be marketed.
Step 2. Estimate production and cash flow costs using crop budgets.
Step 3. Establish price objectives.
Step 4. Establish scale-up selling plan.

Worksheet 2-2 (page 32) will aid in the planning process. Instructions for completing the worksheet are on pages 30 and 31.

Alternative pricing tools—hedging and forward contracts

This section discusses the possible use of hedging and forward contracts as part of the marketing plan.

Hedging approach—reducing risk

Hedging on the futures market is another method that can be used to price a commodity. Technically, the use of hedging *separates the pricing decision from the decision of how and when to deliver*. Thus, with hedging, the key decisions are when to **place** and **lift** a hedge.

Table 2-4 illustrates the role hedging can play in marketing grain. For example, assume a farmer expects to produce 20,000 bushels of corn. In April, the December corn futures price is $3.80 per bushel. After adjusting this price for an expected 50 cents/bushel difference between the cash price and the futures price (basis) and a commission/interest charge of 10 cents per bushel, the local price would be $3.20.

Since this price is acceptable to the producer, half the crop is "locked in" by selling two 5,000 bushel futures contracts, December option, at the $3.20 adjusted price.

When the 10,000 bushels are sold on the cash market in November at $3.02 per bushel, the December futures contracts are bought back at $3.52, resulting in an 18 cent profit, or an average net price of $3.20 per bushel. Of course, if the cash market price had been higher, say $3.31 per bushel, then the futures market would have been closed out at a loss of about $0.11 per bushel, again resulting in a $3.20 average net price.

Hedging works because cash prices and futures prices tend to fluctuate together. The futures price quotation reflects the price at an acceptable delivery point and time (e.g. December delivery in Chicago). Transportation, storage, carrying charges, and interest are required to deliver a commodity from the local market to the accepted delivery point. These costs are reflected in the basis which is the difference between local cash prices and futures prices.

Because of changing supply and demand conditions, transportation, interest, and storage costs, the basis may fluctuate throughout the crop season so that the perfect hedge illustrated in Table 2-4 will not always occur. But basis fluctuations are typically much smaller than price fluctuations during the year. Therefore, even though hedging does not eliminate all the risk associated with pricing a commodity, it does substitute the fairly small basis risk for the fairly large price risk. *Thus, hedging can be used not only to lock in a profitable price, but also to reduce price risk. However, by reducing downside price risk with a hedging strategy, the possibility of gains from an increase in market prices is also eliminated.*

To use hedging, a capital or cash reserve is required to meet **margin calls**. Margin calls are deposits to restore the margin account or performance bond to its original level after a loss in the futures position has occurred. Consequently, while hedging may reduce price risk, *it may increase financial risk* when margin calls occur and funds are not available to meet these calls.

Table 2-4. Example of using the futures markets to price corn.

Date	Cash market	Futures market
April		Sell two 5,000 bushel futures contracts, December option, at $3.80 ($3.20 equivalent local price)
November	Sell 10,000 bushels at $3.02 per bushel	Buy back two 5,000 bushel futures contracts, December option, at $3.52
Net price	$3.02 per bushel	$0.18 per bushel ($3.80 - [$3.52 + $0.10])
Total price per bushel (cash plus futures market profit) = $3.20		

Various rules can be used to establish hedges. Producers who are hedging their grain should evaluate basis patterns and estimate their cost of production so that they know what price is needed to hedge a profit rather than a loss. Some producers use the periodic or scale-up pricing strategies discussed in the instructions to Worksheet 2-2 in determining when to place hedges in the futures market and when to make cash sales.

Hedging can be used to price products prior to or after harvest for storable commodities. However, if a hedging procedure is used to price a commodity prior to or during the production process, care must be exercised not to price more product than will be produced, since this would put the individual in a speculative position.

When hedging is used, decisions must also be made as to when the hedge will be lifted and when it will be placed. For a true hedge position, the initial position should be offset when the cash commodity is priced. For example, if a November soybean futures contract is sold in May to establish a hedge position and the soybeans are sold for cash in October following harvest, a November contract to liquidate the futures market position should be bought on the same day in October that the beans were sold for cash.

Forward contract approach

In recent years, forward contracting has become increasingly important as a method of pricing commodities, particularly in the grain markets. With a forward contract, one can take advantage of favorable prices that may occur prior to production, or during the production process. Doing so reduces price risks, guarantees a market, and possibly increases the amount of funds that can be borrowed for the production process.

In general, forward contracting has important advantages over hedging. Problems such as potential margin calls, an unstable basis, or the minimum size of contract do not exist with forward contracting. A contract sale is less flexible than hedging, however, because delivery is required on a contract, while a hedge can be lifted at any time. Thus, there may be penalties for non-delivery or the delivery of a different quality of product than specified in the contract. But, this inflexibility may prove to be an advantage in that producers using the hedging approach may get greedy and end up *speculating* rather than reducing price risks.

Several types of forward contracts might be used.[1]

Cash forward contract. Seller contracts to deliver a specified amount and quality of grain to the elevator on a later specified date. Seller is paid a price that is agreed upon when the contract is formed. The price bid for the future date of delivery is determined by the elevator. Buyer deducts an amount (basis) off an upcoming futures contract to determine a bid price. If seller contracts more than is actually produced, elevators *can* force the seller to meet the contract. For example, if a hailstorm wipes out the crop, the seller may have to purchase cash grain to deliver on the contract. Some elevators offer contract clauses that can limit seller's losses on these contracts.

1. Prepared by Erlin Weness, extension educator, University of Minnesota Extension Service, Worthington, MN.*

Price later contract. (Also known as delayed price contracts or no price contracts). Seller delivers grain to an elevator and transfers title to the elevator or buyer. The buyer gives a specified amount of time to price the grain. When seller chooses to price it, seller is paid the price the elevator is paying that day.

Delayed payment contract. Seller delivers the grain and prices it, similar to a cash sale. The contract is with the elevator or buyer to delay the check (payment) until a later date. This is usually done by cash basis taxpayers to defer taxable income to a later tax year. Farmers using the "price later contract" have a financial risk regarding performance by the buyer. Most elevators sell the grain and ship it once they own it or hold title to it. If they are later unable to pay the for it, it may be the seller's loss.

Basis contract. Seller contracts to sell and deliver grain to an elevator at a set basis. The basis is the difference between the cash and futures price on a given day. If the basis contract is to deliver corn in June at a basis of $.20 under the Chicago futures price, the seller will gain if future prices rise and lose if future prices fall. Use a basis contract if future prices are expected to rise and basis to widen. Some elevators will pay most of the money upon delivery of the grain and finish payment when the basis price is contracted.

Hedge to arrive. The seller contracts with the elevator to deliver grain at a designated future's price. If prices rise, the seller doesn't share in it and if prices drop the seller is protected. Seller receives the futures price *less* the basis for the day of pricing. For example, a hedge to arrive contract is set with the elevator for $6.40 July soybeans. In July, seller is paid $6.40 less the basis (difference between July futures price and local cash price) on the day of delivery. If the basis is $.40, seller gets $6.00; if it is $.20, seller get $6.20. If the basis improves (is less) seller captures the basis improvement. *Use a hedge to arrive contract if prices are expect to go down and basis to narrow or improve. Seller can set the basis after entering the contract but before the grain is delivered.* Doing so puts seller into the same position as a cash forward contract.

Minimum price contracts. Seller contracts to deliver a certain quality and quantity of grain. Seller is usually given a time period to price the grain. The contract specifies the minimum price (before quality discounts). The minimum price is determined from the futures market, less a basis amount and a cost for the elevator to purchase a put option on the grain. The minimum price will be less than the elevator's forward contract price of the same month due to the options premium cost. With this contract, seller locks in a guaranteed minimum price while waiting for price improvements later in the season. These contracts are used to take advantage of the current price, but chances are good for even stronger prices ahead.

A note of caution: In any forward pricing technique, once title is passed to the buyer, the seller has financial risk if a check has not been issued. The security of a forward contract is *not* as secure as a warehouse receipt. If seller holds a warehouse receipt, seller holds title to the grain. If an elevator subsequently files bankruptcy, a warehouse receipt receives a higher priority for payment than other contracts, such as a forward contract.

Develop a schedule for selling grain

Finally, develop a projected grain sales transactions schedule, using a worksheet such as that provided in Worksheet 2-3 (pages 33 and 34).

Implementing, monitoring, and adjusting the marketing plan

Once the marketing plan is in place, establish the following processes:

- How to manage information about happenings in the grain markets.
- How sales transactions are to be recorded.
- How adjustments in marketing plans are to be made.

Managing information flow relative to grain markets

Grain markets are in a constant state of flux. Thus, a manager needs to establish a system for tracking these markets. This may be a system on a computer to monitor markets and happenings on a minute by minute basis, or a market service mailing that may come once a week. Be sure to develop a system that reflects the complexity of the marketing plan and the manager's interests and abilities in the marketing area.

Recording and analyzing sales transactions

Another important component of a marketing system is the recording of product sales or transactions as they occur. The format used in Worksheet 2-3, on pages 33 and 34, should prove helpful in developing such a recording system and for analyzing situations as the marketing season progresses.

Adjusting the marketing plan—some options

As part of the marketing plan, one may want to develop some rules to be followed as markets and/or situations change. This might include a set of "what if" scenarios or actions to be taken relative to possible changes. It might also include contingency plans.

Instructions to Worksheet 2-1—Developing a crop enterprise budget

Step 1. Estimate gross returns per acre

The **yield per acre** should be the yield expected under normal weather conditions, the soil types involved and the production inputs and practices that will be used. If the land is share rented, only the farm operator's share of the crop should be shown. A unit price must then be estimated and multiplied times the expected yield, to determine the crop's value per acre.

These prices should be realistic estimates based on past trends and one's current expectations. It is also important that these prices are set relative to other crop budgets the manager develops. Include other crop income, such as government program payments and the sale of straw.

Step 2. Estimate direct costs per acre.

Expenses are usually divided into two categories: direct and overhead expenses.

Direct expenses are the **variable costs** associated with a given crop enterprise. These costs normally vary with the production practices used and/or the desired yield for a given enterprise. They include seed, fertilizer, chemicals, fuel, repairs, drying and hauling costs, custom hiring, seasonal hired labor, and other cash expenses, such as crop insurance and interest on direct expenses.

These expenses can be estimated from farm records and/or be based on actual cost of purchased inputs and custom hire. For share-leased land, only the farm operator's share of expenses should be included in the enterprise budget. Develop budgets for both the owned/cash rented land and the share-lease situation.

Step 3. Calculate returns over direct costs

The difference between the gross **returns per acre and direct costs per acre** is the

return over direct costs/acre (often called the gross margin; see line 3 in the worksheet). This indicates how much the enterprise will contribute toward covering overhead costs relative to the profitability of the business.

Step 4. Calculate and allocate overhead costs

Overhead costs are in fact, the **fixed costs** associated with a given cropping enterprise. They include the costs associated with items such as machinery, equipment, facilities, land, and family/regular hired labor. They are commonly thought of as being incurred whether the crop is grown or not. However, there is often an **opportunity cost** associated with these items. For example, the land could be rented out and the machinery could be used on another crop or another farm doing custom work. Another difficulty is in allocating these ownership costs among the various crop enterprises.

To estimate the overall profitability of an enterprise, first estimate the total overhead costs of these fixed items and then allocate the total amount of these costs among the crop enterprises. The following overhead costs should be included in an enterprise budget:

- **Machinery** and equipment depreciation, interest on the average value of the machinery, and insurance costs on the machines should be determined and a portion allocated to each crop.

- **The land charge** varies with the situation. The land charge for land that is *owned* should be based on the opportunity cost of its use. That is, what would it return before the payment of real estate taxes if it were leased to another producer. If the land is cash rented, the land charge is the cash payment. If the land is crop shared, then there is no land charge, as the landowner is receiving a share of the crop as payment for the use of the land.

- **Buildings and facilities**. Appropriate depreciation, interest, repair, taxes, and insurance costs should be estimated for the buildings and facilities used to shelter machinery, to store harvested crops, and so forth. Check estimated costs against building rents in the community. Machinery and grain storage rents are usually higher than other outbuildings. These other outbuildings usually rent for less than calculated ownership costs.

- **Operator, family, and regular hired labor**. The hours of operator, unpaid family, and regular hired labor used should be a blend of the cost of the hired labor and the going rate for other hired labor.

- **General overhead**. Costs should include the farm's share of utilities, accounting and other fees, general insurance, and office expenses. These expenses can be allocated among enterprises based on their relative total revenue or total expenses.

Next, total these allocated overhead costs for the crop (line 4) and divide the total by the acres of the crop grown (line 5).

Step 5. Calculate total costs and returns over total costs.

First, calculate the total of all costs (line 7) for the enterprise by adding together the total direct (variable) costs (line 2) and overhead (fixed) costs (line 4). Subtracting these total costs from the gross return per acre for the enterprise (line 1), the resultant amount can be referred to as a **return over total costs** or the **return to management** (line 8).

Developing a complete budget like this for each cropping enterprise, enables one to determine the relative profitability of these enterprises at a given point in time.

Worksheet 2-1. Crop enterprise budget format.

Crop_____

Gross return

Item	Example	Base plan	Alt. #1	Alt. #2
Yield per acre	140			
Price per unit	$2.25			
Value per acre	$315			
Other crop income per acre	$35			
Gross return per acre	(1) $350	$	$	$

Direct costs per acre

Item	Example	Base plan	Alt. #1	Alt. #2
Seed	$23	$	$	$
Fertilizer	26			
Crop chemicals	25			
Crop insurance/loss charge	10			
Fuel and oil	11			
Repairs	21			
Custom hire	0			
Seasonal hired labor	0			
Drying costs	13			
Marketing charge	0			
Operating interest	5			
_____	___			
_____	___			
Total direct costs per acre	(2) $134	$	$	$
Return over direct cost per acre (1 -2)	(3) $216	$	$	$

Allocated overhead; total and per acre

Total overhead to crop	Example	Base plan	Alt. #1	Alt. #2
Machinery depreciation	$3000	$	$	$
Interest on mach. invest/ins	1,800			
Buildings and facilities charge, Taxes and insurance.	1,500			
Land interest charge	7,000			
Family and hired labor	2,500			
General overhead	500			
Total overhead to crop	(4) $16,300	$	$	$
Acres of crop grown	(5) 100			
Total overhead costs/acre (4 ÷ 5)	(6) $163	$	$	$
Total of all costs/acres (2 +6)	(7) $297	$	$	$
Return over total costs/acre (1 -7)	(8) $53	$	$	$

Instructions to Worksheet 2-2—Developing a grain pricing/selling plan

Step 1. Estimate the quantity and quality of product.

The marketing plan must be integrated with the production plan if a realistic marketing plan is to be developed. Often, production information needs to be estimated even before planting begins. Estimate the volume of the various products to be marketed and the schedule of their availability for sale. The likely quality of the products needs to be estimated, since quality can affect the choice of market and/or the price that can be expected.

Step 2. Estimate production/cash flow costs using the crop budgets.

The information developed earlier in the form of crop enterprise budgets should also be utilized in developing the marketing plan. They can be used in two ways. First, the **estimated total cost of production**, including both overhead and direct costs, is essential to implement a marketing plan where the goal is to generate a specific profit per unit of production or rate of return on investment.

A second approach is to estimate the **cash flow costs** associated with the enterprise. These costs represent the cash flow requirements of producing a particular commodity. They may be higher or lower than the estimated total costs, depending on one's financial and land tenure situation. For example, a corn producer who cash rents land and has a sizable debt obligation against machinery and operating costs may well have cash flow costs higher than estimated overhead and direct costs.

Step 3. Establish average and price range objectives.

Stage 1. Estimate expected price (averages and ranges).

Determine the USDA or a private marketing service estimate of the **season's average price**. To determine the expected **range in prices**, secure a futures contract price chart to obtain the range of price movements. Then calculate expected price range as follows:

USDA midpoint price	$ _____
Less ½ futures price range ..	$ _____
Equals expected low price ...	$ _____
USDA midpoint range	$ _____
Plus ½ futures price range ..	$ _____
Equal expected high price ...	$ _____

Stage 2. Establish sales price objectives (average and range).

With these expected prices as a guide, establish sales objectives for the crop. If one is prepared to make full use of the tools available, one can shoot for the top 33 to 40 percent of the expected price range as calculated above. For example, if the expected price range is projected to be $2.25 to $2.85 per bushel of corn. The upper one-third of this range would be $2.65 to $2.85 ($2.85 - $2.25 = $.60 ÷ 3 = $.20). The average sales price objective would be $2.75 per bushel ($2.65 + $2.85 = $5.50 ÷ 2 = $2.75).

Step 4. Establish the scale-up selling plan

To evaluate opportunities for cash sales of storable commodities such as grains, compare expected patterns in grain prices to the carrying costs of storage. Although storage is not always the best option (e.g. in a short crop year, early seasonal prices may be the highest) in a large majority of cases the higher prices received after the harvest will more than compensate for the cost of storage–at least the direct costs of storage.

It is estimated that two-thirds of farm grains are sold in the bottom third of the seasonal price range each year. Thus, if one sells grain in the top third of the market, that is doing extremely well. In the Step 3 example, the top third of the expected market price was $2.65 to $2.85. With this range in place, it becomes much easier to pull the trigger in making the pricing decision.

A good approach is to simply "scale-up" sales within this range.

For example, based upon the price range available, one might set up pricing triggers as follows:

- $2.65 to $2.70–Price first 20 percent of the crop.
- $2.70 to $2.75–Price next 20 percent for total of 40 percent of the crop.
- $2.75 to $2.80–Price next 20 percent for total of 60 percent of the crop.
- $2.80 to $2.85–Price next 20 percent for total of 80 percent of the crop.
- The remaining 20 percent of the crop could be held for sale during a possible late-season rally.

Remember, this is just an illustration. One may decide to sell more than 40 percent of the crop when prices have reached the $2.65 to $2.75 range. One may even use specific calendar dates rather than specific price levels to trigger sales.

Worksheet 2-2. Developing grain pricing/selling plan

Step 1. Estimate quantity and quality to be sold.

Crop_____

Number of acres _____

Estimated yield/acre _____ bushels

(a) Estimated production		bushels
(b) Beginning inventory		bushels
(c) Total supply (a+b)		bushels
(d) Usage on farm		bushels
(e) Ending carryover		bushels
(f) Total used/carryover (d+e)		bushels
(g) Marketable surplus (c-f)		bushels

Step 2. Project production and cash flow costs. (see crop enterprise budget in Worksheet 2-1)

	Production costs			Cash flow costs		
Costs	**Total**	**Acre**	**Bushel**	**Total**	**Acre**	**Bushel**
Direct	$_____	$_____	$_____	$_____	$_____	$_____
Overhead	$_____	$_____	$_____	$ XXXX	$ XXXX	$ XXXX
Debt service	XXXX	XXXX	XXXX	_____	_____	_____
Total cost	$_____	$_____	$_____	$_____	$_____	$_____

Step 3. Establish sales price objectives—average and price range.

Expected season average $_____/bu Expected range $_____/bu to $_____/bu

Personal sales price objective $_____/bu Selling range $_____/bu to $_____/bu

■ **Estimate expected average and price range**

U.S.D.A. est. average price (1) $_____

Less 1/2 future price range (2) $_____

Equals estimate low price (1-2) (3) $_____

Plus 1/2 future price range (4) $_____

Equals estimate high price (1+4) (5) $_____

■ **Your sales price objective**

Projected average sales price $_____

Projected sale price range $_____ to $_____

Step 4. Establish scale-up selling plan.

	Price target	Bushels to be sold	Gross sales
First 20%	$_____/bu	_____	$_____
Next 20%	$_____/bu	_____	$_____
Next 20%	$_____/bu	_____	$_____
Next 20%	$_____/bu	_____	$_____
Last 20%	$_____/bu	_____	$_____
Total		_____	$_____

Average sale price expected $_____/bu

Worksheet 2-3. Grain sales schedule using cash, forward contracting, and hedging methods.

Crop_____

Projected marketable surplus	
Beginning carryover	
Production	
(1) Total	
Usage on farm	
Ending carryover	
(2) Total	
Marketable surplus (1-2)	

Unhedged cash sales

Month	Quantity	Price/ unit ($)	Gross sales	Del. loc
Jan				
Feb				
Mar				
Apr				
May				
Jun				
Jul				
Aug				
Sep				
Oct				
Nov				
Dec				
Total		XXX		

Forward contract sales

Month	Quantity	Price/ unit ($)	Gross sales	Date contracted	Del. loc.
Jan					
Feb					
Mar					
Apr					
May					
Jun					
Jul					
Aug					
Sep					
Oct					
Nov					
Dec					
Total					

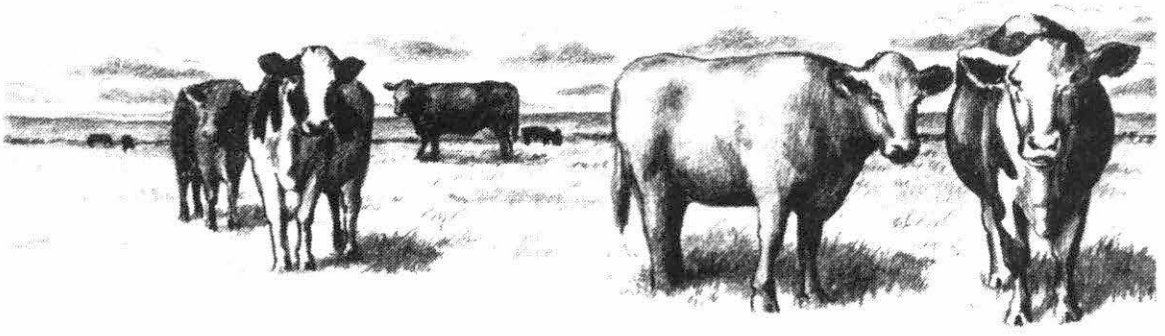
Hedged sales

Month	Quantity	Contract month	Month sold	Price/ unit ($)	Expected Basis	Net price/ unit ($)	Gross sales
Jan							
Feb							
Mar							
Apr							
May							
Jun							
Jul							
Aug							
Sep							
Oct							
Nov							
Dec							
Total							

Managing livestock enterprise/ systems

3

- Developing livestock enterprise budgets—a base plan
- Making short-term livestock-related decisions
- Developing livestock market pricing plans
- Making long-term livestock-related decisions/plans
- Implementing, monitoring, and adjusting livestock plans



This chapter focuses on managing livestock enterprises and related systems. First, the process of developing a livestock budget is described, then the making of selected short-term decisions and the development of a marketing plan. Since making long-term livestock decisions is often quite complex, this aspect is discussed only briefly, making reference to planning considerations and procedures covered in Part I of this series. This chapter concludes with a brief discussion of the process of implementing, monitoring, and adjusting the resultant livestock plans.

Developing livestock enterprise budgets—a base plan

Although budgets for livestock enterprises follow the same general format as crop enterprises (Chapter 2), there are some differences (Worksheet 3-1, page 45). With livestock enterprises, the unit of analysis varies depending on the enterprise. For example, a swine enterprise budget might be prepared on a per sow or per litter basis; the dairy enterprise budget may be on a per cow basis or per cow and replacement basis. It is important to determine the unit and make it a part of the worksheet heading for the budget. Other differences may include multiple products, such as a dairy budget would include milk, calf, and cull cow sales. Farm-produced inputs such as feed are often used in the production process and thus must be valued and charged to the livestock enterprise.

Past farm records, if available, are a good source of data for estimating production levels and inputs used. Typical enterprise budgets may be obtained from the local county extension service and from other public and private sources. These budgets can be helpful when developing one's own livestock budgets, but they do need to be adapted to the specific farm and one's personal expectations regarding the future. Preparing livestock enterprise budgets requires a

working knowledge of production and cost relationships (Chapter 1) and an understanding of the production process.

Enterprise budgets can be formatted in several different ways. One approach is illustrated in the example in Worksheet 3-1.

From a decision making standpoint, it would work well to develop the initial budget based on your present production system. Then use either a partial budget or a revised enterprise budget to reflect the impact of various proposed changes on profits and cash flows. The following is a brief outline of the steps involved in developing a livestock enterprise budget, using a procedure like the one shown in Worksheet 3-1.

Step 1. Estimate production levels, prices, and revenues.
Step 2. Estimate direct costs.
Step 3. Estimate overhead costs.
Step 4. Calculate total costs.
Step 5. Calculate selected net return measures.

Making short-term livestock-related decisions

This segment focuses on using enterprise budgets and partial budgeting in making short-term livestock-related decisions. Making decisions involving variable inputs is first discussed, followed by a discussion of making decisions involving breeding stock offspring and livestock finishing operations.

Making variable input use decisions

Feed makes up a major cost for most livestock enterprises. The principles of nutrition interact with economic forces to determine the most profitable rate or level of feeding and the composition of the ration. The making of both of these decisions is briefly discussed. But first, review the section on production relationships discussed in Chapter 1.

Making feed ration decisions

Here, the goal is to determine whether the ration is the least cost way of supplying the nutrients the animals need. To make such an analysis, the nutrient composition of the feeds and the nutrient requirements of the animal must be specified. Once this information is known, the manager can proceed to determine the combination of feeds that would provide the least cost ration.

The tools used in this analysis can range from the old Phillips Square, which merely shows the combination of a given set of feeds that would best meet the animal's **nutritional needs**; to one involving the use of linear programming, which considers the physical needs of the animal, the nutritional content, and the cost of the various feeds in arriving at a **least cost ration**. Many feed companies provide such a service, and increasing numbers of farmers use their own personal computers in making their own ration decisions.

Determining the most profitable level of feeding

Another major feed-related decision is how much feed should be fed to reach the most profitable level of production. To make this analysis, estimate the likely production response to various levels of feeding, the estimated prices of the feeds, and the final product.

Making decisions involving breeding stock offspring

With breeding stock operations, the manager is often faced with a very short-term decision of whether to sell or hold younger animals, and a more long-term decision of whether to sell or feed them out. The following are some factors to consider when making these decisions.

To sell or hold?

Here, one is deciding whether to sell now or later. Of course, a key question is what is

likely to happen to market prices over the next few days, weeks, or months? Part of the marketing strategy of hog and cattle producers should be to market animals later during the uptrend phase of a price cycle and market earlier in the downtrend phase.

Of course, the decision of how long to hold livestock depends on the actual price level, weight and grade premiums or discounts, the cost of gain, and the likely seasonal or short-term price pattern.

To sell or feed out?

The farmer/rancher may also have to decide whether to sell calves in the fall or overwinter them and sell in the spring. Similarly, the hog producer may be faced with the decision of whether to sell the pigs as feeder pigs or to feed them out to market weight.

This, of course, is both a production and a marketing question. First, budget the costs associated with overwintering of calves or feeding out of hogs. This would include feed, veterinary, utilities, repair, labor, and potential death loss. Another major factor is what prices might be like when one plans to sell. This is obviously a partial budgeting decision (see Chapter 1). One may also want to consider forward contracting or hedging to reduce potential price risks (see the "when to price" discussion in the next segment).

Making decisions involving finishing operations

A farmer faces marketing decisions whether buying or selling. But, to decide whether to buy and/or sell, the producer must also estimate the likely feedlot costs involved. Here, the producer can use either hand or computerized budgeting procedures. Choose procedures that show the sensitivity of profits and/or cash flows to changes in purchase prices, sale prices, and changes in feed costs. With cattle feeding, the producer may also want to consider the profitability of feeding calves or yearlings. There are computer programs available to estimate profitability of these alternatives.

Decisions also must be made as to how many to feed and when. These decisions must take into account the capacity of facilities, the feed supply, labor availability, and likely price patterns when the animals would be ready for sale.

Developing livestock market pricing plans

Today, most livestock producers realize that their marketing decisions can make the difference between profit or loss. There are four basic marketing decisions to make:

1. What to market.
2. Where to market.
3. What price level to market at.
4. When to price the product.

The discussion in the preceding segment of this chapter focused on what to market. The decision of where to market depends heavily on market outlets in the area.

The following discussion addresses the other two key pricing decisions: (1) what price level to market at and (2) when to price. Since these decisions often are interrelated, they are discussed together.

As one begins developing a price decision model, it is important to recognize that pricing decisions need to take into account four interrelated factors:

1. Production schedule and volume to be produced.
2. Financial condition, goals, and needs of the livestock enterprise.
3. Attitude of the livestock producer regarding risk-taking and the ability to assume it.
4. Economic conditions of the market.

Perhaps the most important step in developing a pricing plan is to use a decision model, which triggers action. Egertson[1] and others suggest that a pricing decision model should be made up of three major components:

1. Some decision criteria.
2. A way to place relative weights of importance on these criteria.
3. A set of decision rules based on these criteria.

Each of these components will now be discussed, referring as appropriate to Worksheet 3-2 on pages 46 and 47.

Explore various decision criteria

Criteria for making a pricing decision can come from three sources:

1. The financial conditions and cash flow needs of the enterprise.
2. Contract and cash pricing opportunities.
3. The result of analyzing technical conditions in the market.

Criterion 1. Financial conditions and cash flow needs of the enterprise.

A useful criterion, which should be weighted into any pricing decision, is the financial needs or cash flow requirements of the enterprise. More than one cash flow level should be specified. These cash flow needs may range from some minimum level needed to just cover operating expenses, to one that meets scheduled debt payments, any needed or desired increases in family living expenses, and/or a major business expansion. Step 1 of Worksheet 3-2 (can be used to estimate the price levels required to meet cash flow needs.

Criterion 2. Contract and cash pricing opportunities.

Contract and cash price prospects and probabilities are the next criteria to be explored. There are at least three alternatives to consider:

1. Should the producer enter into a forward contract with a meat packer or commission firm?
2. Should the producer hedge the livestock, using a futures market contract or option and assume basis risks?
3. Should the producer wait to price in the cash market at the time the livestock is delivered to market?

Many large-scale swine operations have contractual arrangements that extend over multi-year periods. Many of these use option strategies involving "windows" to stabilize price. This type of strategy involves both contributions and withdrawals of premiums to maintain price levels.

In order to make a sound pricing decision consistent with stated financial goals, livestock producers need to be able to place some odds on what might happen to the future's basis or to cash prices. This might involve setting the expected highs and lows and the most likely price. Step 2 in Worksheet 3-2 can be used to estimate the expected price under various assumptions relative to expected basis and cash price levels.

Criterion 3. Results of technical analysis.

In addition to using enterprise financial and fundamental outlook criteria (Criteria 1 and 2) as a basis for pricing decisions, the manager may want to use the technical analysis approach. Technical analysis focuses on price movements and patterns as a source of price signals. These patterns include trends, cycles, seasonal price patterns, and short-term price patterns. They can be useful in making price predictions, in calculating odds, or as buy-sell signals in the market.

Placing weights on criteria

The next step is to decide how much weight to place on each of the criteria mentioned previously. This is an individual decision. Some producers will want to place more weight on pricing when a contract tends to cover a selected threshold price.

1. This market management discussion approach is adapted after one developed by Professors Kenneth E. Egerston, Paul R. Hasbargan, Earl I. Fuller and Hal Everett of the University of Minnesota and published in a marketing study letter series in 1983.

Others will want to take a riskier approach and wait for the market price to rise as perhaps suggested by technical signals.

Regardless of the weighting process, all decision makers need something against which to measure the various criteria. The approach described here uses the current contract prices available from meat packers or commission firms as the measuring stick. In other words, this question is always asked: how do the current contract prices compare with the level of cash flow needs, outlook predictions, and technical signals?

Table 3-1 exemplifies one approach. In criterion A: current contract prices versus cash flow needs of the enterprise, the livestock producer has assigned the following criteria factors and weights as influenced by the degree to which the criteria relate to the current contract price. A weight of 1 is assigned to a situation where the contract price is well below the threshold price, a weight of 5 if well over that price.

Similar criteria factors and weights are developed for B in comparing current contract prices versus outlook prices with weights of 1 through 4 serving as decision making criteria.

Category C, as it relates to current pricing opportunities versus rank according to signals from technical analysis, has in this example three weights relating to upward, stable, or downward trends in charting the markets.

As was mentioned before, individual livestock producers can leave out certain criteria or assign different weights to each. For example, a producer who has no experience in technical analysis can still develop a marketing plan by using only the first two criteria and by leaving out technical analysis entirely.

Develop decision rules

Perhaps the most difficult step in pricing is to take specific action on pricing. The problem is generally associated with the failure to lay out some definite decision rules based on the weighted criteria developed in the previous section.

Table 3-2 provides an example of a pricing tool that might be used. In the left hand column are some possible pricing options. With the criteria weights of Table 3-1, the producer next enters the weighted scores for each pricing option and combination of criteria.

For example, suppose a livestock producer used the weighted criteria calculated in Table 3-1, but only used criterion A in the first column (a comparison of the current contract price with needed threshold prices) as a basis for developing a pricing rule. If this aggregate sum of the weights of factors in criterion A is 1 or 2, meaning that the contract price is below a given threshold price, this livestock producer would do no contract pricing. If the weights summed to 3, meaning that the contract price is equal to the objective threshold price, the producer would decide that some pricing should be done. If the weighted score is 4, meaning that the contract price is above the objective threshold price, a decision could be made to scale up pricing in that period. If the score is 5, the producer would decide to price everything at this time for later delivery.

Now suppose another livestock producer uses both the cash flow needs criteria of the enterprise (A) plus some outlook predictions (B) as criteria for developing a pricing decision rule. The procedure is the same as that outlined for the first farmer, but the weighted

Table 3-1. Three criteria statements and the weights that might be assigned to each.

A. Current contract price vs. cash flow needs	B. Current contract price vs. outlook	C. Current contract price vs. technical signals
WGT contract price is:	**WGT contract price is:**	**WGT contract price is:**
1. Much below (5%) threshold	1. Much below outlook price	1. Short-term uptrend
2. Some below (5%) threshold	2. Mod below outlook price	2. Sideways trend
3. Equal to threshold	3. About equal to outlook	3. Short-term downtrend
4. Mod. over (2-3%) threshold	4. Mod above outlook price	
5. Well over (5%) threshold		

Table 3-2. Developing pricing decision rules.

Pricing options	Criteria and resultant weight		
	A	A + B	A + B + C
No forward pricing	1-2	2-5	3-7
Price some production	3	6	8
Scale up amt. priced	4	6	9-10
Price remaining production	5	9	11-12

sums are different. For example, if the aggregate sum of criteria factor weights in the table are between 2 and 5, no forward pricing is done. An aggregate score of 6 would elicit some pricing and so on to a point where a total score of 9 would trigger complete output pricing.

Now, suppose a livestock producer uses the A, B plus C, which includes technical analysis. The aggregate sum to trigger pricing action would be greater than where only criteria A and B were used, in this case at least a score of 8. The trigger pricing sums would be as shown in Table 3-2. *By using a decision rule model such as this, producers can take definite actions: whether to forward contract, use a futures hedge, or use the cash market.*

Making long-term livestock-related decisions/plans

Making long-term changes may involve changes in enterprise and/or production systems. Two related topics: the leasing of breeding stock and the use of production contracts also will be discussed.

Making long-term changes in enterprises

In contrast to crop production, for most livestock-oriented businesses, a change in enterprises or enterprise mix is a complex, long-term decision. Therefore, if considering such a change, refer to Part I, Chapter 3, where enterprise selection guidelines and analysis using the FINLRB, long-range planning procedure are discussed in some detail.

Making long-term changes in a production system

One of the more important long-term decisions to be made in livestock production is often the selection of the **production system**. This involves consideration of the combination of buildings, equipment, and labor practices used to house, feed, and care for livestock. A given production system can have a significant long-term impact on the farm's capital investment, operating expenses, labor requirements, and level of production.

Assessing the trade-off of capital and labor

Because of the high capital and labor requirements associated with some animal enterprises such as dairy and hogs, farm managers need to know the capital and labor trade-off for various production systems. There are two ways to use labor more efficiently: (1) making it more productive without increasing capital outlays appreciably. (This would likely involve simplifying the chores to be performed or making it easier to physically do the chores) and (2) combining labor with the proper amount of capital in the form of labor-saving equipment.

The number of systems available and their differences in labor efficiency and capital requirements complicate selecting the optimal production system. In deciding on the best system, the manager will want to substitute capital (increased mechanization) for labor as long as the labor savings are sufficient to pay for the use of the added capital. If the systems vary as to production response of the livestock, this must be factored in as well.

Determining the proper amount of capital to combine with labor is relatively simple when output or the size of the enterprise remains unchanged. Use the partial budget and/or capital budgeting procedure to evaluate alternative housing equipment systems. (See "Related planning tools," Chapter 1).

Making more substantial changes in livestock buildings and facilities—A brief look

Before erecting or remodeling any building, determine what impact the change will have on the profitability and financial soundness of the business. The following are some issues to be addressed in making changes.

Determine the impact of building investment on profitability. Since buildings represent only an additional cost of doing business, it is important to determine their overall impact on profitability. To do this, use either a partial budget or whole farm budget. Some of the alternatives you might look at include: (1) whether to remodel, add on, or build new; (2) deciding which system or type of facility would be best; and (3) how large a building to build. The more complex the change being considered, the more likely one will have to resort to whole farm budgeting to determine its impact on profitability. (Part I, Chapter 3).

Determine the impact of a building investment on financial soundness. Investments in buildings tend to affect liquidity and solvency positions adversely. In the case of **liquidity**, to merely compare two types of equipment or facilities, use either a partial budgeting procedure that includes a repayment capacity analysis, or use the capital budgeting procedure. However, the larger and more complex the change, the more necessary it is to rely on whole farm budgeting and the use of cash flow budgets over a three- to five-year period. (See Part I, Chapters 3 and 4).

The most telling impact of a building investment is likely to be on **solvency**. Once the building is in place, its likely market value is considerably less than the cost of putting it there. This is due in large part to the fact that buildings are costly to move, and building rents are typically much lower than the actual overhead costs involved. (See "Lost capital" discussion, Chapter 3, Part I).

Financing building investments. Small to moderate changes in building investments are often put on a separate note, with the note secured by a second mortgage on existing land and buildings. More substantial changes will likely require at least some refinancing of long-term loans presently in place. Obviously, it is important to have financing in place before signing any building contracts, etc. One thing a lender does not appreciate is surprises. Since buildings represent a potential financial drain on a business, well thought out plans should be in place before approaching a lender.

Many times, however, the introduction of a new production system will affect the amount of output, which has a ripple effect across the whole business. In these instances, one should resort to the whole farm budgeting system (Part I, Chapters 3 and 4). The partial budget or capital budgeting procedures may prove helpful in analyzing various aspects of systems within the proposed change, but the whole farm approach will provide a more complete picture of the proposed system change.

As part of this overall change, a manager needs to carefully explore environmental rules and zoning laws and regulations. This aspect is becoming increasingly complex and critical as size and technology dominate the economic side of a farm business.

Projecting labor needs. The amount and kind of labor required varies considerably with the production system employed and the volume produced. Therefore, it is necessary to project the amount and kind of labor required by the livestock systems. The labor required will also vary with the amount and kinds of crops grown for feed and for sale. Compare labor projections with the labor available during the year. Use the worksheets contained in Chapter 4 Part IV, for estimating labor requirements. Also, review the section on planning labor needs, found in that chapter.

Breeding stock lease arrangements—a brief look

On occasion, beef and dairy cows are owned by outside investors or retiring farmers who leased the animals to farm operators. This approach reduces the amount of non-real estate capital a farm operator would need in developing a livestock operation. This segment discusses briefly how to assess a lease for fairness and profitability and explains how to develop a lease agreement.

Is the lease profitable and fair?

Developing a fair breeding stock lease arrangement involves a two step process. First, one will need to determine the value of the contributions of the livestock owner and the farm operator. Second, determine how income is to be shared, including how calves are to be owned or divided, etc. Worksheet 3-3 lays out a procedure for developing a dairy cow sharing agreement.

Other considerations; provisions of the lease agreement

A number of other questions must be answered and made part of a written lease agreement. These include the following:

- Who provides the replacements? (Worksheet 3-3, assumes the operator will furnish replacements).
- How are death losses to be accounted for?
- Who decides when cows are to be culled and calves are to be sold?
- Who decides on the production management practices such as feeding, breeding, and housing?
- Will there be any security deposits or replacement costs?

Production contract arrangements—an alternative

To this point the discussion has been along more traditional lines, where the owner/operator develops and finances the production system and may or may not forward contract the production. But, farm operators are resorting increasingly to the use of production contracts with input suppliers and processors and also are forming production groups or cooperatives, where they attend to production aspects while linking up with processors for marketing purposes. These increasingly important arrangements are discussed in Chapter 4.

Implementing, monitoring, and adjusting livestock plans

Since each business situation has its own unique characteristics of implementing, monitoring, and adjusting livestock-related plans, this discussion merely suggests what might need to be done in these critical areas of management.

Implementing livestock plans

If revised livestock production plans involve only **modest changes**, the implementation process should be fairly simple. Probably the most important activity is to monitor the revised system to determine whether the plan is being implemented properly and whether the desired result is being achieved.

However, if plans call for **major changes** in choice of enterprises or production systems, then the implementation phase or process can become much more complex. Use the plans developed in Chapters 3 and 4, Part I of this series or earlier in this chapter to guide this implementation process.

The implementation of major changes in a livestock sector can be complex and requires careful planning. It may involve gaining control of necessary feed and livestock, the building of necessary facilities, etc. In the case of breeding stock, such as dairy and beef cows, the question of whether to buy additional breeding stock, or to grow them, will affect several aspects of the business,

including the amount of money borrowed and the resultant flow of income. Growing into an expansion program can cause major short-term cash flow problems. Both the farm manager and lender should be aware of this at the outset.

Monitoring and adjusting livestock enterprises/production systems

Before implementing revised livestock-related production plans, managaers must decide what key aspects of the plans need to be monitored on a continuing basis during the year. Such analysis should result in the development of an information system that will measure the performance for key aspects of the plans. Focus on identifying the key items, developing a system to measure them, and establishing standards against which to evaluate performance. Also include a system for monitoring relevant happenings outside the farm gate. Such happenings also may dictate that a change in the original plan is in order.

There is also a need for an information system that permits a careful, detailed analysis of the system at the end of a production period, and/or at year's end. Again, the information system needs to focus on the key aspects of the livestock system and provide for the development of a revised or updated plan for the coming production period or year.

Refer to the discussion of enterprise analysis Part I, Chapter 3, of this series. An updated plan would likely include information about the following:

- Cash transactions, including direct expenses and sales.
- Inventories of livestock on hand.
- Production records.
- Overhead costs.
- Labor used and related costs.

Instructions for Worksheet 3-1—Developing livestock enterprise budgets

Step 1. Estimate production levels, prices, and revenues.

To complete the revenue section of a budget, list commodities produced by the enterprise first. In the example, there are three items produced for sale: milk, calves, and cull cows. Indicate the units in which production is measured (in per cwt. or per head), and the quantity of units produced. Multiply the amount produced by the price per unit to get the gross returns expected.

Step 2. Estimate direct costs.

Include here the expenses that vary with the amount produced. To estimate feed costs, first estimate the feed required to produce the units of production noted above. Purchased feed should be valued at expected cost; home raised feed should be valued at its expected opportunity cost, such as its net selling price. Total feed costs at line 2. Other direct expenses include veterinary costs, breeding fees, marketing costs, utilities, machinery operating expense, and building repairs that result from their use. For livestock finishing enterprises, list the cost of feeder pigs and feeder cattle purchased for resale. The hired labor associated with the enterprise can be included here or at line 13 in the example budget (Worksheet 3-1). Total other direct costs at line 3. Interest on operating capital should also be charged to the enterprise (line 4). Total feed and other direct costs at line 5.

Step 3. Allocate overhead costs.

Overhead costs include the ownership costs (depreciation, interest, nonuse-related repairs, taxes, and insurance) associated with the facilities and equipment used by the enterprise. These expenses are normally calculated on the basis of new or replacement cost, salvage value and useful life. If the facilities are to be shared with other

enterprises, then the cost should be prorated according to the amount of use by each enterprise.

The overhead expenses associated with raised breeding stock normally include interest on investment in the animals and insurance. The cost of raising replacement animals is normally included in operating expenses. If replacement-breeding stock is purchased, then a charge for depreciation is included as an ownership expense. The depreciation amount is usually determined by dividing the difference between the cost of the replacement and the expected full sale price of the animal by the number of years the animal will likely be in the herd.

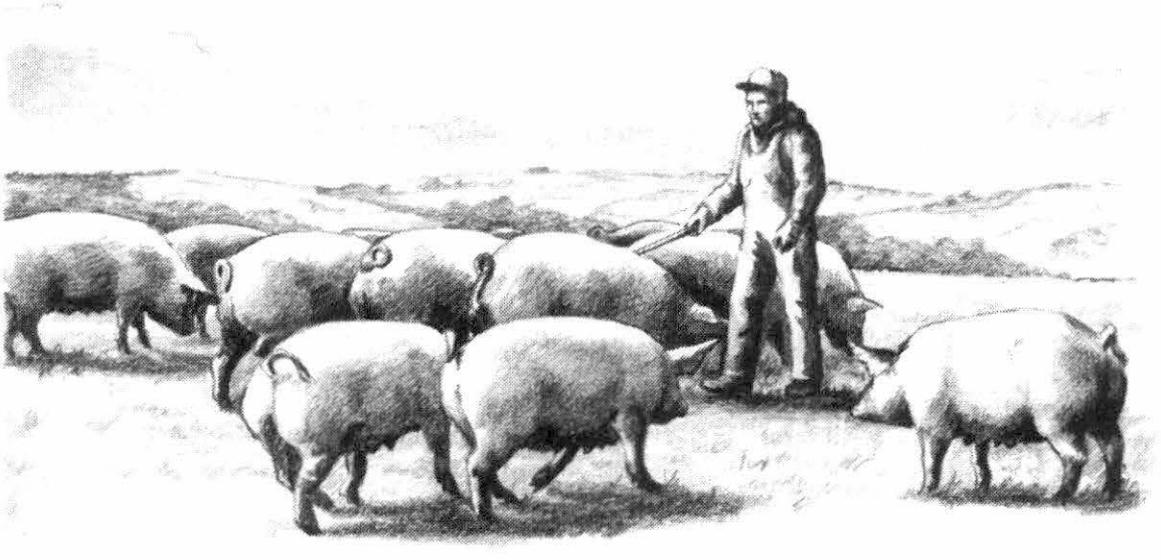
The operator's and the unpaid family labor used in the enterprise should be estimated and valued at its opportunity cost, or the amount that might be earned by using this labor elsewhere. The portion of regular hired labor used by the enterprise should also be included. Total overhead costs at line 6.

Step 4. Calculate total costs.

Total costs are determined by adding together the estimated direct and overhead costs associated with the enterprise (line 7). This figure can be used to calculate the average total cost of producing a unit of production. This calculation is often complicated by the fact that several products may have been produced by that unit of production. A simplistic approach is to subtract the value of these other products from the total cost, then divide the remaining costs by the quantity of production associated with the livestock enterprise unit.

Step 5. Calculate selected net return measures.

Net return measures include return over direct costs (line 10); returns to labor and management (line 12); and returns to management (line 14). These return measures can be calculated on a per head basis (i.e., per cow) or a per unit of production (i.e., per cwt.).



Worksheet 3-1. Developing a livestock enterprise budget (a format for dairy cows without replacement).

I. Estimate production levels, prices, and revenues	Example	Base plan	Alt #	My farm
Milk-20,000 lb. of 3.7% milk @ $11.00/cwt	$2,400.00			
Bull calf and cull heifer sales	90.00			
Cull cow 30% x 1300 lb. @ $45/wt	175.00			
1. Gross income per cow	(1) $2,665.00			

II. Estimate direct costs	Price/unit	Physical amount	Total value		
A. Feed requirements for cow					
Forage	$55/TonHE	6.35THE	$349		
Corn	$2.50 bu	106 bu	265		
Soybean meal (44% C.P.)	$9.00/cwt	1400 lb	126		
Dical (23% Ca-18% P)	$22.00/cwt	145 lb	32		
T.M. salt	$7.00	85 lb	6		
2. Total feed costs			(2) $778		
B. Other direct costs					
Bedding	$40.00/ton	1.23 ton	$49		
Milk hauling	$0.50/cwt	200 cwt	100		
Vet. and med.			43		
Breeding			27		
Power & fuel			65		
Supplies, soap, inflations			30		
Overhead (DHI, legal, accounting, etc)			55		
3. Total other direct costs			(3) $369		
4. Interest on operating capital			(4) 36		
5. Total direct costs (Lines 2+3+4)			(5) $1,183		

III. Allocate overhead costs				
Buildings	$1750 @ 14%	$245		
Equipment	$850 @ 17%	144		
Livestock	$1400 @ 8%	115		
Death Loss	$1400 @ 2%	28		
6. Total overhead costs		$532		

IV. Calculate total costs	(Lines 5 +6)			
(excluding for labor and management)		$1,715		

V. Calculate selected net return measures	per cwt	per cow		
8. Gross income (line 1)	$13.30	$2,665		
9. Less direct costs (line 5)	5.90	1,183		
10. Returns over direct costs (lines 1-5)	$7.40	$1,482		
11. Less overhead costs (line 6)	2.65	532		
12. Returns to labor and mgmt.(line 9-10)	$4.75	$950		
13. Less labor cost 64 hr. @ $5/hr	1.60	320		
14. Returns to management (lines 11-12)	$3.15	$630		

Source: Adapted from R. A. Leuning, W. T. Howard and R.M. Klemme, A2731, Wisconsin Farm Enterprise Budgets - Dairy Cows and Replacements (1987), University of Wisconsin Cooperative Extension Service.

Instructions to Worksheet 3-2—Developing livestock marketing pricing plans

Step 1. Calculate threshold price needed to meet selected cash flow needs and desires.

First, estimate the cash flow needed to cover production costs. These costs should include those listed in the top portion of Worksheet 3-2. It may be easiest to express most of them on a per head basis first and then calculate what the total would be on a per lot basis.

Estimate the cash flow needed to cover existing capital investment costs associated with the enterprise. Then record the cash flow needed to provide a minimum return to operator and family labor. Also, estimate the cash flow needed to maintain family living and/or meet business expansion needs.

Calculate the price needed to cover these selected cash flow needs. The price needed is calculated for three situations described in the previous paragraph.

Step 2. Determine price expectations and associated risk.

Explore pricing options. If forward contracting, insert the contract price that would be available. Since the contract sets the price, there is a 100 percent probability that this will be the price received.

With the futures or hedging contract, record the price quoted for the month contracted. Then subtract the expected basis, to arrive at the most likely price. Also, calculate the lowest futures hedge price expected under a higher basis situation and the highest futures price with a lower than normal basis. Also, subtract the expected basis change on your net cash position. Also, insert expected cash price at delivery (or later contract price) under moderate, low, and high risk assumptions.

Step 3 . Place weights on decision criteria: develop decision rules

With the above information, refer back to the discussion of these two important steps in the segment entitled Developing Your Livestock Market Pricing Plans. Using the decision criteria and weights shown in Table 3-1, complete the table in step 3 of the worksheet. (Use example and discussion of Table 3-2 as a guide in completing step 3.)

The results of this analysis should aid the manager in taking definite action: whether to forward contract, use a futures ledger, or use the cash market approach.

Worksheet 3-2. Developing a livestock market pricing plan.

Step 1. Calculate threshold price needed to meet selected cash flow needs and desires

Estimate cash flow needed to cover production costs.

Item	Per head	Per lot
Feeder animals purchased	_____	$ _____
Feed	_____	_____
Marketing and hauling	_____	_____
Equipment and power	_____	_____
Veterinary and medicine	_____	_____
Interest on invest. & operating capital	_____	_____
Hired labor	_____	_____
Other	_____	_____
Total	_____	(1) $ _____

Worksheet 3-2 (continued). Developing a livestock market pricing plan.

Estimate cash flow needed to cover.

Item	Amount
Existing capital investment cost	(2) $ _____
Minimum return to family labor	(3) $ _____
Maintain family living and/or meet business expansion needs	(4) $ _____

Calculate price needed to cover selected cash flow needs.

Cash flow to cover	Per lot	+	Cwt. to be sold	=	Price needed
Production costs and capital investment costs (lines 1 + 2)	(5) $ _____		_____		_____
Production & investment costs plus minimum return to family labor (lines 1 + 2 + 3)	(6) $ _____		_____		_____
Production & investment costs plus maintain family living and/or business expansion (1 + 2 + 3 + 4)	(7) $ _____		_____		_____

Step 2. Determine price expectations and associated risk

Calculate expected net futures price from hedging with varying basis expectation.

Item	Most likely basis	Widest basis	Narrowest basis
Futures price for month contracted	$ _____	$ _____	$ _____
Less expected basis	$ _____	$ _____	$ _____
Expected net futures price	$ _____	$ _____	$ _____

Summarize expected price information and risk involved.

Pricing method	100% probability	Most likely price/risk	Lowest price/risk	Highest price/risk
Forward price contract	$ _____			
Net price from hedge		$ _____	$ _____	$ _____
Cash price at delivery		$ _____	$ _____	$ _____

Step 3. Place weights on decision criteria; make final price decision.

Criteria and resultant weight*

Pricing options	A	A+B	A+B+C
No forward pricing			
Price some production			
Scale up amount priced			
Price remaining production			

*See tables 3-1 and 3-2 and related discussion (pages 39 and 40.)

Worksheet 3-3. Developing a dairy cow sharing agreement using the contribution approach.

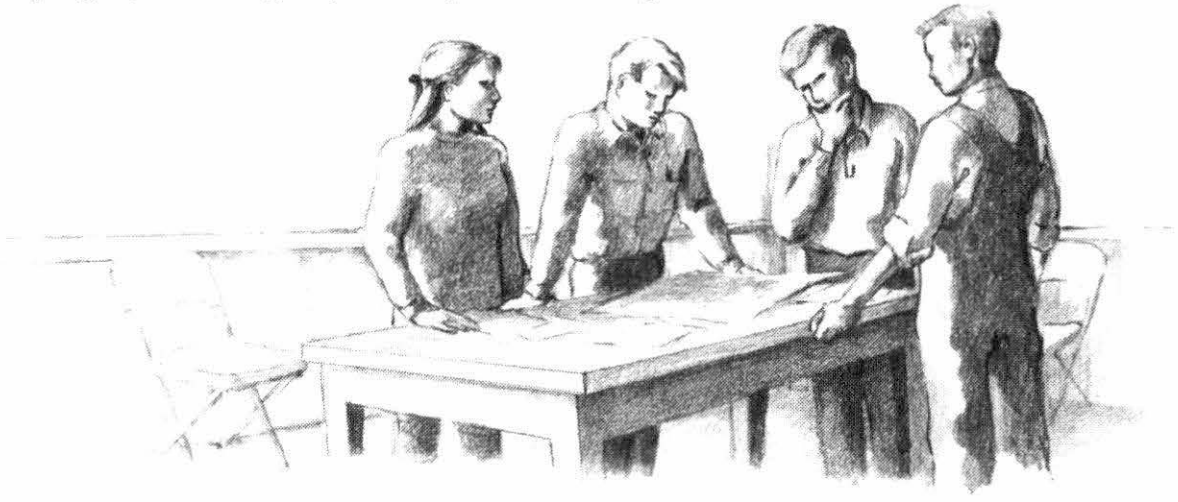
Example: Operator furnishes cow replacements.

Contributions	Example			Your Situation		
	Total costs	Owner costs	Operator costs	Total costs	Owner costs	Operator costs
Cows						
Depreciation	$ 0	$ 0	$ 0			
Interest	40	40				
Insurance	3	3				
Taxes	6	6				
Death loss	3	0	13			
Subtotal	$62	$ 49	$ 13			
Buildings 1						
Depreciation	$ 40		$ 40			
Interest	32		32			
Repairs	8		8			
Taxes and insurance	6		16			
Subtotal	$ 96		$ 96			
Equipment 2						
Depreciation	$ 42		$ 42			
Interest	19		19			
Repairs	15		15			
Taxes and insurance	2		2			
Subtotal	$78		$ 78			
Feed 3						
Corn equivalent	$ 204		$ 204			
Protein	93		93			
Mineral	17		17			
Trace mineral salt	4		4			
Forage	238		238			
Milk replacer	4		4			
Subtotal	$ 560		$ 560			
Livestock Costs 3						
Bedding	$ 45		$ 45			
Vet & medicine	22		22			
Breeding fees	12		12			
Power and fuel	22		22			
D.H.I.A.	6		6			
Supplies	15		15			
Hauling	35		35			
Interest on feed & livestock costs	32		32			
Subtotal	$ 189		$ 189			
Labor	$276		$276			
Total contributions	**$1261**	**$49**	**1212**			
Percent of contributions	**100.00%**	**4.00%**	**96.00%**	%	%	%

Evaluating/developing production contract arrangements

4

- Evaluating supplier/processor contracts with individual producers
- Developing a producer group or cooperative arrangement



This chapter first discusses the process of evaluating supplier/processor contracts with individual producers. It then considers the development of producer groups and cooperatives to increase an individual producer's competitive position.

In the sectors where contract production began, over 90 percent of broilers and over 80 percent of processed vegetables are now produced under contract. But marked increases in the use of production contracts can be observed in the livestock sector as well. For example, between 1980 and 2000, the percentage of hogs produced under production and marketing contracts has increased dramatically.

Because of the rapid changes taking place in the swine industry, hog production is used to illustrate the evaluation and development process of production contracts. *Though the discussion of these arrangements will focus on hog production, the analysis procedures presented are applicable to other farm enterprise situations as well.*

Evaluating supplier/processor contracts with individual producers[1]

In this segment, the advantages and disadvantages of contract production are discussed first. This is followed by a discussion of evaluating the economic and legal aspects of production contracts.

Advantages and disadvantages of contract production

As with any management plan, there are some economic factors that favor contract production as well as some downside risks associated with such arrangements.

Economic factors favoring contract production

Production contracts offer several economic benefits to processors, suppliers, and producers.

Economic benefits for processors/suppliers. One of the key economic factors favoring increased use of production contracts by processors and suppliers is better risk management. This includes lining up supplies,

1. Adapted from: *Preparing and Using Production Contracts* by Christopher R. Kelley, Agricultural Law Update, March 1995, pages 4&5.

better control over product quality, and fostering the use of new technologies. Production contracts also can:

1. Preserve confidentiality of pricing and marketing arrangements.
2. Protect proprietary technologies and processes.
3. Reduce a processor's land, facility, and labor costs.

Economic benefits for producers. Production contracts also offer economic benefits to producers. Relatively few producers process the commodities they produce. Thus, their economic fate is tied to those who find a consumer market for their products. That market is changing across the full spectrum of potential customers. Capturing specific markets is becoming more important than producing commodities in volume. Production contracts improve communication in the various stages of the marketing process, ultimately permitting producers to gain access to otherwise inaccessible markets.

Producers also are concerned with risk management, and production contracts can help manage certain risks. For example, by offering a guaranteed price, production contracts eliminate the risks associated with a volatile open market. Contracts also permit risk reduction through diversification, often at a lower capital cost than would be required without the processor's participation. The assistance the supplier or processor offers in the production process can lower the producer's management costs and improve management skills.

Disadvantages of production contracts

Like any business endeavor, production contracts do have some negative aspects that may affect both the producer and the processor/supplier.

Disadvantages for the producer. Although production contracts reduce some risks for the processor and the producer, new risks can arise. For the producer, the failure to meet contract standards results in loss of the contract's premium prices. Other risks include the contract not being renewed or being terminated, perhaps for non-economic reasons. Some contracts impose unique risks, particularly those involving the construction or maintenance of specialized facilities. Even if the contract relationship continues for a facility's useful life, the income realized under the contract may not be sufficient to replace or improve the facility.

Disadvantages for the processor/supplier. Three broadly defined risks predominate:

Failure to line up supply or the risk of not receiving the desired quantity and quality of the product in a timely fashion. For example, the producer might secretly encumber the product in a third party's favor; fail to care for the product; use substandard animal feed or veterinary products; sell the product at a higher price to another buyer; deliver a substandard or residue-laden product; or simply decide to walk away from the contract. Any one of these happenings could cause the processor to fail to line up supply. (Of course, there could be potentially severe legal consequences for the producer.)

Loss of technological advantage or the risk of losing control over proprietary technology or losing the opportunity to promote the use of a desired technology. For example, the producer might resell or put proprietary products to his or her own use or refuse to adopt processor-desired technologies or production practices, thus causing the processor to lose technological advantage.

Garden variety risks, including the risk of liability to the producer and to third parties. For example, the producer might claim a loss because of reliance on the processor's advice; use a pesticide inconsistent with its labeling; violate applicable labor and environmental laws; injure a worker during the production or marketing process; deny access to processor representatives seeking to inspect the product or production facilities; drive off the highway while delivering the product; assert that the parties' relationship was a partnership, joint venture, or employer/employee

relationship; or do something else detrimental to the processor's interest.

Public scrutiny. Contract production is changing the structure of American agriculture. Production contracts are replacing open, public markets with closed, private markets. With the substitution of private markets, producers lose some of their traditional independence and autonomy. As farms cease to be autonomous operations and become closely allied with processors, they function as operating units of the processor. This transition from autonomy to operating unit has been described as the industrialization of agriculture.

As the basic legal instruments fostering the industrialization of agriculture, production contracts are being closely examined by those who react to changes in agriculture's structure, including legislatures. For example, when the Minnesota legislature looked at production contracting, it decided to dictate some of the contract terms. Minnesota production contracts must now have either an arbitration or mediation clause, and the duty of good faith is an implied term. A breach of this duty can result in the award of attorney's fees to the other party.

Production contracts and the related issue of vertical integration are also drawing attention in other states. This scrutiny is expected to continue. Recognizing that they are operating under the potential for legislative scrutiny, processors must draft and use production contracts to protect their interests without unreasonably interfering with the interests of producers. A balanced approach to the use of production contracts begins with identifying the risks the processor and producer face.

Evaluating the economic aspects of a production contract [2]

Using hog production as an example, the process of evaluating the economic aspects of a production contract includes: (1) identifying the types of contracts available, (2) determining whether a contract will be both profitable and fair, and (3) considering some common risks.

General types of hog production contracts

Investors, feed dealers, farmers, and others are often interested in producing hogs, but are unwilling or unable to provide the necessary labor, facilities, and equipment. Therefore, they seek producers who are willing to furnish the labor and equipment in exchange for a fixed wage and/or a share of the profits. The resulting contracts between owner and producer vary considerably in form and the responsibilities of each party involved. Some producers have also found contract production to be an effective method of expanding their operations without assuming much additional financial risk. These contract arrangements are often attractive to beginning farmers or financially strapped producers who do not have the capital to invest in necessary livestock, and for producers with under-utilized facilities.

Some of the more popular contracts are fixed payment, directed feeding, and profit-share. These contracts are most commonly used for feeder pig production and hog finishing; hog finishing is the most popular use.

Fixed payment. These contracts guarantee the producer a fixed payment per head as well as bonuses and discounts, which are based on performance. Under a guaranteed (fixed) payment contract for finishing hogs, the producer normally provides the buildings and equipment, labor, utilities, and the necessary insurance. The contractor supplies the pigs, feed, veterinary services, medications, and transportation. The contractor would also provide management assistance and be responsible for marketing the finished hogs. The producer will often receive an *in-payment* which is based on the weight of the feeder pigs when they come into the producer's facilities. For example, $5 for a 30-pound pig and $4 for a 40-pound pig. The producer's final payment is based on the pounds of gain multiplied by the negotiated payment rate per pound of gain. Most contracts contain bonuses for keeping death losses low and feed efficiency high along with penalties for high death losses and unmarketable animals.

2. Adapted from: *Producing and Marketing Hogs Under Contract* by John S. McDaniel, Pork Industry Handbook, Purdue University PIH6, undated.

Directed feeding. A cooperative or feed dealer may contract with a producer to finish hogs. The contractor's objectives when entering into a directed feeding contract are to increase feed sales and secure a reliable feed outlet. The contractor provides the feed and some management assistance, and typically directs the feeding program. The contracting firm will often purchase the feeder pigs, in which case profits from the sale of the hogs are shared. Or the firm will help the producer obtain financing to purchase the pigs. The producer agrees to purchase all feed and related services from the contractor and is responsible for all other costs of production. The producer receives all proceeds from the sale of the hogs minus any outstanding balance owed to the contractor.

Profit-share. The producer and contracting firm divide the profit depending upon who provides the majority of inputs and their value (i.e. the division would not have to be 50-50, but could be 60-40 or 70-30). Typically, the producer provides the facilities, labor, utilities, and insurance for his/her portion of the profit. The contracting firm will normally purchase the pigs and is responsible for all feed, veterinary, transportation, and marketing expenses. Over the duration of the contract, the contractor's costs are charged to an account. This account balance is then subtracted from the sale proceeds to determine the profit. The contracting firm will often use its own feed and provide management assistance. The producer is normally guaranteed a minimum amount per head as long as death losses are below a set percentage. For instance, the producer would receive $5/head if death losses were 3 percent or less, and $3/head if death losses were 5 percent. The producer receives this regardless of whether a profit is made. The contractor's return depends upon the profit made on the sale of the hogs and the gain received from the markup on feed, pigs, and supplies provided.

Is the contract profitable and fair?

Through contracting, producers are able to achieve more stable returns, trading the possibility of larger profits for the assurance of a more reliable return. Likewise, many producers enter into contracts because they lack the necessary capital required in hog production. Producing on contract often results in low returns to the parties involved, since the farmer and the contractor must share profits that previously had all gone to the farm operator. Therefore, it is important to first make an economic analysis of the proposed contract. *The question is, is the contract both fair and profitable to the producer*?

To make such an analysis, the producer needs to first estimate costs of production, both the expected variable costs and the fixed costs. Then determine the returns necessary to first cover variable or direct costs and then total costs. Compare these returns to the expected compensation under the contract.

Feeder pig production contracts. Feeder pig production programs come with several options:

Option 1: The producer provides everything but the breeding stock and bids what he/she is willing to produce a feeder pig for. The return is then based on production criteria, such as pigs weaned per litter; dockages and bonuses are based on target levels. Most of the risk is still retained by the producer.

Option 2: A person with contract finishing yards will provide breeding stock, feed, and management assistance and will pay the feeder pig producer a flat fee for each pig. This fee will vary according to pig weight, and current production costs. In this case, most of the risk falls on the person providing breeding stock, feed, and management.

Option 3: The owner provides breeding stock, feed, facilities, and veterinary costs. The manager/operator provides labor, utilities, maintenance, and manure handling. A fee for each pig produced and a monthly fee for each sow and boar maintained is paid to the manager. This option fits an owner who no longer wants

to be actively involved but has a good manager with limited cash willing to take over.

Option 4: This is a shared revenue program. As an example, the producer supplies facilities, veterinary care, utilities, labor, and insurance. The feed dealer provides feed. The breeding stock supplier provides animals. The management firm supplies computerized records and consultations. Negotiated percentage shares should be based upon inputs, services provided, and the risks borne by each participant.

Farrow-to-finish contracts. Currently most farrow-to-finish programs are set up on a percentage to reflect the amount of resources supplied by each person or firm.

Option 1: The producer supplies facilities, labor, veterinary care, utilities, and insurance for an appropriate percentage of gross sales based on input costs. The feed retailer supplies feed, standard feed medications, and receives a predetermined percentage. The capital partner and breeding stock supplier get another percentage. The management firm also receives a percentage for supplying computerized records services and management consultation.

Option 2: The current hog inventory is purchased outright by a limited partnership. The partnership supplies sow replacements. The producer supplies facilities, labor, utilities, veterinary costs, repairs, and manure disposal. The feed retailer provides feed and standard feed medications. A management agency supplies production and marketing guidance. Each of the contract participants receives a percentage of the proceeds when hogs are marketed. A remaining percentage is split between the limited partnership and the general partner for managing the partnership.

Evaluating risk aspects

If the above analysis indicates that the arrangement is both profitable and fair, then consider the risks involved. Refer to "Some disadvantages of production contracts."

The key to feeding or producing hogs under contract is finding the type of contract that will allow each individual producer to profit most from what he/she does best. This may be record keeping, producing with a low mortality rate, or an ability to maximize herd feed efficiency. Whatever the case, producers should make certain that the contract would reward them appropriately for what they do best.

Evaluating the legal aspects of a contract—a checklist

A checklist for evaluating a production contract follows. After the checklist is an example evaluation of a contract.

Production contract checklist[3]

When drafting or reviewing production contracts, it is important that the contract be tailored to the situation at hand, taking into account the legal requirements of the state in which the contract will be used. The contract also should explain clearly the terms of the business relationship, so that it can be read and understood by both the producer and processor or supplier.

The following is a brief checklist of provisions that should be considered for inclusion in a production contract.

Preliminary statements:

- Nature of the contract.
- Date and place of formation.
- Names and addresses of the parties involved.
- Legal relationship of the parties.
- Legal description of the property.
- Purpose of the contract.
- Duration of the contract.

3. Adapted from: *Preparing and Using Production Contracts* by Christopher R. Kelley, Agricultural Law Update, March 1995, pages 5-6.

Production-related aspects include:

- Provisions as to how the crops or livestock are to be grown.
- Production deadlines.
- Guidelines for field or facility inspections by the processor's representatives.
- Title to the crop or livestock, and provision for security interests.
- Provision for crop failure, catastrophic animal losses, and other non-performance situations.

Marketing-related aspects include:

- Date and location of delivery.
- Responsibility for risk of loss and delivery costs.
- When and how the processor's acceptance (or non-acceptance) will occur.

Other general provisions include:

- Required notices.
- Termination.
- Assignment of interest.
- Arbitration or mediation provisions.

In cases where profit sharing is used, the review of business and production records should be provided for.

Evaluating the legal aspects of the contract for hogs—an example

Once the economic analysis is complete, review the wording of the contract carefully. A contract should be thoroughly read and understood before it is signed. Securing the advice of an attorney, lender, or contract specialist is helpful and often necessary when evaluating contracts. *Remember* a contract does not ensure that two parties will continue to work together, but it does provide the basis for settling up once they decide to quit working together.

Evaluating the reputation of the contractor. The relationship of the producer and contractor is generally more complex and interdependent for production contracts than for marketing agreements. Hence, production contracts need to be evaluated with special care. But, before considering the details of a contract, one should first *consider the reputation of the company or individual* with whom the contract is to be made. For instance, How long has the company been in business? What has been the company's financial success? How long has the company offered contracts? Do other producers in the area have contracts with this company? Does the company fulfill the terms of its contracts? What is the company's history in other areas?

The following guidelines for evaluating the legal aspects of a given swine production contract provide a good example of items to be considered.

Contract provisions must:

- Be in written form and must be clear and concise.
- Clearly define the rights and responsibilities of the parties involved.
- Indicate the number of pigs involved, the names of both parties, duration of the contract, the method and timing of payment, and definition of who shall supply certain inputs.

Other possible contract provisions would include:

- The right of the owner to inspect pigs at any time.
- Designation of responsibility for purchasing and marketing.
- The basis for compensation of feed and non-feed costs.
- The method or legal procedure if failure of payment arises.
- The means and timing of communication by producer to owner when a death loss occurs.
- Who assumes the risk of death loss.
- The extent of the producer's responsibility for care of the pigs and record keeping.
- Designation of who will provide insurance and how much coverage.
- The brand of feed and the supplement that is required, if any, and who is responsible for ration formulation.
- How and when the contract may be terminated by either party.

Developing a producer group or cooperative arrangement

At this writing, the livestock industry is going through a restructuring process. This includes establishment of producer groups and/or cooperative arrangements as well as networking together on various production and marketing aspects.

Following is a checklist of items to explore when forming a producer group. Then the selection of the appropriate legal structure for a group is discussed.

Checklist for forming a producer group

Reiners[4] offers the following checklist of items to explore when considering the formation of a producer group:

1. Clearly define objectives and make sure all members concur with the objectives, (i.e. supply single source of feeder pigs, add value to corn produced by members, diversify existing operations, etc).

2. Identify early in the process the amount of capital needed and the prospective members' ability to generate sufficient capital to support the project and ongoing operation on a stand-alone basis.

3. Determine the willingness of prospective members to incur complete or partial personal liability.

4. If the group consists of a large number of producers, elect a manageable sized board of directors to explore and develop the project proposal.

5. Engage the expertise needed to evaluate or provide direction in issues such as community support, environmental assessment, organizational structuring, the permit process, facility design and construction, genetics, herd health management, and record keeping.

6. Since management is the key to success, identify management needs, compensation requirements, and appropriate timing for retaining key management personnel.

7. Explore potential alliances with genetic companies, feed companies, packers, etc., that may benefit the operation in terms of services and capital needs.

8. Develop a business plan that encompasses the goals and objectives of the operation as it is currently proposed and that identifies long-term goals and a plan to achieve them.

9. If financing is required, develop a loan application package to present to a potential lender that includes the following:
   - Total capital needs, including contingencies.
   - Ownership and organizational structure (capital raised, membership requirements, membership list, shares issued, etc).
   - Ten-year cash flow projection with first two years on a monthly basis. Identify all assumptions used in the projections.
   - Initial balance sheet and proforma balance sheet to coincide with cash flow.
   - Specific analysis in terms of production efficiencies, interest rate, feed costs, and hog prices.

Selecting the right legal structure

Bostrum[5] offers up a set of considerations in selecting the right legal structure for a group and a listing of legal structures that might be considered.

4, 5. Adapted from: *Economic Aspects of a Producer Group or Cooperative* by Sadie Reiners, St. Paul Book for Cooperatives, pages 173-174

Checklist in selecting the right legal structure

The following are some items to consider in selecting a legal structure:

- Goals and objectives of the group.
- Participants of the group and their individual concerns and agendas.
- Issues related to ownership, governance, and financial risks and rewards.
- Advantages and disadvantages of various legal structures.
- Legal limitations of various legal structures.
- Tax advantages and disadvantages to the members of the group.
- Political aspects of community acceptance.

Some possible legal structures

Since most producer groups tend to foster larger more consolidated production, no existing legal structures will erase the rural community's concern with the size issue. And though the term network is a preferred term, existing legal structures will have been selected. The following are some options:

Cooperative. As indicated earlier the cooperative has been used extensively in meeting the needs of producer groups. It has some favorable attributes, such as:

- Democratic control by members.
- Services provided at cost.
- Financial benefits flowing proportionately to the member's use of the cooperative.

Consideration should be given to using a **closed** cooperative arrangement. This would permit members to maintain better control of the business and provide opportunity for appreciation in the value of the shares owned by the members.

Corporation. The corporate structure can also be used (where permitted by state law). It can be formed as a C- (or regular corporation) or an S-corporation. The regular corporation has the potential for double taxation if dividends are declared. The S-corporation profits flow through to the shareholders, thus avoiding the double tax. Current law provides that no more than 35 shareholders can participate in an S-corporation. See Chapter 7, Part II of this series for a more detailed discussion of the corporate structure.

Other possible business arrangement options. There are several other business arrangements that might be considered including:

- The limited liability partnership.
- The limited liability company.
- The joint venture.
- A corporate subsidiary.

These options are described briefly in Chapter 7, Part II.

The producer group needs to evaluate these options in concert with lenders and with the assistance of attorneys well versed in these legal structures.

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