

PARTIAL BUDGETING

CHAPTER OUTLINE

Uses of a Partial Budget
Partial Budgeting Procedure
The Partial Budget Format
Partial Budgeting Examples
Factors to Consider When Computing
 Changes in Revenue and Costs
Sensitivity Analysis
Limitations of Partial Budgeting
Final Considerations
Summary
Questions for Review and Further Thought

CHAPTER OBJECTIVES

1. Discuss the purpose of a partial budget
2. Emphasize the many possible uses of a partial budget
3. Illustrate the format of a partial budget
4. Show what types of entries are made on a partial budget
5. Note the importance of including only changes in revenue and expenses on a partial budget
6. Demonstrate the use of partial budgeting with several examples

Enterprise budgets are useful, but they do have limitations because they are restricted to one enterprise. A *partial budget* is often the appropriate way to analyze changes involving interactions between several enterprises.

Many of the day-to-day management decisions made by farmers and ranchers are really adjustments to, or fine-tuning of, an existing

farm plan. Even the best farm plan will need some occasional fine-tuning as changes occur and new information becomes available. These adjustment decisions often affect revenue and expenses. A convenient and practical method for analyzing the profit potential of these partial changes in the overall whole-farm plan is the use of a partial budget.

USES OF A PARTIAL BUDGET

Examples of decisions that can be analyzed with a partial budget are whether to increase the size of, or to eliminate, a small herd of beef cows, to own harvesting equipment or custom hire harvesting, or to plant more barley and less wheat. Most of these decisions could be evaluated by comparing two whole-farm budgets, but time and effort would be wasted collecting and organizing information that will not change and therefore does not affect the decision.

A partial budget provides a formal and consistent method for calculating the expected change in profit from a proposed change in the farm business. It compares the profitability of one alternative, typically what is being done now, with a proposed change or new alternative. Throughout the discussion of partial budgeting, the emphasis will be on *change* in revenue and expenses. The final result is the expected change in profit.

Designed to analyze relatively small changes in the farm business, partial budgeting is really a form of marginal analysis. Figure 12-1 illustrates this point by showing how typical changes analyzed by partial budgeting relate to a production function, an isoquant, and a production possibility curve. Assuming that the current input/output combination is point A, the production function in the first panel of Figure 12-1 shows possible increases

or decreases in that combination. Examples would be using more or less fertilizer, irrigation water, labor, or capital and analyzing the effects on output, revenues, expenses, and profit.

The second panel shows possible movements up or down an isoquant or different combinations of two inputs to produce a given amount of output. Possible changes in input combinations can be analyzed easily with a partial budget. Substituting larger machinery for less labor would be an example. Another typical use of a partial budget is to analyze the change in profit from substituting more of one enterprise for another. This adjustment is shown in the third panel by possible movements up or down the production possibility curve from the current combination at point A. A fourth general type of alternative adapted to partial budget analysis is expanding or contracting one or more enterprises. This would be illustrated by moving to a higher or lower isoquant or a higher or lower production possibility curve.

PARTIAL BUDGETING PROCEDURE

Steps in the tactical decision-making process discussed in Chapter 2 included: identify and define the problem, identify alternatives, collect data and information, and analyze alternatives. Partial budgeting fits this process, with one modification.

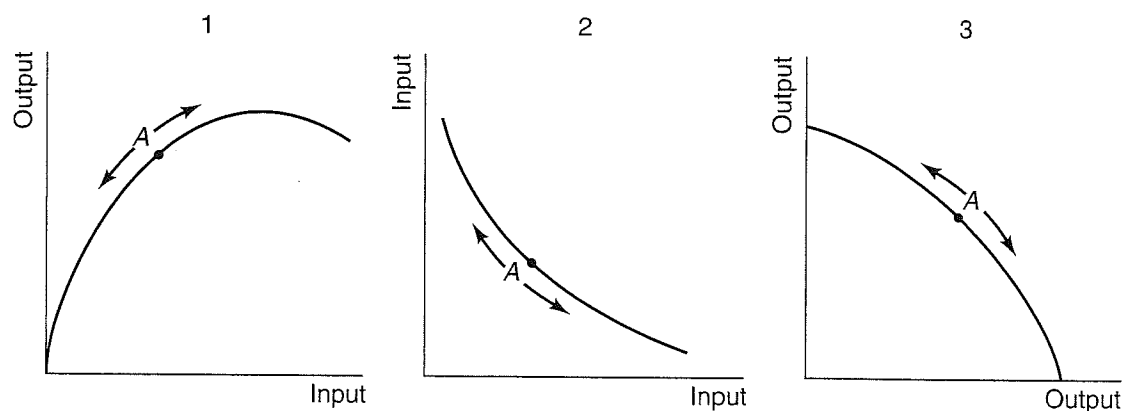


Figure 12-1 Partial budgeting and marginal analysis.

It is capable of analyzing only two alternatives at a time: the current situation and a single proposed alternative. Several partial budgets can be used to evaluate a number of alternatives. Identifying the alternative to be analyzed before gathering any information reduces the amount of information needed. The only information required is changes in costs and revenues *if* the proposed alternative is implemented. There is no need for information on any other alternative or for information about costs and revenue that will not be affected by the proposed change.

The changes in costs and revenues needed for a partial budget can be identified by considering the following four questions. They should be answered on the basis of what would happen *if* the proposed alternative was implemented.

1. What new or additional costs will be incurred?
2. What current costs will be reduced or eliminated?
3. What new or additional revenue will be received?
4. What current revenue will be lost or reduced?

For many problems, it will be easier to first identify all physical changes that would result if the alternative was adopted. These can then be assigned a dollar value to use in the partial budget.

THE PARTIAL BUDGET FORMAT

The answers to the preceding questions are organized within one of the four categories shown on the partial budget form in Table 12-1. There are different partial budgeting forms, but all have these four categories arranged in some manner. For each category, only the *changes* are included, not all costs or revenues.

Additional Costs

These are costs that do not exist at the current time with the current plan. A proposed change

may cause additional costs because of a new or expanded enterprise that requires the purchase of additional inputs. Other causes would be increasing the current level of input use or substituting more of one input for another for an existing enterprise. Additional costs may be either variable or fixed, because there will be additional fixed costs whenever the proposed alternative requires additional capital investment. These additional fixed costs would include depreciation, interest (opportunity cost), taxes, and insurance for a new depreciable asset.

Reduced Revenue

This is revenue currently being received but that will be lost or reduced should the alternative be adopted. Revenue may be reduced if an enterprise is eliminated or reduced in size, if the change causes a reduction in yields or production levels, or if the selling price will decrease. Estimating reduced revenue requires careful attention to information about yields, livestock birth and growth rates, and output selling prices.

Additional Revenue

This is revenue to be received only if the alternative is adopted. It is not being received under the current plan. Additional revenue can be received if a new enterprise is added; if there is an increase in the size of a current enterprise; or if the change will cause yields, production levels, or selling price to increase. As with reduced revenue, accurate estimates of yields and prices are important.

Reduced Costs

Reduced costs are those now being incurred that would no longer exist under the alternative being considered. Cost reduction can result from eliminating an enterprise, reducing the size of an enterprise, reducing input use, substituting more of one input for another, or being able to purchase inputs at a lower price. Reduced costs may be either fixed or variable. A reduction in

Partial Budget Form

PARTIAL BUDGET	
Alternative:	
Additional Costs: 	Additional Revenue:
Reduced Revenue: 	Reduced Costs:
A. Total additional costs and reduced revenue \$ _____	B. Total additional revenue and reduced costs \$ _____ \$ _____ Net Change in Profit (B minus A) \$ _____

Can Fixed Costs Really “Change”?

It may seem strange to talk about computing changes in fixed costs when Chapter 9 emphasized that fixed costs do not change. The explanation is in the difference between short run and long run. Fixed costs do not change in the short run. However, analyzing the purchase or sale of a capital asset is a long-run decision with

respect to that asset, and fixed costs can change from one time to another. Computing the fixed costs that would exist at one time and those that would exist at another after a purchase or sale would indicate a difference. It is that difference, or change, that should be included on a partial budget.

fixed costs will occur if the proposed alternative will reduce or eliminate the current investment in machinery, equipment, breeding livestock, land, or buildings.

The categories on the left-hand side of the partial budget in Table 12-1 are the two that reduce profit—additional costs and reduced revenue. On the right-hand side of the budget are the two categories that increase profit—additional revenue and reduced costs. Entries on the two sides of the form are summed and then compared to find the net change in profit. If the total of additional revenue and reduced costs is greater than the total of additional costs and reduced revenue, then the net change in profit will be positive and profit will increase by making the change. In the opposite case, net change in profit will be negative and profits would fall if the change were made. Whenever opportunity costs are included on a partial budget, the result is the estimated change in “economic profit.” This will not be the same as the change in “accounting profit.”

PARTIAL BUDGETING EXAMPLES

Two examples will illustrate the procedure and possible uses of partial budgeting. The first is a relatively simple partial budget, which examines the alternative already considered in Chapter 11 in the third column of Table 11-6, adding 100 cows to the example farm by renting 200 acres of pasture and converting 20 acres of cropland to feed production. It is assumed that the additional pasture can be rented for \$25.00 per acre. Gross returns per head of beef cattle are \$450 per head, as shown in Table 10-3, the corresponding enterprise budget, and also in Table 11-3. Variable costs per head would equal \$332, as shown in Table 11-3. Recall from Chapter 11 that, because this farm has ample operator and family labor, a variable cost for labor is not included in the production expenses, which is why variable costs are lower than in the enterprise budget in Table 10-3.

The additional costs of adding 100 beef cows can be divided into fixed and variable costs. Fixed costs would include an additional annual interest charge of \$3,750 on the additional cows as well as \$200 in additional bull depreciation. Variable costs include the increased variable costs of \$33,200 ($100 \times \332) plus the pasture rent of \$5,000 ($\25×200). No new labor needs to be hired because the original farm plan had surplus labor of 603 hours, enough to support the additional beef cows.

The additional revenue from adding 100 beef cows would total \$45,000 ($100 \times \450). In Table 12-2, this revenue is divided into that received from cull cows, heifer calves, and steer calves, following the format in the beef cattle enterprise budget, Table 10-3.

The reduced revenue and reduced costs are associated with the 20-acre reduction in plantings of soybeans on Class B land. Gross revenue and variable costs for this enterprise are shown in Table 11-3, \$315 and \$253 per acre, respectively. If the 20 acres are converted to feed production, then the reduced revenue would equal \$6,300 ($20 \times \315). Reduced costs would total \$5,060 ($20 \times \253).

To complete the partial budget, the first step is to sum additional costs and reduced revenue. Together they total \$48,450. Next, additional revenue and reduced costs are totaled. Together these sum to \$50,060. Finally, the sum of total additional costs and reduced revenue is subtracted from the total additional revenue and reduced costs. In this example, the net change in profit is \$1,610, the same figure we derived in the whole-farm budget format. Hence, the change is slightly more profitable than the original farm plan.

The example shown in Table 12-2 is very simple and includes only broad categories of costs and returns. A more detailed break down may be useful for planning purposes. Also, to be accurate, a partial budget should include an interest charge on the variable costs. The interest charge for the production costs is already included in the \$332 per acre figure used to

TABLE 12-2 Partial Budget for Adding 100 Cows

PARTIAL BUDGET			
Alternative: Add 100 beef cows on 200 acres rented land and convert 20 acres of cropland to feed production			
Additional Costs:		Additional Revenue:	
Fixed costs		10 cull cows	4,900
Interest on cows/bulls	\$ 3,750	33 heifer calves	16,165
Bull depreciation	200	45 steer calves	23,935
Variable costs			
Pasture rent	5,000		
Production costs	33,200		
Reduced Revenue:		Reduced Costs:	
Soybean sales, 20 acres	6,300	Soybean production costs, 20 acres	5,060
A. Total additional costs and reduced revenue	\$48,450	B. Total additional revenue and reduced costs	\$50,060
			\$48,450
		Net change in profit (B – A)	\$ 1,610

calculate the production costs, as shown in Table 10-3. However an interest charge for the money tied up in the pasture rent has not been included. Assuming an interest rate of 5 percent and that the rent is paid at the beginning of the year, an additional annual interest charge of \$250 should probably be included for greater accuracy.

A More Detailed Example

The second and more detailed example of a partial budget is shown in Table 12-3. This partial budget does not apply to our sample farm from Chapter 11. Here it is assumed that a producer is considering switching from dryland cotton to irrigated cotton. This producer currently farms 500 acres of dryland cotton and would convert the whole 500 acres. Irrigation equipment necessary for the change would have an original cost of \$300,000, a salvage value of \$50,000

and an expected economic useful life of 15 years. Additional insurance for the machinery would cost \$600 per year.

The dryland cotton has a yield of 600 pounds per acre. The irrigated cotton is expected to have a yield of 800 pounds per acre. Fertilizer, fuel and chemicals, and labor costs are expected to increase with irrigation, as shown below.

	Dryland	Irrigated
Fertilizer	\$100/acre	\$120/acre
Fuel and chemicals	\$70/acre	\$100/acre
Labor	\$20/acre	\$30/acre

Cotton is expected to sell for \$0.60 per pound, regardless of whether it is dryland or irrigated.

The proposed change will cause additional fixed costs as well as additional variable costs. Depreciation on the equipment is calculated using straight-line depreciation at \$16,667 per year.

TABLE 12-3 Partial Budget for Converting Dryland Cotton to Irrigated Cotton

PARTIAL BUDGET			
Alternative: Convert 500 acres of dryland cotton to irrigated cotton			
Additional Costs:		Reduced Costs:	
Fixed costs		Variable costs	
Depreciation	\$ 16,667	Fertilizer	\$ 50,000
Interest	10,500	Fuel and chemicals	35,000
Insurance	600	Labor	10,000
Variable costs		Interest on variable costs	2,850
Fertilizer	60,000		
Fuel and chemicals	50,000		
Labor	15,000		
Interest on variable costs	3,750		
Reduced Revenue:		Additional Revenue:	
Dryland cotton production	\$180,000	Irrigated cotton production	\$240,000
500 acres × 600 lb. × \$0.60		500 acres × 800 lb. × \$0.60	
A. Total additional costs and reduced revenue	<u>\$336,517</u>	B. Total additional revenue and reduced costs	<u>\$337,850</u>
			<u>\$336,517</u>
		Net change in profit (B – A)	<u>\$ 1,333</u>

Average annual interest is estimated using the formula presented in Chapter 9:

$$\frac{(\text{Original Cost} + \text{Salvage Value})}{2} \times R$$

Using an assumed 6 percent interest rate, fixed interest on the irrigation equipment comes out to \$10,500 per year. The insurance costs are also fixed costs and are included in that section of the partial budget.

Additional variable costs include the cost of fertilizer, fuel and chemicals, and labor. Interest on variable costs is calculated on half their total value, times the assumed interest rate of 6 percent. Interest is only calculated on half of

the production costs because they are assumed to be incurred for 6 months. Other variable costs of production are assumed not to change and hence are not included in the partial budget.

The reduced revenue would result from the loss of the sale of dryland cotton. There are 500 acres multiplied by 600 pounds per acre multiplied by \$0.60 per pound for a total of \$180,000 in reduced revenue. The sum of additional costs and reduced revenue equals \$336,517.

Additional revenue will be received from the sale of the irrigated cotton. A total of \$240,000 in additional revenue results from multiplying the 500 acres by the yield of 800 pounds per acre and by the price of \$0.60 per pound. Reduced costs are calculated for fertilizer, fuel

and chemicals, and labor on the dryland acres. As before, a variable interest charge is calculated on half the total of these costs multiplied by an assumed 6 percent interest rate.

The sum of additional revenue and reduced costs is \$337,850. From this total, the sum of additional costs and reduced revenue, \$336,517, is subtracted to find the expected net change in profit of \$1,333. Because the difference is positive, the proposed change would increase profit.

FACTORS TO CONSIDER WHEN COMPUTING CHANGES IN REVENUE AND COSTS

In addition to the usual problem of acquiring good information and data, there are several other potential problems when doing a partial budget. The first is nonproportional changes in costs and revenue. This problem will occur more often with costs, but it is possible for revenues. Assume the proposed change is a 20 percent increase (decrease) in the size of an enterprise. It would be easy to take the totals for each existing expense and revenue and assume that each will be 20 percent higher (lower). This could be wrong for two reasons. Fixed costs would not change unless the 20 percent change caused an increase or decrease in capital investment. Many relatively small changes will not. Even variable costs may not change proportionally. For example, adding 20 cows to an existing beef or dairy herd of 100 cows will increase labor requirements but probably by something less than 20 percent. Also, as we saw in Table 12-2, if there is an unused resource, such as labor, an enterprise can be expanded up to a point with no increase in the associated cash cost of that resource. Economies and diseconomies of size must be considered when estimating cost and revenue changes.

Opportunity costs are other easily overlooked items. They should be included on a partial budget to permit a fair comparison of the alternatives. This is particularly important if

the difference in capital or labor requirements is large. Additional variable costs represent capital that could be invested elsewhere, so opportunity cost on them should be included as another additional cost. The reverse of this argument holds true for reduced variable costs, so an opportunity cost on these should be included as a reduced cost. Opportunity cost on any additional capital investment becomes part of additional fixed costs and likewise should be a part of reduced fixed costs if the capital investment will be reduced.

Opportunity cost on the farm operator's labor may also be needed on a partial budget. However, several things should be considered when estimating this opportunity cost. Is there really an opportunity cost for using additional labor if it is currently unused? Free or leisure time would be given up, and there may be an opportunity cost on this time. Alternatively, the farm operator may desire some minimum return before using any excess labor in a new alternative. The same question exists in reverse if the alternative will reduce labor requirements. Is there a productive use for an additional 50 or 100 hours of labor, or will it just be additional leisure time? What will it earn in the alternative use, or what is the value of an additional hour of leisure time? Answers to these questions help determine the appropriate opportunity cost of operator labor on a partial budget.

Another consideration is the unit of change used in the partial budget. Is the budget based on changes in total farm revenue and expenses or is it for one acre or one head of livestock? In other words, is the unit the whole farm or some smaller unit? Some alternatives can be analyzed either way if they have a common physical unit such as acres. Others where the alternative involves both changes in acres of crops and head of livestock have no common unit of measurement. They must be budgeted on a whole farm basis. Budgeting on a whole farm basis is always the safer method to prevent any confusion about the budgeting unit.

SENSITIVITY ANALYSIS

It is often difficult to estimate the average prices and yields needed in a partial budget. Estimation is particularly difficult if the budget projects well into the future. Yet, the accuracy of the analysis and of the resulting decision directly depends on these values. A sensitivity analysis of the budget can provide some additional information on just how dependent the results are on the prices and yields used.

Sensitivity analysis consists of doing the budget computations several times, each with a different set of prices or yields. The results show how sensitive the estimated change in profit is to changes in these values. One way to perform a basic sensitivity analysis is to use low, average, and high prices each in a different partial budget. The same could be done for low, average, and high yields if appropriate. A comparison of the results will show how sensitive the expected change in profit is to price or yield variation. This will provide the manager with some idea of the risk involved in the proposed change.

Another way to do sensitivity analysis would be to look at prices that, for example, are 10, 20, and 30 percent higher and lower than the expected average price. Using this method, one of the prices may result in an expected change in profit of somewhere near zero, meaning it is close to the break-even price. For some types of partial budgeting problems it is possible to compute the break-even price or yield directly, which simplifies the calculations. Once a break-even value is calculated the manager can decide if the future price or yield is more likely to be above or below that value. This information can help make the final decision.

The example in Table 12-3 can be used to illustrate sensitivity analysis. The key figure in this problem is the expected yield of the irrigated cotton. Current dryland yields are known, and information on the cost of the irrigation equipment can be obtained fairly easily. We would expect higher irrigated cotton yields to favor purchasing

the equipment and vice versa. For example, an expected irrigated cotton yield of 700 pounds per acre rather than 800 pounds per acre would lower additional revenue by \$30,000, making the net change in profit a negative \$28,667.

The break-even irrigated cotton yield is the value that makes the net change in profit equal to zero. This requires a reduction of \$1,333 in additional revenue. Therefore, an irrigated yield of around 796 pounds per acre is the break-even value. Any irrigated yield higher than this value would make it profitable to convert to irrigated production.

In a similar fashion, sensitivity analysis for the price of cotton could be developed. Higher prices would favor conversion to irrigated production, and vice versa. If the cotton price falls below \$0.587, irrigated cotton production would be less profitable than dryland, given the assumptions about yields and equipment costs.

Sensitivity analysis and break-even calculations can also be done on the budget in Table 12-2, but it is more difficult because of the greater number of prices and yields. However, it can be done by holding all price and yield values constant but the one of most interest. For example, if all livestock prices were held constant, break-even soybean prices or yields could be computed.

The budget indicates that the value of the soybean production (either from price or yield) must increase \$1,610, or \$80.50 per acre, before the net change in profit would become zero. If price is assumed to be \$7.50 per bushel, yields would need to be around 53 bushels per acre or higher for the change to increased beef cow production to be unprofitable. With an assumed yield of 42 bushels per acre, price would need to rise to around \$9.42 per bushel for the change to be unprofitable.

Performing a sensitivity analysis and computing break-even values can require numerous calculations. However, a partial budget is relatively easy to set up on a computer spreadsheet. Once this is done, it is quick and easy to change a value and observe the result.

LIMITATIONS OF PARTIAL BUDGETING

Partial budgets are easy to use, require minimal data, and are readily adaptable to many types of management decisions. However, partial budgeting does have some limitations. It can only compare the present management plan with one alternative at a time. This requires many budgets when there are many alternatives to consider. Partial budgeting can still be used in this situation but it can be time consuming.

The data in partial budgets are expected average annual changes in economic revenue and expenses. While an alternative may increase profit based on average changes there are other factors to consider when the changes are not constant from year to year. An example would be the planting of an orchard or other crop where no revenue is expected for several years and then expected to increase annually for several years before reaching a maximum level. Though it may be a profitable alternative based on *average* annual values, it may be difficult to meet the crop expenses in the early years and to make any loan payments. In other words, the cash shortage in the early years is not reflected in the partial budget. Any type of change requiring a large capital investment and revenues that vary over time should be analyzed by more detailed procedures that should include a cash flow projection. (See Chapters 13 and 17.)

A partial budget should include appropriate opportunity costs to account for all economic costs. However, they are not included as accounting costs so the expected change in net profit shown on a partial budget should not be interpreted as expected change in accounting profit. The expected change in net profit must be adjusted for any opportunity costs included

in its calculation to find the expected change in accounting profit.

FINAL CONSIDERATIONS

The partial budget in Table 12-3 can be used to illustrate two additional factors to be considered in the decision. Before adopting a proposed change that appears to increase profit, any additional risk and capital requirements should be carefully evaluated. If risk is measured in terms of annual variability in profit, is the profit from the irrigated acreage more or less variable than the profit from the nonirrigated acres? Irrigation should reduce the yield variability, but the increased costs make the producer more vulnerable to price downturns. The decision maker must evaluate the potential effects of additional risk on the financial stability of the business. Is the additional average profit worth the additional risk or variability of profit? Chapter 15 discusses risk in more detail.

Purchasing irrigation equipment will require an additional capital investment. Is the capital for acquiring the equipment available or can it be borrowed? If it is borrowed, how will this affect the financial structure of the business, risk, cash flow requirements, and repayment ability? Will this additional investment cause a capital shortage in some other part of the business? These questions need to be evaluated carefully before making the final decision to adopt the change. A profitable change may not be adopted if the increase in profit is relatively small, it increases risk, or an additional capital investment is required. Potential changes requiring additional capital investment can also be analyzed other ways. See Chapter 17 for capital budgeting and other more comprehensive investment analysis methods.

SUMMARY

A partial budget is an extremely useful type of budget. It can be used to analyze many of the common, everyday problems and opportunities that confront the farm and ranch manager. Partial budgets are intended to analyze the profitability of proposed changes in the operation of the business where the change affects only part of the farm plan or organization. The current situation is compared to the expected situation after implementing a proposed change.

Data requirements are rather small, because only changes in costs and revenues are included on a partial budget. The sum of additional costs and reduced revenue is subtracted from the sum of additional revenue and reduced costs to find the estimated change in profit. A positive result indicates that the proposed change would increase profit. However, any additional risk and capital requirements should be considered before making the final decision.

QUESTIONS FOR REVIEW AND FURTHER THOUGHT

1. Will partial budgets ever contain some fixed ownership costs? If yes, give an example of a partial budget that might contain some fixed ownership costs.
2. List the types of changes that would appear in a partial budget for determining the profitability of participating in a government farm program. The program requires that 10 percent of your crop land be left idle in exchange for a lump-sum payment.
3. Why are changes in opportunity costs included in partial budgets?
4. Assume that a proposed change would reduce labor requirements by 200 hours. If this was the farm operator's labor rather than hired hourly labor, would you include a reduced cost for labor? What factors would determine the value to use?
5. True or false and explain. Partial budgeting can be used to develop a whole-farm plan.
6. Besides additional profit, what other factors should a farm operator take into account when evaluating a proposed change?



FARM MANAGEMENT, SEVENTH EDITION

Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020. Copyright © 2012 by The McGraw-Hill Companies, Inc. All rights reserved. Previous editions © 2008, 2004 and 1999. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of The McGraw-Hill Companies, Inc., including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 DOC/DOC 1 0 9 8 7 6 5 4 3 2 1

ISBN 978-0-07-354587-5

MHID 0-07-354587-2

Vice President & Editor-in-Chief: *Marty Lange*

Vice President EDP/Central Publishing Services: *Kimberly Meriwether David*

Sponsoring Editor: *Colin Wheatley*

Marketing Manager: *Heather Wagner*

Senior Project Manager: *Lisa A. Bruflodt*

Design Coordinator: *Brenda A. Rolwes*

Cover Designer: *Studio Montage, St. Louis, Missouri*

Cover Image: © *Imagestate Media RF*

Buyer: *Sandy Ludovissy*

Media Project Manager: *Balaji Sundararaman*

Compositor: *S4Carlisle Publishing Services*

Typeface: *10/12 Times Roman*

Printer: *R.R. Donnelley*

All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

Library of Congress Cataloging-in-Publication Data

Kay, Ronald D.

Farm management / Ronald D. Kay, William M. Edwards, Patricia A. Duffy. — 7th ed.

p. cm.

Includes index.

ISBN 978-0-07-354587-5

1. Farm management. I. Edwards, William M. II. Duffy, Patricia Ann, 1955– III. Title. S561.K36 2011 630.68—dc22

2010041998