EXTENSION

Wheat Grazeout versus Harvest for Grain

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An important role of the farm manager is planning for the future. Planning includes taking an inventory of resources, considering alternative uses for resources, estimating costs and returns associated with the alternate uses, and choosing the "best" alternative. The manager can organize financial and physical plans by budgeting.

Many changes do not require a complete reorganization of the farm or ranch. The manager can use resources in more than one way when responding to changes in product price levels and cropping patterns. Partial budgets are useful in evaluating changes such as expanding an enterprise, adding a new enterprise, changing production practices, and buying new machinery.

Principles of Partial Budgeting

Partial budgets estimate the economic effect of minor adjustments in some part of the farm business. With partial budgeting, the manager assumes that many aspects of the business are fixed in the short-term. He or she uses partial budgets to evaluate changes in resources that are not fixed. Partial budgeting is based on the principle that a small change in the organization of a farm business will eliminate or reduce some costs and returns, while possibly also adding or increasing costs or revenues. The net economic effect of a change will be the sum of the positive economic effects minus the sum of the negative effects.

Wheat Grazeout versus Wheat Harvest for Grain

A partial budget (Table 1) may be used to decide whether to graze out or harvest wheat for grain. The decision is made prior to first hollow stem and is based on expected yields and prices of wheat and stockers. Prices are a main determinant in the decision and are estimated for the future. By combining known figures with estimates of future yields and prices, the farm manager can compare alternative plans of action for profitability. Prices and yields data should be updated and customized for an individual situation. Other factors that can affect grazeout profitablity include stocking rate, value of gain, weather and the grazing length of time. The budget below is prepared on a per-head basis with a stocking rate, for an additional 60 days, of one steer per acre of wheat. Additional information includes:

Table 1. Partial Budget, Wheat Grazeout versus Harvest for Grain.

Situation: Should I leave stockers on wheat pasture for 60 days rather than remove stockers and combine wheat?

Additional Costs		Additional Returns	
Interest on investment	$ 8.90	Steers: 790 lbs. x $1.38/lb.	$ 1,090.20
Additional vet., feed, etc.	4.00		
Reduced Returns		Reduced Costs	
Steers: 640 lbs. x $1.52/lb.	$ 972.80	Harvesting	
		$23/a + ($0.23/bu. x 14)	$ 26.22
Wheat sales:		Hauling:	
35 bu. x $5.00/bu.	175.00	$0.22 x 35 bu./acre	7.70
Total annual additional costs and reduced returns	$ 1,160.70 (A)	Total annual additional returns and reduced costs	$ 1,124.12 (B)
			- 1,160.70 (A)
		Net change in income (B - A)	$ -36.58

Rate of gain per steer = 1.52 lbs./day (60 days)
#1 - #2 Steers: 640 lbs. on March 1 at $1.57/lb = $972.80
#1 - #2 Steers: 790 lbs. on May 1 at $1.38/lb = $1,177.10
Wheat yield = 35 bu./acre
Wheat price = $5.00/bu.
Interest on investment (livestock) = $8.90/steer
Additional veterinary expenses, feed, etc. = $4/steer
Custom combining = $23/acre + ($0.23/bu. over 21 bu.) = $26.22/acre
Custom hauling = $0.24/bu. x 30 bu./acre = $7.70/acre

Components of the Partial Budget

The typical partial budget consists of these components: additional costs, reduced returns, additional returns, reduced costs, totals of the first two and the second two, and the net difference. These categories are used to estimate the effects of a proposed change in business organization. In the left column, negative economic effects resulting from the proposed change are estimated; in the right column, positive economic effects are summarized.

Additional costs are those that will occur if the change takes place. However, this does not include costs that are common to both the present and proposed business operation (any cost that does not change will not be included in the partial budget). In our example, the additional costs category includes costs that are incurred by keeping the steers through May 1. Interest expense is increased because the cattle are held two months longer. Veterinary, feed, and other costs may increase as well (Table 1). It is important to note that these costs are incurred only when the cattle are kept, not if they are sold.

Reduced returns is the income that would not be received under the proposed change. In our example, reduced returns is the value for the calves which could be sold now plus the wheat sales not received when the grain is grazed out. The yield and prices shown are estimates based on current expectations. Totaling the left column shows a figure of $1,160.70. This represents the total negative economic impact of the proposal on the farm operation.

In our example, additional returns are the added receipts that will be received if the alternative plan is adopted. Additional returns include the value of beef grown from March 1 to May 1 at a stocking rate of one steer per acre gaining two and a half pounds per day. The listed weight is an average over all animals, but the price is an actual steer price in the weight range at the time of sale.

Reduced costs are those that will no longer be incurred if the change is initiated. Reduced costs include the costs of custom combining and hauling which are not incurred if the wheat is grazed out. Rates should be representative of current rates in the region.

Additional returns and reduced costs are totaled at the bottom of the column. The net difference between positive and negative economic effects is an estimate of the net effect of making the proposed change. A positive net difference indicates the potential increase in net returns if the change is made. Conversely, a negative net change in income is an estimate of the reduction in net returns if the change is adopted.

In our example, the total of the Additional Returns/Reduced Costs column is $1,124.12 and the total of the Additional Costs/Reduced Returns is $1,160.70. Subtracting the total of column A from B yields a net value of $-36.58. This represents the amount of economic gain with grazing out the wheat rather than selling the steers on March 1 and combining the wheat. Note that with different prices or stocking rates, the conclusion could be different. In some years, grazing out is the more profitable option so having accurate price forecasts is critical. The reasoning behind the budget formulation is simple.

Partial Budgeting Process

The success of the partial budget depends on the accuracy of the information and estimates it contains. The farm manager must collect pertinent, factual data about each proposed change and provide reasonable estimates of future prices, yields, gains, etc. Factual information includes current production costs, costs of capital, current prices for products such as grain or livestock, etc.

Estimating future unknowns, particularly prices is difficult. The manager must estimate yields and prices to determine the returns given up and received. Yield estimates can be obtained from several sources. The best source is an individual's farm records. The farm records will show the history of production. This, combined with an assessment of current crop conditions, should closely predict future yields, given normal weather and other conditions. Other sources of yield estimates are neighboring farm histories, OSU research reports showing average yields, and the farm manager's previous experience. A combination of these sources should provide a close estimate of projected yields.

Future product prices are difficult to predict. Agricultural economists, USDA statisticians, and futures markets all provide information on the trend of prices and national crop conditions. However, it will be unusual to find a predicted price for a product on a particular day. Using published information by the above sources as well as the manager's intuition will provide the best estimate on future product prices. Using a range of prices – low, medium, and high – to evaluate changes reveals the price sensitivity of the projected change.

The partial budget is ready to be developed after all pertinent data are assembled. A blank worksheet is included at the end of this publication. The cost of the proposed change is calculated for each of the categories. Only the costs and returns that will change by adopting the alternate plan are analyzed in the partial budget. The unit used to analyze the change may be any size, for example, the whole crop, one acre of the crop, one head of cattle, or the entire herd. The column totals show the negative and positive economic aspects of the proposed change. Subtract the left column total from the right column total to obtain a net amount that reflects the change in net farm income if the proposed alternative is adopted.

A positive net change says it would be economically beneficial to proceed with the alternate plan. A negative amount implies that it would not be economically profitable to proceed with the change. Two notes of caution: 1) The value of this analysis using partial budgeting is only as accurate as the data used. 2) The partial budget does not necessarily include "cash flow" tied to capital purchases (for instance, machinery). Cash flow is addressed in OSU Extension Fact Sheet AGEC-751. After the analysis has been performed, the result should be multiplied as necessary to show the economic impact on the entire farm situation.

Sensitivity Analysis

To determine the sensitivity of the results to the price and yield assumptions, it is useful to calculate the net change in income under different scenarios. Table 2 provides an example of a price sensitivity table. For a given steer price, grazing out becomes less profitable (or more unprofitable) as wheat price or yield increases. In our example, grazing out wheat is more profitable than harvesting wheat if grazout steer prices are $1.43/lb. or greater. On the other hand, harvesting wheat is more profitable than grazing it out if grazeout stocker prices are lower or wheat prices or yields are higher.

Individual farmers should modify the estimates to more closely conform to their actual situations. Additionally, individual farmers may find some of the included costs not applicable to their situation or have other costs that should be included. Remember that the partial budget includes only the costs that change. Costs that cannot be affected should not be included in this analysis.

Table 2. Net change in income for graze-out stockers versus wheat harvest under different price scenarios using data from Table 1.

		Steer Sale Prices		
		$1.28/lb.	$1.38/lb.	$1.48/lb.
Wheat Prices	$4.50/bu.	(98.08)	(19.08)	59.92
	$5.00/bu.	(115.58)	(36.58)	42.42
	$5.50/bu.	(133.08)	(54.08)	24.92

The breakeven price is calculated by setting the sum of Additional Costs plus Reduced Returns equal to the sum of Additional Returns and Reduced Costs. In this case, mathematically:

Additional Costs + Reduced Returns = Additional Returns + Reduced Costs

where:

Additional Costs = additional costs of maintaining stockers extra months = $12.90/a

Reduced Returns = stocker income if calves are sold in March plus wheat harvest income = price of stockers in March (P_{sm}) times their yield in weight in March (Y_{sm}) + (price of wheat times wheat yield) = $P_{sm} \times Y_{sm} + P_w \times Y_w$ = (640 lbs/a x $1.52/lb) + (35 bu./a X $5.00/bu) = $1,147.80/a

Additional Returns = price of stockers in May (P_{sg}) times their yield in weight in May (Y_{sg}) = $P_{sg} \times Y_{sg} = P_{sg} \times 790$

Reduced Costs = wheat harvest costs = flat cost per acre + hauling costs + premium for more than 21 bushels per acre = $23/a + ($0.22/bu x 35 bu/a) + [(35 bu – 21 bu) x .23/bu] = $33.92/a

Thus, the breakeven price for grazeout stockers is:

$12.90/a + $1,147.80/a = ($P_{sg}$ x 790 lbs/a) + $33.92/a
P_{sg} = ($12.90/a + $1,147.80/a – $32.92/a)/790 lbs/a = $1.43/lb

To solve for the breakeven price of wheat:

$12.90/a + (640 lbs/a x $1.52/lb) + (35 bu/a X P_w) = ($1.38/lb x 790 lbs/a) + $33.92/a

P_w = ($1,090.20/a + $33.92/a – $12.90/a – $972.80/a)/35 bu/a = $138.42/a /35 bu/a = $3.95/bu

To calculate breakeven stocker weights, assume a stocker price and substitute stocker grazeout weight for the missing variable:

$12.90/a + $1,147.80/a = ($1.38/lb x Y_{sg}) + $33.92/a

Thus, the breakeven stocker weight at $1.38/lb. is:

Y_{sg} = ($12.90/a + $1,147.80/a - $33.92/a)/$1.38/lb. = 817 lbs/a

If the breakeven variable of interest is the wheat yield, it becomes a bit more complicated since both the reduced returns and reduced costs are a function of wheat yield. In this example, solving for wheat yield becomes:

$12.90/a + (640 lbs/a x $1.52/lb) + ($5.00/bu x Y_w) = ($1.38/lb x 790 lb/a) + $23/a + $.23/bu x ($Y_w$ – 21 bu/a) + (.22/bu x Y_w)

$985.70/a + ($5.00/bu x Y_w) = $1,113.20/a + $.23/bu x Y_w – $3.22/a + ($.22/bu x Y_w)

$5.00/bu x Y_w - $.45/bu x Y_w = $124.28/a

$4.55/bu x Y_w = $124.28/a

Y_w = $124.28/a/$4.55/bu = 27.3 bu/a

Conclusions

This partial budget fact sheet presents a simplified procedure to aid producers in everyday decision-making. This design is not for total farm planning, but rather to estimate the economic consequences of making a change in some phase of the farm operation. Partial budgeting is a step-by-step process for identifying the costs and returns that change due to alterations in the production process. Once these costs and returns are identified, they are weighed against each other to estimate the economic consequences of the change. The results can only be as good as the data used. Therefore, care should be taken when estimating values for the various categories. In addition, sensitivity test for values such as yields and prices should be developed to highlight their effect on the ultimate outcome.

Worksheet. Partial Budget Form

Situation:

Additional Costs	Additional Returns
Reduced Returns	**Reduced Costs**
Total annual additional costs and reduced returns _____ (A)	Total annual additional returns and reduced costs _____ (B) - _____ (A) Net change in income (B - A) _____

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