



Getting Started in Ag: The Role of Marginal Costs and Returns in Decision Making

If you are new to production agriculture or just getting started, congratulations—you have chosen a challenging time to begin!

Today's production environment is chock-full of challenges, ranging from unstable markets to inflationary pressures and supply chain issues. It is more important than ever to have a firm grasp on your costs while looking to maximize production and manage the associated risk.

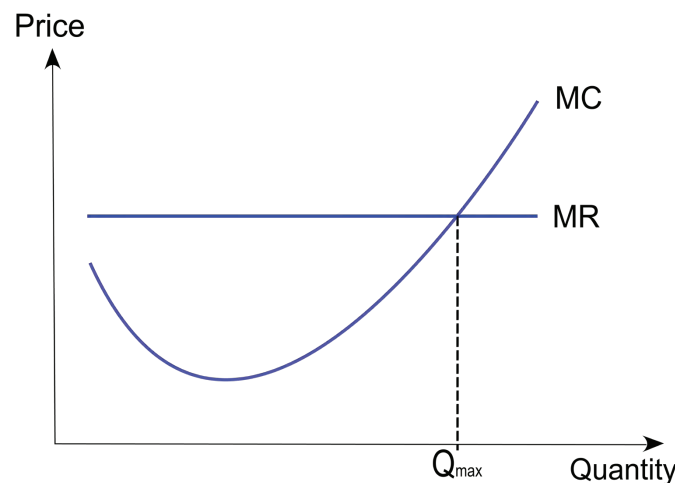
The concept of marginal costs and returns might not be one you are familiar with, but it is integral to managing commercial agriculture. Simply put, marginal cost is the cost of producing an additional unit of production. Marginal return is the added revenue that results from the added production.

For example, applying added units of fertilizer increases cost but also results in additional bushels of wheat over the baseline. Similarly, vaccinating a cow herd against a threatening infection will increase the cost of production, but likely will also result in additional calves weaned compared to an unvaccinated herd. The added production in both cases leads to increased income.

Managers looking to identify the most profitable level of production increase input levels to the point where marginal cost outpaces marginal return (it costs more to produce than it is worth). In other words, additional production becomes financially infeasible when marginal cost is greater than marginal return.

Optimum production occurs when marginal costs are equal to marginal returns. In reality, this concept is difficult to realize in many situations, especially in our current inflationary environment. It is important to remember that, especially in agriculture, it is very likely unprofitable to push for maximum revenue in every production situation.

The goal of any effective risk management strategy is to understand the effective production level where marginal costs



Optimum production (Q_{max}) occurs when marginal costs (MC) are equal to marginal returns (MR).

are close to or equal to marginal returns. One way to map out an effective production plan is through the use of a partial budget.

PARTIAL BUDGETS AND RISK

There is a good chance that nearly every business will need to make one or more operational changes at some point. Operational changes can range from relatively minor adjustments, such as deciding whether or not to put more weight on feeder cattle before selling, to evaluating how much fertilizer to apply when cost has doubled over the past year. In the face of a severe drought, operational changes might include choosing between buying hay or selling cows. Any change includes uncertainty, otherwise known as risk, that must be accounted for in the selection process.

Partial budgets and enterprise analysis are excellent ways to evaluate alternatives and assess whether to make a change or not. These approaches can also include the risk involved and serve as the foundation for a sound risk management strategy.

Partial budgets comparing alternative courses of action provide the basis to decide if a change is feasible by separating the adjustments required into two basic categories. These include the benefits (reduced costs, increased returns) and the costs (increased costs, reduced returns).

PRODUCTION EXAMPLES

The academic professionals at RightRisk.org have developed a partial budget tool called the Risk Scenario Planning (RSP) tool. RSP allows users to outline the projected results for a proposed operational change and refine values to address potential uncertainty, such as commodity prices or yields. The RSP tool combines the partial budget approach with probability analysis to evaluate a proposed change. Circling back to the concept of marginal costs versus marginal returns, RSP can be useful in the analysis of many management decisions.

For example, Wyoming producer Bob Willis* is trying to decide between feeding 100 calves after weaning or selling them right after weaning. Bob could sell his calves at weaning for \$1.58/lb. (or \$790/head) with no additional expense. He would like to feed them for 50 days and put an extra 100 pounds on them to increase their value. Bob figures the extra 100 pounds of gain per head is worth \$1.60/lb. or \$16,000 total. There are additional costs to feeding the calves that include feed (\$2.25/head/day); yardage, the cost to feed and care for the cattle (\$0.40/head/day); veterinary expenses (\$5/head or \$500 total); and increased death loss (2 head at \$950/head, or \$1,900 total). Entering these values into the RSP partial budget yields a net gain of \$350 total for this strategy. Essentially Bob's marginal costs are equal to his marginal returns.



Bob can take this analysis further by considering the uncertainty involved. Calf price, feed price and death loss are just some of the variables that could affect the net results of this strategy. Visit RightRisk.org to

access the free RSP course and online guide for further explanation and examples of how to use this risk analytics tool.

Bob's situation is a prime example of just how important it is to consider the marginal costs and returns of a strategy rather than targeting maximum revenue as the only consideration.

* The Willis operation is a case study example created to demonstrate RightRisk tools and their application. No identification with actual persons (living or deceased), places or agricultural operation is intended nor should be inferred.

Positive Effects				Negative Effects			
Added Returns	Quantity	Value	Total	Added Costs	Quantity	Value	Total
Value of calf weight gain - 100 lbs/head at \$1.60/lb	10000	\$ 1.60	\$ 16,000.00	Feed cost - \$2.25/head/day, 50 days	5000	\$2.25	\$ 11,250.00
				Yardage - \$0.40/head/day, 50 days	5000	\$0.40	\$ 2,000.00
				Veterinary Expense - \$5/head	100	\$5.00	\$ 500.00
				Death loss (2 head)	2	\$950.00	\$ 1,900.00
							\$ -
							\$ -
Total Added Returns			\$ 16,000.00	Total Added Costs			\$ 15,650.00
Reduced Costs	Quantity	Value	Total	Reduced Returns	Quantity	Value	Total
			\$ -				\$ -
			\$ -				\$ -
Total Reduced Costs			\$ -	Total Reduced Returns			\$ -
Total Positive Effects (Added Returns + Reduced Costs)				Total Negative Effects (Added Costs + Reduced Returns)			
\$ 16,000.00				\$ 15,650.00			
Net Benefit of: Feed or Sell Calves Example				\$ 350.00			

In this example, the RSP partial budget suggests that the producer should move forward with his plan to feed the calves for 50 days.

FOR MORE INFORMATION

Visit RightRisk.org for all of your risk management planning needs. The site contains numerous resources designed for any stage of risk management in agriculture, including budgeting tools, crop insurance information, producer profiles, online courses and more. Click the Resources tab and select RightRisk Analytics from the menu to begin using the RSP tool. The risk analytics includes a user guide and pre-loaded examples to help users understand their application.