PRECISION AGRICULTURE INVESTMENT - FIXED COST ANALYSIS AS A STARTING POINT IN EVALUATING RETURN-ON-INVESTMENT

Barry Ward

Ohio State University, Columbus, Ohio, USA

Abstract:

The use of precision agricultural technology has increased significantly in the past 25 years. Producers have added a number of precision agriculture technologies to their machinery and equipment investment portfolio. Strong returns for US Midwestern field crops from 2006 to 2012 together with favorable tax incentives (bonus depreciation and Section 179 expensing) led to strong demand for farm machinery and equipment over this period as well as precision agriculture technology that often accompanied these purchases. High crop prices during this period created an environment more favorable to positive return-on-investment for precision agriculture technology. Yield monitors, global positioning systems, guidance and steering systems, automatic section control, unmanned aerial vehicles, and other precision agriculture technologies became more common investments partly as a result of higher producer incomes.

Deterioration in profit margins for major U.S. Midwestern field crops over the last four years has created a changing environment with respect to farm machinery and equipment investment and has caused producers to reevaluate all costs of production including precision agriculture technology investment. One of the difficulties in evaluating return-on-investment to technology adoption is the difficulty in defining attribution of yield or profit to the new technology investment. In other words, "How much of the yield/profit improvement was a result of the yield monitor or automatic section control?" The inherent difficulty in determining the yield or profit effect of a precision agriculture technology investment leads one to seek an alternative as baseline for decision making.

One alternative is to calculate the cost of the investment on a per annum, per acre per annum or per output unit to allow producers to evaluate the additional yield or profit needed to meet the investment cost. This approach allows producers to use informal yield or profit attribution and sensitivity analysis to evaluate the return on investment. This allows producers to target a certain output return necessary to pay for the investment. A producer calculating the fixed ownership cost of a yield monitor of $1.41 per hectare per year can make more informed investment decisions. By calculating these fixed costs on a per hectare per year or per ton basis, producers can gain a clearer insight into the yield and/or revenue required to create a positive return-on-investment.

Keywords: *Precision Agriculture; technology; fixed costs; return-on-investment*