

Table 1 (continued). Revenue and expense categories and their associated drivers.

Item	Category explanation	Revenue/expense driver
Fixed non-cash expenses		
Depreciation ¹	Amortization of initial and replacement capital assets	Capital expenditures, capital replacement, depreciation method, expected useful life (EUL)
Loss (gain) on culled and dead cows ²	Losses or gains due to differences in cow salvage revenue and cow book value	Replacement price, cull price, depreciation method, culling rate, death loss rate

¹Depreciation is a non-cash expense but potentially affects cash income by reducing taxable income.

²Loss on culled and dead cows is a non-cash expense but potentially affects cash income by reducing (losses) or increasing (gains) taxable income.

future the cash flow is realized. An interest rate (i.e., discount rate) is used to calculate the discount factor and should represent the expected rate of return from an alternative investment of relatively the same size and level of risk. Generally, the investor desires the largest positive cash flows early in the investment's life so capital from the investment can be recaptured and reinvested. Reinvestment puts the money back to work earning even more returns, thus reducing opportunity costs.

The cash flow aspect of capital budget analysis does not consider the time value of money. However, the timing of cash flows is still very critical. The magnitude of undiscounted positive cash flows must be high enough each period to meet periodic obligations to claimholders who have supplied capital for the investment. If these obligations cannot be met, foreclosure may result, even though in the long term the investment might be profitable. Cash flow problems of this nature are typical in the first stages of a project when production is lowest and expenses are usually at their highest.

Investment analysis tools

There are several tools useful in analyzing the profitability of any investment. First, **payback period (PP)** calculates the number of years to recapture the initial investment in a project. If net annual cash receipts are equal, PP is calculated as follows:

$$PP = \frac{\text{Initial investment outlay}}{\text{Annual net cash receipt}}$$

If the net annual cash receipts are expected to fluctuate year-by-year, PP is calculated by summing the net annual cash receipts until the initial investment outlay is covered. Payback period is an

important consideration with many investors, and widely used in agriculture; however, it has serious limitations. First, it does not consider the time value of money or the timing of cash flows. Therefore, PP provides no information on long term investment value between the proposed investment and other investment alternatives. Furthermore, looking at PP alone can often result in incorrect decisions because PP does not consider the profit beyond the PP. For example, one investment alternative may have a longer PP than a competing alternative, yet in the years exceeding its PP it may have several years of positive net cash receipts greatly in excess of alternative investments with shorter PPs. If the investment decision is made solely on PP, alternatives with shorter PPs would be chosen and long-run profit would be sacrificed.

A second method of analyzing the profitability of capital investments is **simple rate of return (ROR)**. The general equation for ROR is:

$$ROR = \frac{\text{Estimated average annual return}}{\text{Initial investment outlay}}$$

Again, many investors are concerned with the ROR of a proposed investment. However, as with PP, ROR does not consider the time value of money or the timing of cash flows. It also does not consider the size of competing investments or their length. For example, would you rather have a return of 25% on \$1 for one year, or 15% return on \$1 million for ten years? The answer is obvious, and shows the limitation of relying only on ROR as a decision criteria for competing investments. A final consideration for ROR is exactly what number to use in the numerator. Firms commonly use estimated average annual net profit (after deducting depreciation). However, modified versions of ROR use a variety of measures of return in the numerator,