management strategy, geographical area, etc. before making a final decision.

Two final topics related to capital expenditures also deserve mentioning: capital replacement costs and salvage value of replaced capital. These two areas are important since many portions of the dairy investment have differing lengths of useful life. For example, in considering the 20-year life of the entire project, some items (e.g., milking equipment) will have to be replaced once, or even several times, during the project's life. Therefore, it is critical to accurately predict useful life of system components and accurately project replacement costs. Furthermore, since replacement of some capital items is anticipated, it is important to establish accurate salvage values for those items. It is critical to realistically determine if a market exists for replaced capital items or if past history shows that these items end up rusting behind the farm shop.

Estimating cash flows

The next step in the capital budgeting process is estimating the expected cash flows (i.e., cash revenues and cash expenses) that the project will generate throughout its expected life. This can be more difficult than estimating capital expenditures. Estimating cash flows requires a detailed analysis of the day-to-day operation of the business and proficiency in the technical aspects of dairy production. Even with the best of planning, the timing and magnitude of future cash flows will remain uncertain over the entire life of the project. Therefore, methods of dealing with these uncertainties, like "what-if" analyses using spreadsheets or simulation modeling, should be employed.

The first step in estimating cash flows involves the identification and quantification of all revenue and expense categories. Within each revenue and expense category it is necessary to identify the revenue/expense driver. A revenue or expense driver is any factor whose change causes a change in total revenues/expenses. For example, important revenue drivers are number of cows and milk sold per cow. Common expense drivers include number of cows, culling rate, number of employees, etc. Table 1 shows the revenue and expense categories chosen for this example spreadsheet analysis and gives a brief explanation of each revenue/expense category and its associated revenue/expense drivers.

ANALYZING THE CAPITAL BUDGET

A sound analysis of the capital budget should consider both its cash flow and profitability. Analysis of the project's cash flow seeks to answer the question: "Can I pay for this project?" Thus, the cash flow analysis determines whether the dairy investment can generate adequate cash to meet periodic obligations to claimholders who have contributed capital to the investment (e.g., owner equity, bank or other financial institution). Profitability seeks to answer a broader question: "Is this project a wise investment?" Therefore, analysis of the project's profitability determines how favorably the dairy investment compares to other investment opportunities available for the same capital. A sound analysis of any investment must consider both of these aspects because an investment may be profitable but not feasible from a cash flow standpoint and vice versa.

When considering the profitability of an investment, two important and related concepts must be understood: 1) time value of money; and, 2) timing of cash flows. The capital invested in the dairy facility is tied up by the project for a particular period of time and unavailable for investing in some alternative investment. Therefore, the time value of money accounts for income that must be sacrificed from an alternative investment over this period. The income sacrificed is often referred to as an opportunity cost. In other words, by tying up capital in the dairy the investor must forego the opportunity of income from other investments.

Timing of cash flows is related to the time value of money since the further into the future a cash flow is realized the less value it has today. Thus, the absolute value of revenues (positive cash flow) or expenses (negative cash flow), in terms of present worth, decreases the further into the future they are expected to be realized. Furthermore, the impact of cash flows on today's decisions should decrease as those cash flows extend further into the future.

The process of accounting for opportunity costs due to the time value of money is accomplished by discounting future cash flows. Cash flows are discounted, or reduced, by using a discount factor whose effect becomes greater the further into the