

USING THE SPREADSHEET VERSION OF THE NCSU IRRIGATION BUDGETS

Introduction

There are four irrigation budgets for row crop systems:

- Electricity powered 1,000 foot Center Pivot
- Electricity powered 600 foot Center Pivot
- Diesel powered 1,000 foot Center Pivot
- Diesel powered 600 foot Center Pivot

The cost information in these enterprise budgets is intended as an example or guideline only and the spreadsheets should be used to develop one or more budgets for a particular farm situation, using information specific to that farm situation. Field size and shape, soil type, water source, the specific crops to be irrigated, crop rotations, and weather conditions will affect the investment and operating costs for a specific farm situation. The example budgets were developed by NCSU extension specialists to reflect a fairly typical farm situation. These budgets assume a new well had to be dug in order to have adequate water for the irrigations system. However, if adequate amounts of surface water from a pond or a stream are available, the cost of providing water will be reduced.

These spreadsheet budgets estimate the costs of irrigation. The expected returns to irrigation will depend on the specific crops to be grown, including crop rotations, projected yield increases (which will vary year-to-year because of differences in rainfall) and projected crop prices.

Each spreadsheet has certain cells that are protected and others that the user can modify with his or her information. The cells that are colored yellow can be modified by the user to enter his or her descriptions or data. More information and suggestions for modifying these budgets are provided below.

CAUTION: Every effort has been made to produce spreadsheets that work as intended but they are offered “as is” and the user must accept responsibility for any information generated and any decisions based on that information.

Budget Costs

Each enterprise budget contains three categories of cost; investment, ownership or fixed, and operating. Operating costs are also known as variable or out-of-pocket costs and include such items as fuel, repairs and maintenance, and labor.

Investment costs are associated with the purchase of the irrigation system, pumps and motors, and the cost of the power and water source. The total investment costs in the

budgets are based on specific assumptions about field size and shape, the water source, and the available power source.

Ownership or fixed costs are the annual costs or charges associated with the initial investments in equipment and well. Because these initial investments last for several years, we calculate annual charges that consist of a depreciation charge, interest on the investment, property taxes and insurance. These are abbreviated to DITI. The depreciation charge reflects the fact that these investments have a useful life and that, to be profitable, the proposed use must allow the investor to recoup this initial investment. Most investments in farm equipment lose value over time because of use, age and obsolescence. Interest charges are included regardless of the source of the investment funds. Debt financed investments incur actual interest charges and owner financed investments mean giving up potential earnings in other uses (opportunity cost). In the example budgets, the annual interest charge is based on the average amount invested based on the new investment and the salvage value, i.e., $(\text{new investment plus salvage value}) / 2$. This is an economic cost or charge which is made each year of useful life and likely will differ from the actual payments on a loan. Property taxes and insurance costs also are calculated as a percentage of the average investment.

The example budgets are based on new equipment prices for 2007. If used equipment is purchased it will have a shorter useful life and higher annual repair and maintenance costs. A farmer considering investing in irrigation should use the actual prices for the system(s) under consideration.

Operating or variable costs include fuel or electricity, equipment repairs and maintenance, and labor. Diesel fuel or electricity cost is estimated from the engine or motor horsepower, hours of use and fuel or power prices. Repairs and maintenance costs are calculated as a percentage of the initial investment costs. A labor cost or charge is made for the time spent operating, maintaining and monitoring the equipment. It may be the cost of hired labor or the value the farmer places on his or her time.

Total annual costs include ownership and operating expenses, and are shown for the total system and per acre irrigated.

Modifying the budget

Each spreadsheet has certain protected cells and others, colored yellow, that the user can modify with his or her information. The following discussion indicates some of the structure and workings of the budgets. Specific budgets may include footnotes that help explain individual items in that budget.

For each of the budget worksheets:

- The header describes the irrigation system related to that budget. It may be useful to modify this to describe the specific farm situation to which the customized budget refers. The acres that will be irrigated and the hours required

to apply one inch of water should be changed to reflect the proposed system and carry over into the cost calculations.

- The investment costs are shown for the system that has been specified. The descriptions and costs of the individual items can be changed. Fixed costs are calculated from information contained in the investment section of the budget and transfer automatically to the annual ownership and operating cost sections.
- The annual ownership or fixed cost of the irrigation system costs are depreciation, interest on investment, property tax and insurance (DITI). The following changes can be made in the annual fixed costs table. Individual irrigation components carry over from the investment section. The following items, identified in the column headings, should be evaluated for each item and changed as appropriate:
 - Salvage value. Estimate the salvage value if an item is expected to have any resale value at the end of the useful life (see below). This is used in each of the DITI calculations. Annual depreciation is estimated as the difference between the initial cost and salvage value divided by the useful life. The other costs are estimated based on the average investment.
 - Useful life. This is the expected life of the equipment (or the planning horizon or the economic life, as appropriate, if these are less than the physical life) and it is used in the depreciation charge calculations.
 - Interest rate. This is used to calculate the annual interest charge on the average value of the investment in equipment. The rate used should reflect the cost of capital for the farm.
 - Property tax and insurance rate. This rate is used to calculate these cost items based on the average value of the investment in the enterprise.
- The following changes can be made in the annual operating cost table. Some items transfer automatically from the investment section, other items can be modified. The following items, identified in the column headings, should be evaluated for each item and changed as appropriate.
 - Rated horse power of engines or pumps should be entered. This is used to estimate fuel consumption and cost.
 - Fuel or power use per engine or motor horse power should be entered. This figure is used to calculate the fuel cost per hour of use for diesel powered equipment or electricity consumption for electric motors.
 - Fuel price per gallon or the electricity charge per kWh.
 - Acre inches per hour. Five acre inches were assumed to be the average water applied per year. The numbers of irrigation events will affect fuel use and cost
 - Repairs and maintenance. The annual cost figure is calculated as a percentage of the initial cost (purchase price). The percentages shown are “book values” based on new equipment prices and reflect the average annual cost over the life of the piece of equipment. These percentages are applied

to the initial cost figures shown in annual fixed costs table. The percentage figures can be changed.

- Labor hours. This represents time spent, for example, in adjusting, maintaining and monitoring equipment operation.
- Labor cost per hour.