

# **CLEMSON ENTERPRISE BUDGETS**

Clemson's enterprise budgets are intended as guidelines in the estimation of the production costs and returns for South Carolina cash crops and assist producers in selecting enterprise combinations for the UPCOMING season. These budgets should be used only as a guide for decision-making. It is important to remember these projections will not be the same as any individual farm business due to differences in management levels, soils, weather, prices received, prices paid, fertilization and cultural practices. The column "YOUR FARM" was exclusively designed for inclusion of data based on farm records to reflect current conditions.

## **YIELDS**

Some enterprises have different yield levels. The lower yield level budgets represent State averages under normal weather and management conditions and the higher yield represents a reasonably attainable yield with better soils, good management, or both.

## **PRICES**

Prices received for the various crops are estimates made a year in advance based on Clemson outlook projections and projected government program payments as applied to South Carolina. The prices used in the enterprise budgets must be changed to accurately measure the profitability measures of a particular season.

## **PRODUCTION COSTS**

The estimates associated with producing each agronomic crop enterprise are explained in three different sections: fixed and variable costs, and other costs. An explanation of each category is shown as follow:

- 1. <u>Variable Costs</u>: they are incurred only if production takes place for that analyzed enterprise. Most of the costs involved in this section are dependent on yield level and the size of the farm operation.
- a) *Seed*: seeding rates are established by South Carolina crop production specialist recommendations. A technology fee is included.
- b) Fertilizer and Lime: fertilizer rates are estimated from Clemson Extension average soil test recommendations by crop specialists and do not imply improving current fertility levels. Fertilizer costs are calculated from individual components: Ammonium Nitrate (33.5%), Muriate of Potash (60%), and Super Phosphate (45%). 30% Nitrogen Solution is

used for required liquid nitrogen applications. Lime applications range from one application per year (quantity is 1) to one application every three years (quantity is .33).

- c) *Chemicals*: herbicides, insecticides, fungicides, fumigants, nematicides, sucker controllers, growth regulators, defoliants, and surfactants are based on recommendations of extension specialists. Chemical input levels generally agree with Clemson University recommendations as published in the South Carolina Agricultural Chemicals Handbook. The quantities and costs of each chemical are shown in the table "Chemical Use Assumptions". The total number and months of applications are also presented within this table. For example, the expression "2X JUN/JUL" refers to two applications, one in June and one in July. The chemical costs were obtained by surveying major chemical distributors and average prices surveyed were calculated.
- d) *Hauling*: for hauling costs, the average rate was obtained from Clemson Custom Farm Machinery Rates.
- e) *Tractor & Machinery*: machinery prices were obtained through a survey with major agricultural equipment dealers across the state. An average price was calculated using the higher price and lower price surveyed with the discounts. Equipment variable costs consist of repair, fuel, and lubricant costs. These costs refer to the use of the equipment for planting and harvesting seasons, and also the maintenance. Each farmer has different tillage practices. Thus, these costs may also vary. A producer should not assume his/her machinery cost estimates are the same as those shown in this publication. He should estimate his own costs, using our costs as a basis from which to work. The formulas used for obtaining the costs are shown as follows:

## REPAIR COST:

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Percent Life (PF) = (Years of Life * Hours of Annual Use)/
Total Hours Life

Total Accumulated (TA) = [(Average Price * RC1) * (PF)<sup>RC3</sup>]

Cost Per Hour = TA / (Years of Life * Hours of Annual Use)
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## FUEL COST:

# **Self-Propelled Tractors**

Cost Per Hour = Horsepower (HP) \* Fuel Consumption Multiplier \*
Price Per Gallon of Fuel

### Other Self-Propelled Items

Cost Per Hour = (Average Price / 1000) \* Fuel Consumption Multiplier \*
Price Per Gallon of Fuel

## LUBRICANT COST:

Cost Per Hour = Fuel Cost per Hour \* Lubrication Cost Percentage

The formulas and standards (ratios RC1 and RC2, years of life, hours of annual use, total hours of life, and fuel consumption multiplier) were taken from the 1998 ASAE STANDARDS book. Costs for equipment not included in the ASAE standards were developed by Clemson agricultural engineers. This approach may cause differences in some of the parameters and the variable costs might not be exactly the same. These parameters will be revised from time to time and when new equipment is listed in the ASAE STANDARDS book. The fuel consumption multipliers are listed below:

	MULTIPLIER
DIESEL	0.048
GAS	0.068
LP	0.080

Lubrication costs account for 15% of fuel cost per hour. Two other formulas are needed to calculate: machinery hours used per acre and number of hours used. Hours used per acre are not only used for calculating variable costs but also for fixed costs. Total variable cost is the result of multiplying Total Variable Cost Per Hour (repair + fuel + lubricant) times Number of Hours Used. The parameters and the formulas are listed below:

### **HOURS PER ACRE**

Speed = miles per hour

Width = number of feet covered by the implement

Field Efficiency = ratio of the actual capacity of a machine to its theoretical capacity

Times Over = number of times to perform a full operation per acre

Hours per Acre (**HA**) = 1.0 / ((Speed \* Width \* Field Efficiency) / 8.25)

Number of Hours Used (NHU)= Hours Per Acre \* Times Over

f) *Labor*: labor is treated as a variable cost. It is assumed that most farm operations in South Carolina do not hire permanent labor for the entire year. It is also assumed that all estimated labor is hired or the family has an opportunity cost equivalent to hired labor. Since commodity budgets are designed to help farmers evaluate alternative crops for their farm business, labor should play a role in the farm planning only if an enterprise is selected for production. Two types of labor are calculated: labor for operation (such as machinery operation) and unallocated work (related to travel, maintenance and management). The formulas for both types are described below:

Labor Hours Per Acre = Number of Hours Used (NHU) \*
Machinery Labor Multiplier

Unallocated Labor Per Acre = Labor Hours Per Acre \*
Unallocated Labor Hours Multiplier

Machinery Labor Multiplier is 1.1 and Unallocated Labor Hours Multiplier is 1.25 for this publication.

- g) *Interest on Operating Capital*: this interest is calculated on variable costs (seed, fertilizer and lime, chemicals, machinery repairs, fuel and lubricants before selling the crop) for the operation period. It is assumed that all funds required for pre-harvest operations are borrowed through a credit source at a current interest rate.
- h) *Irrigation, Machinery and Labor*: irrigation costs are developed similar to the tractor and machinery costs (repair + fuel + lubricant) and labor costs. However, they appear as a single cost in the variable cost section. More information on irrigation systems can be found at the following Internet address: <a href="http://virtual.clemson.edu/groups/irrig">http://virtual.clemson.edu/groups/irrig</a>.
- 2. <u>Fixed Costs</u>: those costs are incurred regardless of whether production occurs. Fixed costs include: depreciation, taxes, insurance, and interest on machinery investment and irrigation system. These costs are considered to be "fixed" because they generally remain the same within a production period and do not vary with output.
- a) *Tractor & Machinery*: this category falls into the same assumptions as variable costs concerning new prices on equipment, average price, hours used per acre, and number of hours used. Total fixed cost is the result of multiplying Total Fixed Cost Per Hour (depreciation + interest + insurance + tax) times Number of Hours Used. The formulas used for each category are shown below:

## DEPRECIATION:

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Salvage Value = Average Price * (RFV1) * [(RFV2) (YEARS OF LIFE)]
Cost Per Hour = (Average Price - Salvage Value) /
(Hours of Annual Use * Years of Life)

INTEREST:

Cost Per Hour = ((Average Price + Salvage Value) * Interest Rate) /
(2.0 * Hours of Annual Use)

INSURANCE:

Cost Per Hour = ((Average Price + Salvage Value) * Insurance Rate) /
(2.0 * Hours of Annual Use)
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TAX:

Cost Per Hour = (Average Price \* Tax Rate) / Hours of Annual Use

The ratios RFV1 and RFV2, years of life, and hours of annual use are found in the 1998 ASAE STANDARDS book. For the purpose of this budget, property taxes are considered to be zero. Net returns to risk and management must be adjusted to reflect personal property taxes.

b) *Irrigation*: the fixed portion of an irrigation system is associated with depreciation, interest, insurance and taxes on the irrigation equipment. Prices were obtained from major dealers in the state

### 3. Other Costs

- a) *Land Rent*: the land rent is an estimate of the ownership cost of using the land resource; it is similar to a rent charge for the use of the land. This cost is allocated for all enterprise budgets to reflect the scarcity of land in the state of South Carolina. If an individual enterprise were to be produced at a competitive level, this cost of production would be incurred as an alternative to make that enterprise more profitable.
- b) *General Overhead*: a general farm overhead cost of 9 percent of total variable costs is included. These are "catch-all" costs including telephone, utilities and contingencies.

#### **RETURNS**

At this point, the budgets should provide the final result of expenses and costs. When a negative result is shown either on Income Above Variable Costs or on Net Returns to Risk and Management, it does not mean that the analyzed enterprise is not profitable. The returns obtained in the budgets are directly related to the selected resources allocated for that particular enterprise. Allocation of resources will vary among location, size of operation, adoption of technology, financial condition, and enterprises. For that reason, each farm operation should focus on the best combination that applies to its current situation and a negative result may not be applied to it.

- a) *Income Above Variable Costs (IAVC)*: the total variable costs are subtracted from the gross receipts. This figure indicates the income above operating cost and is normally used to determine the number of acres of each crop to plant.
- b) *Net Returns to Risk and Management*: this is the normal stopping point in the construction of these budgets. Purchased inputs and owned resources have paid their share. This figure is sometimes referred to as net profit; however, it is more correct to call it a return above all resource costs except management. If the figure is positive, the producer is rewarded for his management efforts and risk taken.
- c) Cost Per Unit of Production: breakeven prices and breakeven yields are shown on all budgets where they are possible. This table will help analyze the responsiveness of yields and prices using IAVC (Total Variable Costs) and Net Returns (Total Costs) as comparative units. Breakeven price is cost/yield. Breakeven yield is cost/unit price.
- d) Net Returns Above Variable Costs at Different Yields and Prices: this table at the second page allows the producer to gain a better understanding about potential returns when prices and yields are adjusted higher and lower than the assumed figures. This information will help the producer to evaluate the risk involved in producing each crop.