

GROWING SWEET SORGHUM FOR SYRUP

Webster defines syrup as, “*A thick, sticky solution of sugar and water*”.

Estimated Production and Processing Costs

Sorghum syrup made from cane sorghum is made by squeezing the juice from the cane and cooking off the excess water to obtain a sweet, sticky syrup – a delicacy in many parts of the country. It has many uses – a primary one being spread on hot biscuits at breakfast. And it is often used as a sweetener in cooking breads and other foods .

It is primarily a local crop in Georgia, 64 acres grown in two counties in North Georgia according to the 1997 U.S. Census of Agriculture. Production that year was 57,173 pounds.

But the syrup is consumed by a devoted clientele. Consequently sorghum syrup is an important source of revenue in several localities.

Given that the crop is economically significant to some farmers, and that little is known about the overall demand (and potential demand) for the syrup, this document is devoted to an estimate of the costs of growing cane and processing sorghum. Cost estimates shown here were obtained in February, 1999 from sorghum growers and processors in Union County Georgia.

The Crop is Relatively Expensive to Grow *“Labor is a Major Input”*

A per acre cost estimate using traditional methods of growing and hand cutting sorghum is shown in table 1. All cost items are included (whether cash or non-cash). Over \$500 of the \$741 total per acre costs are associated with labor inputs.

Much of the labor is often provided by the family, for which there is no direct cash outlay. But a cost is included for all labor, as family labor is considered to have an opportunity for employment off the farm. Processing costs are not included here.

Stripping the Stalks

This cost estimate includes twenty hours of labor to strip the cane before it is cut. Most sorghum growers tell us stripping the cane prior to cutting results in higher yields of syrup – as much as thirty gallons per acre. Further, they tell us stripping the cane results in a higher quality syrup. Sixty hours of labor is allocated for cutting the cane by hand and removing the heads. For purpose of analysis, we suggest using a yield of 150 gallons per acre from stripped cane, and 125 gallons for cane not stripped.

TABLE 1. Estimated Per Acre Costs of Growing Sweet Sorghum for Syrup; Strip and Hand Cut

| Cost Item | Unit | Price per Unit | Total Cost |
|--|-------------|-----------------------|-----------------------|
| 1. VARIABLE COSTS (excl. Labor) | | | |
| Lime | 1/3 Ton | \$22.00 | \$7.33 |
| Seed | 2 lbs. | 7.50 | 15.00 |
| Fertilizer (5-10-15) | 4 cwt. | 9.00 | 36.00 |
| Herbicide (pre-emerge) | 1 qt. | 3.00 | 3.00 |
| Herbicide (post-emerge) | 1 pt. | 2.00 | 2.00 |
| Fuel | 10.2 gal. | .80 | 8.16 |
| Machinery Maintenance | 1 Acre | 27.49 | 27.49 |
| Interest on Variable Costs | \$98.98 | .09 | <u>4.45</u> |
| Sub - Total | | | \$103.43 |
| 2. LABOR | | | |
| Pre Harvest | 4.3 hrs. | 6.50 | \$27.95 |
| Harvest | 80 hrs. | 6.50 | <u>520.00</u> |
| Total Labor | | | \$547.95 |
| 3. TOTAL VARIABLE COSTS | | | |
| Excluding Labor | | | \$103.43 |
| Including Labor | | | \$651.38 |
| 4. FIXED COSTS | | | |
| Land | 1 Acre | 35.00 | \$35.00 |
| Machinery | 1 Acre | 44.49 | 44.49 |
| General Overhead | \$103.43 | .05 | 5.17 |
| Management | \$103.43 | .05 | <u>5.17</u> |
| Total Fixed Costs | | | <u>\$89.83</u> |
| 5. TOTAL PRODUCTION COSTS | | | |
| | | | \$741.21 |

Mechanical Cutting of Stalks

Table 2 shows the estimated costs associated with a labor saving harvest technique – that of using a corn binder to cut the stalks. This harvest system consumes 45 hours of labor and includes time allocated for stripping by hand and harvest with a binder. The heads are removed by hand. Total harvest labor for this system is just over one-half the amount required for hand harvest. Total per acre costs are only about 60% of cost associated with the hand cut harvest system.

Machinery and labor inputs for the two types of harvest systems are shown in appendix tables 1 and 2. While some of the growers who use means other than hand labor to cut the cane do not strip the cane prior to cutting, a cost for stripping is used in both systems to make more valid cost comparisons. If the cane is not stripped, approximately twenty less hours of labor is needed.

Processing Requirements: *Capital Investment, Fuel, Containers and Labor*

The Initial Investment to process sorghum syrup is relatively small when compared to other farm investments. Total initial investment is estimated to be about \$14,000 (table 3). But these facilities are used for a short period of time each fall and a high level of managerial skills are required for operation. Per gallon processing costs are usually more expensive than costs of cane production.

Fuel and Containers expenditures together amount to near \$3.00 per gallon of syrup. Syrup processors indicate it takes from two-to-three gallons of fuel to make one gallon of syrup. This analysis uses two gallons fuel for one gallon of syrup. Container costs are for quart jar containers.

Labor Costs Are Near Equal the Amount for Fuel and Containers. Two individuals are needed to operate the mill for squeezing the cane. At the cooking operation, two persons are necessary to put the syrup into containers, in addition to the one person who oversees the cooking operation. An estimated seventy hours of labor is used per acre of sorghum cane.

Total estimated costs for processing, per acre and per gallon (150 gallons per acre), are shown in table 4.

Total Costs for Production and Processing are combined and shown in table 5. All costs, both cash and non-cash, are estimated to be in excess of \$1,700 per acre. A yield of 150 gallons per acre amounts to a per gallon cost of nearly \$12.00. A lower yield per acre will make this per gallon cost higher. While many operators use self and family labor, and have less cash costs than those shown here, any returns (profits) should be divided into returns per acre and for profit. Profit is obtained after all costs have been incurred.

TABLE 2. Estimated Per Acre Costs of Growing Sweet Sorghum for Syrup; Hand Strip; Cut w/Corn Binder

| Cost Item | Unit | Price per Unit | Total Cost |
|--|-------------|-----------------------|-----------------------|
| 1. VARIABLE COSTS (excl. Labor) | | | |
| Lime | 1/3 Ton | \$22.00 | \$7.33 |
| Seed | 2 lbs. | 7.50 | 15.00 |
| Fertilizer (5-10-15) | 4 cwt. | 9.00 | 36.00 |
| Herbicide (pre-emerge) | 1 qt. | 3.00 | 3.00 |
| Herbicide (post-emerge) | 1 pt. | 2.00 | 2.00 |
| Fuel | 12.2 gal. | .80 | 9.76 |
| Machinery Maintenance | 1 Acre | 40.62 | 40.62 |
| Interest on Variable Costs | \$113.71 | .09 | <u>5.12</u> |
| Sub - Total | | | \$118.83 |
| 2. LABOR | | | |
| Pre Harvest | 4.3 hrs. | 6.50 | \$27.95 |
| Harvest | 45 hrs. | 6.50 | <u>292.50</u> |
| Total Labor | | | \$320.95 |
| 3. TOTAL VARIABLE COSTS | | | |
| Excluding Labor | | | \$118.83 |
| Including Labor | | | \$439.28 |
| 4. FIXED COSTS | | | |
| Land | 1 Acre | 35.00 | \$35.00 |
| Machinery | 1 Acre | 47.95 | 47.95 |
| General Overhead | \$118.83 | .05 | 5.94 |
| Management | \$118.83 | .05 | <u>5.94</u> |
| Total Fixed Costs | | | <u>\$94.83</u> |

| | | | |
|----------------------------------|--|--|-----------------|
| 5. TOTAL PRODUCTION COSTS | | | \$415.78 |
|----------------------------------|--|--|-----------------|

| TABLE 3. Estimated Investment and Annual Fixed Costs for Equipment to Process Sorghum Syrup | | | | | | |
|--|----------------|--------------|------------------------|--------------|--------------|--------------------|
| Cost Item | Cost | Life (Years) | <u>Estimated Costs</u> | | | Total Annual Costs |
| | | | <u>For:</u> | Deprec. | Repairs | |
| <u>Buildings:</u> | | | | | | |
| 30 x 30, Juice Extraction | \$2,250 | 20 | \$112 | \$56 | \$101 | \$269 |
| 20 x 20 for Cooking | 1,800 | 20 | 90 | 45 | 81 | 216 |
| 8 x 20 for Storage | 2,000 | 20 | 100 | 50 | 90 | 240 |
| Total Buildings | \$6,050 | | \$302 | \$151 | \$272 | \$725 |
| <u>Equipment:</u> | | | | | | |
| Mill | \$1,750 | 20 | \$87 | \$87 | \$79 | \$253 |
| Elec. Motor & Transmission | 600 | 20 | 30 | --- | 27 | 57 |
| Stalk Conveyer | 600 | 15 | 40 | 15 | 27 | 82 |
| Power Belt | 350 | 10 | 35 | --- | 16 | 51 |
| | | | | | | |
| Pan Foundation | 800 | 20 | 40 | --- | 36 | 76 |
| Cooking Pan | 3,000 | 10 | 300 | --- | 135 | 435 |
| Fuel System | 250 | 10 | 25 | --- | 11 | 36 |
| Juice Box | 125 | 10 | 12 | --- | 6 | 18 |
| Syrup Tank | 250 | 10 | 25 | --- | 11 | 36 |
| Skimmings Tank | 400 | 20 | 20 | --- | 18 | 38 |
| | | | | | | |

| | | | | | | |
|--|----------------|--|--------------|--------------|--------------|----------------|
| Total Equipment | \$8125 | | \$614 | \$102 | \$366 | \$1,082 |
| Total Buildings & Equipment | \$14175 | | \$916 | \$253 | \$638 | \$1,807 |

NOTE: Annual Interest Costs Estimated as:

$\frac{\text{New Cost} \times 9\%}{2}$

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| TABLE 4. Estimated Costs of Processing One Acre of Sorghum Cane for Syrup (150 gallons) | | | | |
|--|--------------|---------------------------|--------------------------------|----------------------------------|
| Cost Item | Units | Price per Unit | Total Cost per Acre | Total Cost per Gallon |
| 1. <u>Variable Costs</u>, (excl.Labor): | | | | |
| Fuel | 300 gal. | \$0.75 | \$225.00 | \$1.50 |
| Containers | 600 qt. | .35 | 210.00 | 1.40 |
| Electricity | 60 kwh | .10 | 6.00 | .04 |
| Machinery | 1 acre | 20.00 | 20.00 | .13 |
| Total Variable Costs | | | \$461.00 | \$3.07 |
| 2. <u>Fixed Costs</u> | | | | |
| Buildings | 1 acre | 48.00 | \$48.00 | \$0.32 |
| Equipment | 1 acre | 72.00 | 72.00 | .48 |
| Total Fixed Costs | | | \$120.00 | \$0.80 |
| 3. <u>Labor</u> | 70 hrs. | \$6.50 | \$455.00 | \$3.03 |
| 4. <u>Total Processing Costs</u> | | | \$1,036.00 | \$6.90 |

TABLE 5. Estimated Total Costs for the Production and Processing of Sorghum Syrup (150 gallons)

| Cost Item | Cost per Acre | Cost per Gallon |
|---|----------------------|------------------------|
| 1. <u>Variable Costs, (excl. Labor):</u> | | |
| Production | \$103.00 | \$0.69 |
| Processing | <u>461.00</u> | <u>3.07</u> |
| Total Variable Costs | \$564.00 | \$3.76 |
| | | |
| 2. <u>Fixed Costs:</u> | | |
| Production | \$90.00 | \$0.60 |
| Processing | <u>120.00</u> | <u>.80</u> |
| Total Fixed Costs | \$210.00 | \$1.40 |
| | | |
| 3. <u>Labor:</u> | | |
| Production | \$548.00 | \$3.65 |
| Processing | <u>455.00</u> | <u>3.03</u> |
| Total Labor Costs | \$1,003 | \$6.68 |
| | | |
| 4. <u>Total All Costs</u> | \$1,777 | \$11.84 |

Costs for Growing and Share Processing

Not all growers have processing facilities. Consequently, they haul the cane to a sorghum mill and pay a custom processor to cook off the syrup. A common agreement is to give the processor one-fourth of the syrup. The grower pays for three-fourths of the fuel, provides three-fourths of the containers, provides one worker during the cooking process and one worker for feeding the cane into the mill.

Using the cost figures in this analysis and a 150 gallon yield of syrup, the grower receives 112 gallons from an acre of sorghum with a total cost of \$11.55 per gallon (table 6).

Plan With Care

The inputs and yields used in the analysis are intended as a guide for planning. Actual yields can be higher or lower – and costs can vary. Producers should estimate their own costs when planning for production. And any increase in acreage should be done only after the market potential is determined. Experiences with other specialty farm commodities have shown that the farm price can drop quickly when production increases faster than demand.

Acknowledgments

Appreciation is expressed to individual cane growers and processors who devoted time and assistance in collecting this cost data. This analysis would not have been possible without their cooperation.

TABLE 6. Estimated Costs for Growing Sorghum and Custom Processing Syrup

| Cost Item | Cost per Acre | Cost /Gallon Received |
|---|----------------------|------------------------------|
| 1. <u>Growing Cane:</u> | | |
| Variable Costs | \$103.00 | \$0.92 |
| Fixed Costs | 90.00 | .80 |
| Labor | <u>548.00</u> | <u>4.89</u> |
| Total Production Costs | \$741.00 | \$6.61 |
| 2. <u>Processing Syrup:</u> | | |
| Fuel | \$169.00 | \$1.51 |
| Containers | 157.00 | 1.40 |
| Labor | <u>227.00</u> | <u>2.03</u> |
| Total Processing Costs | \$553.00 | \$4.94 |
| 3. <u>Total Costs</u> | | |
| | \$1,294.00 | \$11.55 |
| 4. <u>Net Sorghum to Grower;</u> <u>Gallons per Acre</u> | | |
| | | 112 Gallons |

Note: The growers provides 3/4 of the fuel and received 3/4 of the syrup, in this example is 112 gallons. Further, the grower provides containers for his share and provides two workers during the cooking process.