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The Estimated Cost of Producing Sweetpotato Slips

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FOREWORD

This report is designed to provide necessary planning data to farmers, research and extension staffs, lending agencies, and others in agriculture. Readers are cautioned that returns presented are labeled **"Returns above Specified Expenses"** and should be carefully interpreted.

Sweetpotato farming operations can have three components: plant beds, production, and packing sheds. Plant beds produce slips for transplanting. Commercial sweetpotato growers (producers) transplant slips as part of their production process to grow (produce) sweetpotatoes for sale.

This report complements Department of Agricultural Economics Research Report 99-005 *(5)* and Mississippi Agricultural and Forestry Experiment Station Bulletin 1096 *(6)*.

ACKNOWLEDGMENTS

The authors wish to express appreciation to several people whose contributions made this project possible. Mississippi sweetpotato producers provided information on crop practices used. Dudley Stephens provided assistance in computer applications and data management, developed the budgets, and constructed all tables. Debra Price organized and typed the manuscript. Personnel of the Mississippi State University Extension Service and the Mississippi Agricultural and Forestry Experiment Station provided numerous services that made this report possible.

DEFINITIONS OF SELECTED TERMS

Plastic — Ground cover material is black; tent material is clear. The recommended thickness is 1.5 millimeters.

Agribond — This porous material, employed to cover the plants after the plastic is removed, can be reused. Some growers report approximately half of the Agribond can be used for 2 years. The budgets indicated all of the Agribond is replaced each year.

Plastic crate — A standard 6-gallon milk crate is used to hold harvested slips. A single crate holds 1,000 slips.

Bin — A bin is a container that holds 1,000 pounds of potatoes. Standard bins are wooden, but plastic bins are currently available.

Bedding wagon — A tractor-towed implement that "plants" the seed potatoes, the bedding wagon lays the seed potatoes on the surface. The typical width of the planted seed potatoes is 30 inches. A forklift is used to load the bedding wagon with seed potatoes from bins.

Plant groomer — This towed implement cuts the plants (slips) to a uniform height.

Plant cutter — This towed implement harvests the slips. The one specified in the budgets requires two riders or laborers on the cutter. Several laborers support it on the ground by gathering the slips and placing them in plastic crates.

Acre of plant beds — The number of linear feet of bed in an acre of land depends on the planting pattern. A 40-inch bedder generates 13,068 linear feet of row per acre of land.

(a) 80-inch (2x1) skip — This pattern uses every other pair of 40-inch rows for a bed. Hence, the "lanes" are also 80 inches. It results in 3,267 linear feet of bed per acre of land.

(b) 80-inch with an 8-foot lane or alley — This pattern results in 2,970 linear feet of beds per acre.

(c) 80-inch (2x1) with an 8-foot lane or alley — This system has a pair of 80-inch beds separated by an 80-inch skip with an 8-foot alley between each pair of beds. This system results in 3,111 linear feet of beds per acre of lane.

Plant bed — In these budgets, a plant bed is 80 inches wide. The area actually planted with seed potatoes is 30 inches in width.

Sweetpotato Seed Quality Available to Growers

(a) Highest quality — The highest quality available to growers is composed of hand-selected, virus-tested seed potatoes from a certified seed grower. Three generations of virus-tested seed are available from certified growers: G1, G2, and G3. G1 is the highest quality available.

(b) Middle quality — The next level of quality is composed of hand-selected, field-run seed potatoes from experienced growers. These potatoes may have originated from virus-tested seed stock but are grown by noncertified growers.

(c) Lowest quality — The lowest quality category contains field-run seed potatoes. These seed are not selected for size or appearance and are only slightly better than canner-grade potatoes. These seed are not recommended.

Keywords: sweetpotato, slips, transplants, tent method, plastic mulch

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Introduction

Most sweetpotato slip producers use two methods of production. The plastic mulch method accounts for 80%, while the tent method accounts for 20% of the slips. The combination of both methods yields approximately 750,000 slips per acre per season per producer.

Most Mississippi sweetpotato producers grow their own slips. Often, two or more smaller producers grow their slips in a single set of plant beds at one location. Many small commercial sweetpotato producers and a few larger producers purchase their slips. In Mississippi, most of the slips offered for sale are grown by large producers who deliberately have a larger acreage of plant beds and grow more slips than they require for their own commercial sweetpotato production.

Methodology

The purpose of this report is to provide an overview of production practices and cost estimates for sweetpotato slip production in Mississippi. Due to the detailed nature of the cost computations, a computerized budget generator procedure was employed. The microcomputer enterprise budget generator developed at Mississippi State University *(4,8)* was used because its procedures for computation and output formats (the budget tables) are widely accepted.

The Department of Agricultural Economics at Mississippi State University routinely publishes budgets for most major crops by regions of the state *(1,2,7)*. These publications contain information necessary to compute the direct and fixed cost per acre of operating tractors and towed equipment, such as performance rate (hours per acre to complete a task), purchase price, and useful life. They also include prices for fertilizers, herbicides, insecticides, and other inputs. The department's most current estimates of these parameters were used in this report. See Appendix Tables 1-5 for the specific information employed to calculate the per-acre cost of producing sweetpotato slips.

The authors estimated the costs of items unique to sweetpotato production by surveying producers, machinery and input dealers, and other relevant industry constituents in the Vardaman area. Labor wage rates were standardized at the levels currently employed by the Department of Agricultural Economics at Mississippi State University *(2)*. A complete listing of the items used in this report is found in Appendix Tables 1-5.

Budgets for Sweetpotato Slips

This publication provides economic and technical information in the form of enterprise budgets for sweetpotato slips produced by Mississippi farmers. The purpose of this section is to present the methods and procedures used to calculate costs and returns.

Enterprise budgets represent a type of information that can be used by a variety of individuals in making decisions:

— Farmers for planning;

— Extension personnel to formulate educational programs for farmers;

— Lenders as a basis for credit; and

— Scientists to provide basic data for research.

Enterprise budgets should be prepared with a specific objective in mind. The budgets in this report were prepared to provide general information for several different uses. They provide information concerning general levels of costs and returns for a "representative" farm operation. These cost and return estimates must be adjusted for specific situations. Most growers should think of these budgets as a first approximation and then make appropriate adjustments for their own operations, using the "Your Farm" column provided, to add, delete, or change costs or incomes to reflect their own specific situations (Appendix Tables 6A, 6B). The budget generator automatically outputs estimates of income and returns in addition to costs. This report is primarily concerned with per-acre costs.

RESULTS

Estimated resource use and costs per acre for sweetpotato slip production using black plastic mulch technology are presented in Table 1A. Table 1B reports similar information for the clear plastic tent method of production.

Plastic Mulch

Some slip producers employ this method on all their acreage devoted to slip production. This method uses black plastic to increase temperature in the beds. A secondary function of the plastic is weed control.

Preplant Tillage and Bedding — Most growers hip their land into rows in the fall for drainage. The budget indicates an "8-row-40" middle buster [Operation (Op.) 1] and a 170-horsepower tractor on 100% of the acreage (indicated as 1.00 in the "Times Over" column). If necessary, a burn-down herbicide is applied in the spring. The budget indicates 0.5 pint per acre of RoundUp on 25% of the acreage.

Growers tend to complete operations 3 through 15 (lay/cover plastic) and 16 (punch holes) in a single day on limited acreage (usually less than 2 acres) so that several days are required to complete bedding. Considerable tillage is required before bedding and covering with plastic. The budget employs the following sequence of operations:

No.	Operation	Times Over
3	Rehip	1.5
4	Chisel	1.0
5	Disk	2.0
6	Do-All	1.0
7	Fertilize	1.0
8	Spray	1.0
9	Disk	1.0
10	Roll	1.0
11	Plant	1.0
12	Spray	1.0
13	Roll	1.0
14	Cover w/ Dirt	2.0
15	Cover w/ Plastic	1.0
16	Punch Holes	1.0

A one-row roller (op. 10) is used to firm the bed, and a towed tool labeled "bedding wagon" (op. 11) plants the seed potatoes. A towed tool labeled "dirt bedder" covers the seed potatoes with dirt. The final operations of the day are to install the plastic (op. 15) and punch holes into the plastic (op. 16). While both operations 15 and 16 are mechanical, the budgets indicate additional labor not related to the tractor or the tools that lay and cover the plastic or punch the holes.

Fertilizer — The budget summarizes the cost of the following fertility program: 400 pounds of 13-13-13 (op. 7), 100 pounds of Bulldog Soda after two of the operations labeled "plant groomer" (designed to establish uniform plant height), and 150 pounds of Bulldog Soda after all but the last harvest.

Spray Program — Table 1A reports the cost of the program described below.

Operation	Material	Type
8	Imidan Command	Insecticide Herbicide
12	Botran Mertech	Fungicide Fungicide
19	Penncap-M Poast	Insecticide Herbicide

Black Plastic Management — After the plastic is installed (laid and covered), and the holes are punched, the budget indicates no costs associated with the plastic until it is removed and destroyed (hauled).

Agribond Management — Agribond, a porous material that allows water to penetrate, modifies the temperature around the new plants (slips). Table 1A reports the costs associated with the following sequence of events: install (Agribond), remove, groom, fertilize, replace; remove, groom, fertilize, replace; remove, groom, haul. The budget indicates the Agribond is removed three times for grooming.

Miscellaneous Costs — The disk bedder is a custom-built tool made from two ditchers (often called "ditch witches"). It leaves two trenches that some growers cover. The budgets do not reflect the cost of covering the trenches. The budgets reflect the cost of two irrigations by a traveling gun.

Harvest — Table 1A lists the costs associated with a towed harvesting unit. The costs reflect two men on the plant cutter, along with the tractor driver and eight men on the ground. Slips are placed in crates. The budget assumes that 10% of the crates are lost per season.

Tent Method

Clear plastic tents are estimated to be used on approximately 20% of the acreage devoted to slip production. None of the operations associated with the plastic mulch system is deleted (see Table 1A). Operation 15a is added to install the tents. It assumes that 10% of the stakes and PVC pipes are replaced per season.

The tent must be opened on hot days (op. 15b). Operation 17a is added to remove and haul the clear plastic (and to remove and store the stakes and pipes).

Table 1A. Estimated resource use and costs for field operations, per-acre sweetpotato slip budget (plastic mulch), Mississippi, 2001.

Operation/ operating input	Size/ unit	Tractor size	Perf. rate	Times over	Month	Tractor cost		Equip. cost		Alloc. labor		Operating input			Total cost
						Direct	Fixed	Direct	Fixed	Hours	Cost	Amount	Price	Cost	
						$	$	$	$		$		$	$	$
(1) Middle Buster	8R-40	170 hp	0.088	1.00	Oct	1.30	1.54	0.33	0.62	0.088	0.77				4.57
(2) Spray (Broadcast)	27'	150 hp	0.061	0.25	Feb	0.20	0.24	0.03	0.05	0.022	0.18				0.72
Roundup Ultra 4SL	pt											0.5	4.99	2.49	2.49
(3) Disk Bed (Hipper)	8R-40	150 hp	0.070	1.50	Feb	1.40	1.72	0.49	0.99	0.105	0.91				5.53
(4) Chisel Plow	24'	150 hp	0.078	1.00	Feb	1.04	1.27	0.24	0.59	0.078	0.68				3.84
(5) Heavy Disk	21'	170 hp	0.112	2.00	Feb	3.32	3.92	1.77	3.54	0.224	1.96				14.53
(6) Row Cond. (Plant)	27'	150 hp	0.073	1.00	Feb	0.97	1.19	0.51	1.09	0.073	0.63				4.43
(7) Spin Spreader	4 ton	150 hp	0.042	1.00	Feb	0.56	0.68	0.30	0.55	0.084	0.65				2.76
Fert. 13-13-13	cwt											4.0	11.00	44.00	44.00
(8) Spray (Broadcast)	27'	150 hp	0.061	1.00	Feb	0.81	0.99	0.13	0.20	0.091	0.74				2.90
Imidan 50-WP	lb											1.5	5.90	8.85	8.85
Command 4EC	pt											2.5	9.70	24.25	24.25
Trailer (Water)	10 ft	75 hp	0.600	1.00	Feb	4.09	4.10	0.57	2.29	0.600	5.25				16.32
(9) Heavy Disk	21'	170 hp	0.112	1.00	Feb	1.66	1.96	0.88	1.77	0.112	0.98				7.26
(10) Roller	1-row	75 hp	1.120	1.00	Feb	7.63	7.65	0.14	0.50	1.120	9.81				25.76
(11) Bedding Wagon	1-row	150 hp	2.500	1.00	Feb	33.53	40.95	7.80	20.73	7.500	56.45				159.47
Forklift—Field			1.000					7.70	14.07	1.000	8.76				30.54
Seed potatoes	lb											15000.0	0.15	2250.00	2250.00
Bedding Labor	hour											10.0	6.91	69.10	69.10
Truck	5 ton		1.000	1.00	Feb			9.87	14.75	1.000	8.76				33.38
(12) Spray (Broadcast)	12'	150 hp	0.124	1.00	Feb	1.66	2.03	0.16	0.24	0.186	1.51				5.62
Botran	lb											2.0	9.57	19.14	19.14
Mertect	oz											8.0	1.64	13.12	13.12
Trailer (Water)	10 ft	75 hp	0.600	1.00	Feb	4.09	4.10	0.57	2.29	0.600	5.25				16.32
(13) Roller	1-row	75 hp	1.120	1.00	Feb	7.63	7.65	0.14	0.50	1.120	9.81				25.76
(14) Dirt Bedder	1-row	150 hp	1.250	2.00	Feb	33.53	40.95	3.06	7.52	2.500	21.90				106.98
(15) Lay/Cover Plastic	1-row	75 hp	2.500	1.00	Feb	17.05	17.08	1.25	3.58	2.500	21.90				60.87
B. Plastic 8x2000	roll											2.0	77.00	154.00	154.00
Cover Plastic Labor	hour											5.0	6.91	34.55	34.55
(16) Hole Puncher	3 ft	75 hp	0.750	1.00	Mar	5.11	5.12	0.62	1.34	0.750	6.57				18.78
Hole Punch Labor	hour											2.0	6.91	13.82	13.82
(17) Trailer (Utility)	10 ft	75 hp	0.600	1.00	Apr	4.09	4.10	0.24	1.19	0.600	5.25				14.88
Truck	2 ton		1.000					7.76	12.35	1.000	8.76				28.87
Remove Plastic Labor	hour											10.0	6.91	69.10	69.10
Haul Plastic Labor	hour											12.0	6.91	82.92	82.92
(18) Spin Spreader	4 ton	150 hp	0.042	1.00	Apr	0.56	0.68	0.30	0.55	0.084	0.65				2.76
Amm. Nitrate (34% N)	cwt											0.5	12.00	6.00	6.00
(19) Spray (Broadcast)	12'	150 hp	0.124	1.00	Apr	1.66	2.03	0.16	0.24	0.186	1.51				5.62
Penncap-M 2F	pt											2.0	3.23	6.46	6.46
Poast	pt											1.5	9.82	14.73	14.73
(20) Irrigate (Gun)	inch			1.00	Apr			3.34	21.78	0.005		1.0			25.12
(21) Install Agribond Labor	hour			1.00	Apr							12.0	6.91	82.92	82.92
Agribond 83x1000	roll											2.0	225.00	450.00	450.00
(22) Remove Agribond Labor	hour			2.00	Apr							16.0	6.91	110.56	110.56
(23) Plant Groomer	1-row	150 hp	0.350	3.00	Apr	14.08	17.20	1.89	3.76	1.050	9.19				46.14
(24) Spin Spreader	4 ton	150 hp	0.042	2.00	Apr	1.12	1.37	0.60	1.10	0.168	1.31				5.53
Bulldog Soda—16.5% N	cwt											1.0	11.00	11.00	11.00
(25) Replace Agribond Labor	hour			2.00	Apr							20.0	6.91	138.20	138.20
(26) Irrigate (Gun)	inch			1.00	Apr			3.34		0.005		1.0			3.34
(27) Trailer (Utility)	10 ft	75 hp	0.600	1.00	Apr	4.09	4.10	0.24	1.19	0.600	5.25				14.88
Truck	2 ton		1.000					7.76	12.35	1.000	8.76				28.87
Remove Agribond Labor	hour											16.0	6.91	110.56	110.56
Haul Agribond Labor	hour											8.0	6.91	55.28	55.28
(28) Plant Cutter	1-row	150 hp	3.330	2.50	May	111.67	136.37	28.30	56.42	24.975	187.97				520.75
Truck	2 ton		1.000					19.40	30.89	2.500	21.90				72.19
Harvest Slip Labor	hour											70.0	8.66	606.20	606.20
Crate	each											25.0	6.00	150.00	150.00
(29) Spin Spreader	4 ton	150 hp	0.042	1.50	May	0.84	1.03	0.45	0.83	0.126	0.98				4.15
Bulldog Soda—16.5% N	cwt											1.5	11.00	16.50	16.50
TOTALS						**263.83**	**310.13**	**110.47**	**220.00**	**52.055**	**415.12**			**4543.75**	**5863.33**
INTEREST ON OPERATING CAPITAL															**126.83**
UNALLOCATED LABOR															**210.24**
TOTAL SPECIFIED COST															**6200.41**

Table 1B. Estimated resource use and costs for field operations, per-acre sweetpotato slip budget (tent method), Mississippi, 2001.

Operation/ operating input	Size/ unit	Tractor size	Perf. rate	Times over	Month	Tractor cost		Equip. cost		Alloc. labor		Operating input			Total cost
						Direct	Fixed	Direct	Fixed	Hours	Cost	Amount	Price	Cost	
						$	$	$	$		$		$	$	$
(1) Middle Buster	8R-40	170 hp	0.088	1.00	Oct	1.30	1.54	0.33	0.62	0.088	0.77				4.57
(2) Spray (Broadcast)	27'	150 hp	0.061	0.25	Feb	0.20	0.24	0.03	0.05	0.022	0.18				0.72
Roundup Ultra 4SL	pt											0.5	4.99	2.49	2.49
(3) Disk Bed (Hipper)	8R-40	150 hp	0.070	1.50	Feb	1.40	1.72	0.49	0.99	0.105	0.91				5.53
(4) Chisel Plow	24'	150 hp	0.078	1.00	Feb	1.04	1.27	0.24	0.59	0.078	0.68				3.84
(5) Heavy Disk	21'	170 hp	0.112	2.00	Feb	3.32	3.92	1.77	3.54	0.224	1.96				14.53
(6) Row Cond. (Plant)	27'	150 hp	0.073	1.00	Feb	0.97	1.19	0.51	1.09	0.073	0.63				4.43
(7) Spin Spreader	4 ton	150 hp	0.042	1.00	Feb	0.56	0.68	0.30	0.55	0.084	0.65				2.76
Fert. 13-13-13	cwt											4.0	11.00	44.00	44.00
(8) Spray (Broadcast)	27'	150 hp	0.061	1.00	Feb	0.81	0.99	0.13	0.20	0.091	0.74				2.90
Imidan 50-WP	lb											1.5	5.90	8.85	8.85
Command 4EC	pt											2.5	9.70	24.25	24.25
Trailer (Water)	10 ft	75 hp	0.600	1.00	Feb	4.09	4.10	0.57	2.29	0.600	5.25				16.32
(9) Heavy Disk	21'	170 hp	0.112	1.00	Feb	1.66	1.96	0.88	1.77	0.112	0.98				7.26
(10) Roller	1-row	75 hp	1.120	1.00	Feb	7.63	7.65	0.14	0.50	1.120	9.81				25.76
(11) Bedding Wagon	1-row	150 hp	2.500	1.00	Feb	33.53	40.95	7.80	20.73	7.500	56.45				159.47
Forklift—Field			1.000					7.70	14.07	1.000	8.76				30.54
Seed potatoes	lb											15000.0	0.15	2250.00	2250.00
Bedding Labor	hour											10.0	6.91	69.10	69.10
Truck	5 ton		1.000	1.00	Feb			9.87	14.75	1.000	8.76				33.38
(12) Spray (Broadcast)	12'	150 hp	0.124	1.00	Feb	1.66	2.03	0.16	0.24	0.186	1.51				5.62
Botran	lb											2.0	9.57	19.14	19.14
Mertect	oz											8.0	1.64	13.12	13.12
Trailer (Water)	10 ft	75 hp	0.600	1.00	Feb	4.09	4.10	0.57	2.29	0.600	5.25				16.32
(13) Roller	1-row	75 hp	1.120	1.00	Feb	7.63	7.65	0.14	0.50	1.120	9.81				25.76
(14) Dirt Bedder	1-row	150 hp	1.250	2.00	Feb	33.53	40.95	3.06	7.52	2.500	21.90				106.98
(15) Lay/Cover Plastic	1-row	75 hp	2.500	1.00	Feb	17.05	17.08	1.25	3.58	2.500	21.90				60.87
B. Plastic 8x2000	roll											2.0	77.00	154.00	154.00
Cover Plastic Labor	hour											5.0	6.91	34.55	34.55
(15a) Install Tent labor	hour			1.00	Feb							48.0	6.91	331.68	331.68
Clear Plastic 16x100	roll											40.0	30.00	1200.00	1200.00
PVC Pipe (1/2")	12'											100.0	1.20	120.00	120.00
Stake-Rebar (3/8")	2'											200.0	0.13	26.00	26.00
(15b) Open Tent Labor	hour			1.00	Feb							8.0	6.91	55.28	55.28
Close Tent Labor	hour											8.0	6.91	55.28	55.28
(16) Hole Puncher	3 ft	75 hp	0.750	1.00	Mar	5.11	5.12	0.62	1.34	0.750	6.57				18.78
Hole Punch Labor	hour											2.0	6.91	13.82	13.82
(17) Trailer (Utility)	10 ft	75 hp	0.600	1.00	Apr	4.09	4.10	0.24	1.19	0.600	5.25				14.88
Truck	2 ton		1.000					7.76	12.35	1.000	8.76				28.87
Remove Plastic Labor	hour											10.0	6.91	69.10	69.10
Haul Plastic Labor	hour											12.0	6.91	82.92	82.92
(17a) Trailer (Utility)	10 ft	75 hp	0.600	1.00	Apr	4.09	4.10	0.24	1.19	0.600	5.25				14.88
Truck	2 ton		1.000					7.76	12.35	1.000	8.76				28.87
Remove Tent Labor	hour											40.0	6.91	276.40	276.40
Haul Tent Labor	hour											50.0	6.91	345.50	345.50
(18) Spin Spreader	4 ton	150 hp	0.042	1.00	Apr	0.56	0.68	0.30	0.55	0.084	0.65				2.76
Amm. Nitrate (34% N)	cwt											0.5	12.00	6.00	6.00
(19) Spray (Broadcast)	12'	150 hp	0.124	1.00	Apr	1.66	2.03	0.16	0.24	0.186	1.51				5.62
Penncap-M 2F	pt											2.0	3.23	6.46	6.46
Poast	pt											1.5	9.82	14.73	14.73
(20) Irrigate (Gun)	inch			1.00	Apr			3.34	21.78	0.005		1.0			25.12
(21) Install Agribond Labor	hour			1.00	Apr							12.0	6.91	82.92	82.92
Agribond 83x1000	roll											2.0	225.00	450.00	450.00
(22) Remove Agribond Labor	hour			2.00	Apr							16.0	6.91	110.56	110.56
(23) Plant Groomer	1-row	150 hp	0.350	3.00	Apr	14.08	17.20	1.89	3.76	1.050	9.19				46.14
(24) Spin Spreader	4 ton	150 hp	0.042	2.00	Apr	1.12	1.37	0.60	1.10	0.168	1.31				5.53
Bulldog Soda—16.5%N	cwt											1.0	11.00	11.00	11.00
(25) Replace Agribond Labor	hour			2.00	Apr							20.0	6.91	138.20	138.20
(26) Irrigate (Gun)	inch			1.00	Apr			3.34		0.005		1.0			3.34
(27) Trailer (Utility)	10 ft	75 hp	0.600	1.00	Apr	4.09	4.10	0.24	1.19	0.600	5.25				14.88
Truck	2 ton		1.000					7.76	12.35	1.000	8.76				28.87
Remove Agribond Labor	hour											16.0	6.91	110.56	110.56
Haul Agribond Labor	hour											8.0	6.91	55.28	55.28
(28) Plant Cutter	1-row	150 hp	3.330	2.50	May	111.67	136.37	28.30	56.42	24.975	187.97				520.75
Truck	2 ton		1.000					19.40	30.89	2.500	21.90				72.19
Harvest Slip Labor	hour											70.0	8.66	606.20	606.20
Crate	each											25.0	6.00	150.00	150.00
(29) Spin Spreader	4 ton	150 hp	0.042	1.50	May	0.84	1.03	0.45	0.83	0.126	0.98				4.15
Bulldog Soda—16.5%N	cwt											1.5	11.00	16.50	16.50
TOTALS						**267.92**	**314.23**	**118.48**	**233.55**	**53.655**	**429.14**			**6953.89**	**8317.24**
INTEREST ON OPERATING CAPITAL															**179.90**
UNALLOCATED LABOR															**221.45**
TOTAL SPECIFIED COST															**8718.61**

Per-Acre Costs and Returns

Estimated per-acre income, costs, and returns are summarized in Tables 2A and 2B. Remember that this paper focuses on the per-acre cost of producing sweetpotato slips. The number of cuttings per season, slips per cutting, slip prices, income, and returns are highly variable.

Income

The expected yield of 300,000 slips per acre per cutting (750,000 per season) at an estimated average price of $20 per thousand results in an income estimate of $15,000 per acre. Sweetpotato slip prices usually begin the season at or near $30 per thousand, fall to $20 per thousand, and end the season at or less than $10 per thousand. Most growers who produce slips for sale discontinue sales at prices less than $10.

Direct Costs

Estimated direct expenses per acre associated with sweetpotato production (plastic mulch) total $5,670 (Table 2A). Miscellaneous supplies (black plastic, Agribond, and crates) account for the majority of the direct costs (Appendix Table 6A). The largest item is designated "special labor." These items are identified so that users of the budget material can follow the operations or trips over the field. They include bedding labor, cover plastic labor, haul plastic labor, install Agribond labor, remove and replace Agribond labor, harvest slip labor, etc. (see Appendix Table 6A). Special labor items total $1,373.

Operator labor indicates driver time for tractors and self-propelled equipment. Hand labor is a budget-generator-created item, which indicates support labor for the equipment operator or driver. Unallocated labor is also a budget-generator-calculated item, and is an attempt to estimate overhead labor *(3)*.

Direct expenses associated with the tent method (Table 2B and Appendix Table 6B) increase miscellaneous supplies from $754 to $2,100 to account for the clear plastic used to construct the tents and the PVC pipes and rebar stakes required to hold the tents in place. Special labor is increased from $1,373 to $2,437.

Fixed Costs

Total fixed expenses for the plastic mulch system are estimated at $530. For the tent method, total fixed expenses are increased slightly to $548. The difference is associated with the trailer and tractor and truck utilized to remove and haul the clear plastic. Fixed expenses assume fully utilized machines but do not include management, land rent, and general farm overhead cost.

Total Specified Costs

Total specified expenses, the sum of direct expenses and fixed expenses, for a commercial acre of sweetpotato slips produced 80% by plastic mulch technology and 20% by the tent method, is $6,704. Total direct expenses are $6,170, and total fixed expenses are $534.

Table 2A. Summary of estimated costs and returns per acre, sweetpotato slip budget (plastic mulch), Mississippi, 2001.

Item	Unit	Price	Quantity	Amount	Your farm
		$		*$*	
INCOME					
Sweetpotato slips	thou.	20.00	750.0000	15000.00	
TOTAL INCOME				15000.00	
DIRECT EXPENSES					
Fertilizers	acre	77.50	1.0000	77.50	
Fungicides	acre	32.26	1.0000	32.26	
Herbicides	acre	41.47	1.0000	41.47	
Insecticides	acre	15.31	1.0000	15.31	
Seed/plants	acre	2250.00	1.0000	2250.00	
Misc. supplies	acre	754.00	1.0000	754.00	
Special labor	acre	1373.21	1.0000	1373.21	
Operator labor	hour	8.76	30.0008	262.80	
Hand labor	hour	6.91	22.0436	152.32	
Unallocated labor	hour	8.76	24.0006	210.24	
Diesel fuel	gal	1.05	179.3426	188.30	
Repair & maintenance	acre	186.00	1.0000	186.00	
Interest on op. cap.	acre	123.83	1.0000	126.83	
TOTAL DIRECT EXPENSES				5670.27	
RETURNS ABOVE DIRECT EXPENSES				9329.73	
TOTAL FIXED EXPENSES				530.14	
TOTAL SPECIFIED EXPENSES				6200.41	
RETURNS ABOVE TOTAL SPECIFIED EXPENSES				8799.59	

Table 2B. Summary of estimated costs and returns per acre, sweetpotato slip budget (tent method), Mississippi, 2001.

Item	Unit	Price	Quantity	Amount	Your farm
		$		$	
INCOME					
Sweetpotato Slips	thou.	20.00	750.0000	15000.00	
TOTAL INCOME				15000.00	
DIRECT EXPENSES					
Fertilizers	acre	77.50	1.0000	77.50	
Fungicides	acre	32.26	1.0000	32.26	
Herbicides	acre	41.47	1.0000	41.47	
Insecticides	acre	15.31	1.0000	15.31	
Seed/plants	acre	2250.00	1.0000	2250.00	
Misc. supplies	acre	2100.00	1.0000	2100.00	
Special labor	acre	2437.35	1.0000	2437.35	
Operator labor	hour	8.76	31.6008	276.82	
Hand labor	hour	6.91	22.0436	152.32	
Unallocated labor	hour	8.76	25.2806	221.45	
Diesel fuel	gal	1.05	185.3586	194.62	
Repair & maintenance	acre	191.78	1.0000	191.78	
Interest on op. cap.	acre	179.90	1.0000	179.90	
TOTAL DIRECT EXPENSES				8170.82	
RETURNS ABOVE DIRECT EXPENSES				6829.18	
TOTAL FIXED EXPENSES				547.79	
TOTAL SPECIFIED EXPENSES				8718.61	
RETURNS ABOVE TOTAL SPECIFIED EXPENSES				6281.39	

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APPENDIX

Appendix Table 1. Self-propelled machines: estimated performance rate, useful life, annual use, purchase price, repair cost, fuel consumption rate, and direct and fixed cost per hour and per acre, Mississippi, 2001.

Item	Size	Perf. rate	Useful life	Annual use	Purchase price	Repair cost	Fuel cons. rate	Direct cost		Fixed cost	
								Hour	Acre	Hour	Acre
		hr/A	*yr*	*hr*	*$*	*%*	*gal/hr*	*$/hr*	*$/A*	*$/hr*	*$/A*
Forklift—Field		1.000	15	250	27,500	80	1.75	7.70	7.70	14.07	14.07
Forklift—Shed		1.000	20	350	21,000	50	1.50	1.50	1.50	6.82	6.82
Hi-Clear Sprayer	40’	0.049	8	350	49,600	80	1.00	15.22	0.74	26.11	1.27
Pickup Truck	1/2 ton	1.000	5	800	17,500	45	2.50	5.49	5.49	5.70	5.70
Truck	1 ton	1.000	10	400	25,500	50	3.00	6.33	6.33	10.16	10.16
Truck	2 ton	1.000	10	400	31,000	50	3.70	7.76	7.76	12.35	12.35
Truck	5 ton	1.000	10	400	37,000	50	5.00	9.87	9.87	14.75	14.75
Tractor 40-59 hp	50 hp		14	600	21,700	75	2.57	4.64		4.78	
Tractor 60-89 hp	75 hp		14	600	31,000	75	3.86	6.82		6.83	
Tractor 90-119 hp	105 hp		14	600	50,200	60	5.40	9.26		11.06	
Tractor 120-139 hp	130 hp		14	600	67,200	60	6.69	11.82		14.81	
Tractor 140-159 hp	150 hp		14	600	74,300	60	7.72	13.41		16.38	
Tractor 160-179 hp	170 hp		14	600	79,400	60	8.75	14.85		17.50	
Tractor 180-199 hp	190 hp		14	600	88,000	60	9.78	16.55		19.40	

Appendix Table 2. Implements: estimated performance rate, useful life, annual use, purchase price, repair cost, and direct and fixed cost per hour and per acre, Mississippi, 2001.

Item	Size	Performance rate	Useful life	Annual use	Purchase price	Repair cost	Direct cost		Fixed cost	
							Hour	Acre	Hour	Acre
		hr/A	*yr*	*hr*	*$*	*%*	*$/hr*	*$/A*	*$/hr*	*$/A*
Bedding Wagon	1-row	2.500	10	150	7,800	60	3.12	7.80	8.29	20.73
Chisel Plow	12’	0.156	12	150	4,900	70	1.90	0.29	4.68	0.73
Chisel Plow	16’	0.117	12	150	6,120	70	2.38	0.27	5.85	0.68
Chisel Plow	24’	0.078	12	150	7,960	70	3.09	0.24	7.60	0.59
Cover Trench	1-row	0.410	10	100	1,060	60	0.63	0.26	1.69	0.69
Dirt Bedder	1-row	1.250	12	300	6,300	70	1.22	1.53	3.01	3.76
Disk Bed (Hipper)	4R-40	0.141	10	160	6,380	80	3.19	0.44	6.35	0.89
Disk Bed (Hipper)	6R-40	0.094	10	160	7,140	80	3.57	0.33	7.11	0.66
Disk Bed (Hipper)	8R-40	0.070	10	160	9,490	80	4.74	0.33	9.45	0.66
Disk Harrow	14’	0.134	10	180	7,340	80	3.26	0.43	6.50	0.87
Disk Harrow	24’	0.078	10	180	16,830	80	7.48	0.58	14.91	1.16
Disk Harrow	32’	0.059	10	180	26,010	80	11.56	0.68	23.04	1.35
Disk Harrow	42’	0.045	10	180	37,230	80	16.54	0.74	32.98	1.48
Ditcher		0.020	10	200	2,330	60	0.69	0.01	1.85	0.03
Heavy Disk	14’	0.167	10	180	13,260	80	5.89	0.98	11.74	1.96
Heavy Disk	21’	0.112	10	180	17,850	80	7.93	0.88	15.81	1.77
Heavy Disk	27’	0.087	10	180	26,520	80	11.78	1.02	23.49	2.04
Hole Puncher	3 ft	0.750	12	80	1,000	80	0.83	0.62	1.79	1.34
Lay/Cover Plastic	1-row	2.500	12	150	1,500	60	0.50	1.25	1.43	3.58
Middle Buster	4R-40	0.178	8	160	4,130	80	2.58	0.45	4.75	0.84
Middle Buster	6R-40	0.117	8	160	4,590	80	2.86	0.33	5.28	0.61
Middle Buster	8R-40	0.088	8	160	6,120	80	3.82	0.33	7.04	0.62
Nurse Tank	1000 gal	0.130	12	150	3,000	22	0.36	0.04	2.86	0.37
Plant Cutter	1-row	3.330	10	400	17,000	80	3.40	11.32	6.77	22.56
Plant Groomer	1-row	0.350	10	200	4,500	80	1.80	0.63	3.58	1.25
Roller	1-row	1.120	12	300	950	50	0.13	0.14	0.45	0.50
Row Conditioner (Plant)	13’	0.151	10	100	4,670	75	3.50	0.52	7.44	1.12
Row Conditioner (Plant)	21’	0.094	10	100	7,040	75	5.28	0.49	11.22	1.05
Row Conditioner (Plant)	27’	0.073	10	100	9,440	75	7.08	0.51	15.05	1.09
Spin Spreader	4 ton	0.042	8	100	7,140	80	7.14	0.30	13.15	0.55
Spray (Broadcast)	12’	0.124	8	200	2,150	100	1.34	0.16	1.98	0.24
Spray (Broadcast)	27’	0.061	8	200	3,630	100	2.26	0.13	3.34	0.20
Stalk Shredder	12’	0.142	10	185	7,960	40	1.72	0.24	6.86	0.97
Trailer (Utility)	10 ft	0.600	15	200	3,100	40	0.41	0.24	1.98	1.19
Trailer (Water)	10 ft	0.600	10	150	3,600	40	0.96	0.57	3.82	2.29

Appendix Table 3. Operating inputs: estimated prices, Mississippi, 2001.

Item	Unit	Price
		$
CUSTOM SPRAY		
Applied by Air (2 gal)	appl.	2.20
Applied by Air (3 gal)	appl.	2.60
Applied by Air (5 gal)	appl.	3.25
FERTILIZERS		
Amm. Nitrate (34% N)	cwt	9.19
Bulldog Soda—16.5%N	cwt	11.00
Fertilizer 13-13-13	cwt	10.60
FUNGICIDES		
Botran	lb	9.57
Mertect	oz	1.64
HERBICIDES		
Command 3ME	pt	6.89
Command 4EC	pt	9.70
Fusilade DX	oz	0.92
Gramoxone Extra	pt	4.02
Poast	pt	9.82
Roundup Ultra 4SL	pt	4.99
Touchdown	qt	11.56
INSECTICIDES		
Imidan 50-WP	lb	5.90
Penncap-M 2F	pt	3.23
MISCELLANEOUS SUPPLIES		
Agribond 83x1000	roll	225.00
Black Plastic 5'x2000'	roll	60.00
Black Plastic 8'x2000'	roll	77.00
Bin	each	42.00
Box	each	1.10
Clear Plastic 16'x100'	roll	30.00
Crate	each	6.00
PVC Pipe (1/2")	12'	1.20
Stake-Rebar (3/8")	2'	0.13
PLANTS		
Seed potatoes	lb	0.15
SPECIAL LABOR		
Bedding Labor	hour	6.91
Cover Plastic Labor	hour	6.91
Cover Trench Labor	hour	6.91
Harvest Slip Labor	hour	8.66
Hole Punch Labor	hour	6.91
Install Agribond Labor	hour	6.91
Install Tent Labor	hour	6.91
Miscellaneous Labor	hour	6.91
Remove Agribond Labor	hour	6.91
Remove Plastic Labor	hour	6.91
Replace Agribond Labor	hour	6.91
Transplant Labor	hour	8.66

Appendix Table 4. Estimated fuel prices, labor wage rates, and interest rates, Mississippi, 2001.

Item	Unit	Price
		$
FUEL TYPES		
Diesel Fuel	gal	1.05
Gasoline	gal	1.41
LABOR TYPES		
Operator	hour	8.76
Hand	hour	6.91
INTEREST RATES		
Short-term	%	9.53
Intermediate-term	%	9.53

Appendix Table 5. Other durable inputs: estimated repair cost, fuel consumption rate, direct cost, and fixed cost, Mississippi, 2001.

Item name	Repair cost	Fuel conservation	Direct cost rate	Fixed cost
	$/in	*$/in*	*$/in*	*$/A*
Irrigate (.25 mi CP)	1.870	1.889	3.078	45.42
Irrigate (.5 mi CP)	1.190	2.284	2.651	24.66
Irrigate (Gun)	0.970	2.260	2.416	21.78
Irrigate (Pipe)	0.590	1.410	1.492	22.32
Irrigate (Roll-Out)	0.290	0.742	0.764	14.20

Appendix Table 6A. Estimated costs per acre, sweetpotato slip budget (plastic mulch), Mississippi, 2001.

Item	Unit	Price	Quantity	Amount	Your farm
		$		$	
DIRECT EXPENSES					
FERTILIZERS					
Fertilizer 13-13-13	cwt	11.00	4.0000	44.00	
Amm. Nitrate (34% N)	cwt	12.00	0.5000	6.00	
Bulldog Soda—16.5%N	cwt	11.00	2.5000	27.50	
FUNGICIDES					
Botran	lb	9.57	2.0000	19.14	
Mertect	oz	1.64	8.0000	13.12	
HERBICIDES					
Roundup Ultra 4SL	pt	4.99	0.5000	2.49	
Command 4EC	pt	9.70	2.5000	24.25	
Poast	pt	9.82	1.5000	14.73	
INSECTICIDES					
Imidan 50-WP	lb	5.90	1.5000	8.85	
Penncap-M 2F	pt	3.23	2.0000	6.46	
SEED/PLANTS					
Seed potatoes	lb	0.15	15000.0000	2250.00	
MISC. SUPPLIES					
B. Plastic 8x2000	roll	77.00	2.0000	154.00	
Agribond 83x1000	roll	225.00	2.0000	450.00	
Crate	each	6.00	25.0000	150.00	
SPECIAL LABOR					
Bedding Labor	hour	6.91	10.0000	69.10	
Cover Plastic Labor	hour	6.91	5.0000	34.55	
Hole Punch Labor	hour	6.91	2.0000	13.82	
Remove Plastic Labor	hour	6.91	10.0000	69.10	
Haul Plastic Labor	hour	6.91	12.0000	82.92	
Install Agribond Labor	hour	6.91	12.0000	82.92	
Remove Agribond Labor	hour	6.91	32.0000	221.12	
Replace Agribond Labor	hour	6.91	20.0000	138.20	
Haul Agribond Labor	hour	6.91	8.0000	55.28	
Harvest Slip Labor	hour	8.66	70.0000	606.20	
OPERATOR LABOR					
Tractors	hour	8.76	23.5008	205.86	
Self-Propelled Equipment	hour	8.76	6.5000	56.94	
HAND LABOR					
Implements	hour	6.91	22.0436	152.32	
UNALLOCATED LABOR	hour	8.76	24.0006	210.24	
DIESEL FUEL					
Tractors	gal	1.05	151.4226	158.99	
Self-Propelled Equipment	gal	1.05	23.4000	24.57	
Irrigate (Gun)	gal	1.05	4.5200	4.74	
REPAIR & MAINTENANCE					
Implements	acre	51.29	1.0000	51.29	
Tractors	acre	104.84	1.0000	104.84	
Self-Propelled Equipment	acre	27.92	1.0000	27.92	
Irrigate (Gun)	acre	1.94	1.0000	1.94	
INTEREST ON OP. CAP.	acre	126.83	1.0000	126.83	
TOTAL DIRECT EXPENSES				5670.27	
FIXED EXPENSES					
Implements	acre	113.78	1.0000	113.78	
Tractors	acre	310.13	1.0000	310.13	
Self-Propelled Equipment	acre	84.44	1.0000	84.44	
Irrigate (Gun)	acre	21.78	1.0000	21.78	
TOTAL FIXED EXPENSES				530.14	
TOTAL SPECIFIED EXPENSES				6200.41	

Appendix Table 6B. Estimated costs per acre, sweetpotato slip budget (tent method), Mississippi, 2001.

Item	Unit	Price	Quantity	Amount	Your farm
		$		$	
DIRECT EXPENSES					
FERTILIZERS					
Fertilizer 13-13-13	cwt	11.00	4.0000	44.00	_____
Amm. Nitrate (34% N)	cwt	12.00	0.5000	6.00	_____
Bulldog Soda—16.5%N	cwt	11.00	2.5000	27.50	_____
FUNGICIDES					
Botran	lb	9.57	2.0000	19.14	_____
Mertect	oz	1.64	8.0000	13.12	_____
HERBICIDES					
Roundup Ultra 4SL	pt	4.99	0.5000	2.49	_____
Command 4EC	pt	9.70	2.5000	24.25	_____
Poast	pt	9.82	1.5000	14.73	_____
INSECTICIDES					
Imidan 50-WP	lb	5.90	1.5000	8.85	_____
Penncap-M 2F	pt	3.23	2.0000	6.46	_____
SEED/PLANTS					
Seed potatoes	lb	0.15	15000.0000	2250.00	_____
MISC. SUPPLIES					
B. Plastic 8x2000	roll	77.00	2.0000	154.00	_____
Clear Plastic 16x100	roll	30.00	40.0000	1200.00	_____
PVC Pipe (1/2”)	12’	1.20	100.0000	120.00	_____
Stake-Rebar (3/8”)	2’	0.13	200.0000	26.00	_____
Agribond 83x1000	roll	225.00	2.0000	450.00	_____
Crate	each	6.00	25.0000	150.00	_____
SPECIAL LABOR					
Bedding Labor	hour	6.91	10.0000	69.10	_____
Cover Plastic Labor	hour	6.91	5.0000	34.55	_____
Hole Punch Labor	hour	6.91	2.0000	13.82	_____
Install Tent labor	hour	6.91	48.0000	331.68	_____
Open Tent Labor	hour	6.91	8.0000	55.28	_____
Close Tent Labor	hour	6.91	8.0000	55.28	_____
Remove Plastic Labor	hour	6.91	10.0000	69.10	_____
Haul Plastic Labor	hour	6.91	12.0000	82.92	_____
Remove Tent Labor	hour	6.91	40.0000	276.40	_____
Haul Tent Labor	hour	6.91	50.0000	345.50	_____
Install Agribond Labor	hour	6.91	12.0000	82.92	_____
Remove Agribond Labor	hour	6.91	32.0000	221.12	_____
Replace Agribond Labor	hour	6.91	20.0000	138.20	_____
Haul Agribond Labor	hour	6.91	8.0000	55.28	_____
Harvest Slip Labor	hour	8.66	70.0000	606.20	_____
OPERATOR LABOR					
Tractors	hour	8.76	24.1008	211.12	_____
Self-Propelled Equipment	hour	8.76	7.5000	65.70	_____
HAND LABOR					
Implements	hour	6.91	22.0436	152.32	_____
UNALLOCATED LABOR	hour	8.76	25.2806	221.45	_____
DIESEL FUEL					
Tractors	gal	1.05	153.7386	161.42	_____
Self-Propelled Equipment	gal	1.05	27.1000	28.45	_____
Irrigate (Gun)	gal	1.05	4.5200	4.74	_____
REPAIR & MAINTENANCE					
Implements	acre	51.54	1.0000	51.54	_____
Tractors	acre	106.50	1.0000	106.50	_____
Self-Propelled Equipment	acre	31.80	1.0000	31.80	_____
Irrigate (Gun)	acre	1.94	1.0000	1.94	_____
INTEREST ON OP. CAP.	acre	179.90	1.0000	179.90	_____
TOTAL DIRECT EXPENSES				8170.82	_____
FIXED EXPENSES					
Implements	acre	114.97	1.0000	114.97	_____
Tractors	acre	314.23	1.0000	314.23	_____
Self-Propelled Equipment	acre	96.80	1.0000	96.80	_____
Irrigate (Gun)	acre	21.78	1.0000	21.78	_____
TOTAL FIXED EXPENSES				547.79	_____
TOTAL SPECIFIED EXPENSES				8718.61	_____

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