

# Greenhouse Tomato Budgets for Mississippi



Growing greenhouse vegetable crops and growing tomatoes hydroponically are popular among small producers who want to diversify their farms and landowners looking for extra

income. Before breaking ground for a new greenhouse, you should understand how much time and work is involved. In fact, raising greenhouse tomatoes requires about the same amount of time and effort as raising dairy cattle or poultry. The grower needs to be present to complete daily duties and chores. Leaving the tomato plants without care for a day or two could lead to substantial crop loss.

While hydroponic techniques are used for a variety of crop plants, tomatoes are the crop most commonly grown hydroponically for sale. Worldwide, other vegetables grown hydroponically in greenhouses include cucumbers, peppers, lettuce, eggplant, spinach, melons, various herbs, and other specialty crops. Flowering crops and some fruit crops, such as strawberries and raspberries, are also well suited to hydroponics. You can grow other crops using hydroponic methods, but you must think about how well the crop will sell. If there is little demand for the crop in your area, sales will be poor. In Mississippi, tomatoes are in high demand, so they are the best vegetable crop for businesses to grow in greenhouses.

Corporate owners with 20 or more acres in greenhouse tomato production manage most of the greenhouse tomato acreage in the United States. However, most of the greenhouse tomato growers in this country farm them on less than one acre of floor space. In Mississippi, the average greenhouse tomato grower has 2.4 freestanding or gutter-connected bays, totaling about 6,000 square feet. Greenhouse tomato acreage has been increasing since the mid-1990s. Much of the expansion was caused by a changing consumer preference for the best quality

vegetables. Greenhouse tomatoes are harvested when they are ripe (or at least well on the way to a red-color stage), so they have a good flavor. Greenhouse tomato varieties are nearly the same size, shape, and color but are more resistant to diseases than field-grown tomato varieties.

In many cities, consumers are not concerned about the higher price of greenhouse tomatoes; however, they do expect high quality. Greenhouse tomatoes are never picked green and gassed with ethylene to promote ripening, a common practice with field-grown winter tomatoes in the extreme southern United States, Mexico, and Central America.

Every greenhouse crop has special needs that traditional field crops do not have. Also, the greenhouse favors the breeding and rapid spread of some diseases and pests. Tomatoes are not an easy crop to grow in a greenhouse, and success depends on how well the grower can manage the crop and make the right decisions at the right time.

Information about greenhouse tomatoes is scarce compared to information about field vegetables, so it can be difficult to get help from county Extension agents or other trained personnel. An interested grower should read publications, attend short courses and seminars, and visit other growers to learn from their experiences.

This publication estimates the costs associated with starting a greenhouse tomato business. Figures in this budget reflect average experiences of various systems and are geared toward the typical Mississippi grower. The budget includes capital and operating expenses associated with production of greenhouse tomatoes. If your circumstances differ from the circumstances assumed in this budget, recalculate the estimated budget to reflect your situation. Production information is not included in this publication. Growers seeking production information can refer to the following MSU Extension publications:

Publication 1828 *Greenhouse Tomato Handbook*

Publication 2364 *Greenhouse Tomato Growers' Glossary*

Publication 1879 *Environmental Control for Greenhouse Tomatoes*

Publication 2037 *Fertigation: The Basics of Injecting Fertilizer for Field-Grown Tomatoes*

Publication 1995 *Starting Vegetable Transplants*

Publication 1861 *Greenhouse Tomatoes: Pest Management in Mississippi*

## **Initial Capital Investment**

The polyethylene-covered Quonset-type structure is the most common greenhouse in Mississippi and is the type talked about in this budget. This type of structure is the least expensive to build and has few cross members, letting in more light.

Polyethylene greenhouses use two layers of plastic to cover the structure. Air is forced between the layers of plastic to create a 4- to 6-inch airspace, which forms an excellent insulation barrier. Several other types of coverings exist, including acrylic sheets, polycarbonate plastic, and fiberglass. Each of these coverings has some advantages, but they cost more than polyethylene.

## **Construction Costs**

Greenhouse building costs vary, depending on the materials and equipment you use. When selecting materials, be careful not to sacrifice quality to keep costs low. Also be careful not to spend too much or buy more greenhouse than you need. Choose a greenhouse frame with the right load-bearing strength and useful life expectancy. Galvanized steel tubing and aluminum tubing are strong, economical materials for a greenhouse frame.

Greenhouse flooring can greatly affect cost. The floor in this budget is made of a ground cloth, black plastic, and pea gravel for walkways. This type of flooring is the most common among Mississippi growers. Other floor choices are bare ground, wall-to-wall gravel, concrete walkways, or wall-to-wall concrete, depending on what you want and can afford.

This budget assumes that water and natural gas are available to the greenhouse. If water or gas is not available, add the expenses of digging a well or buying gas storage tanks to the budget.

You must also consider the advantages and disadvantages of buying automated equipment for the greenhouse. Automated equipment costs more but reduces labor requirements. If you lack reliable labor, you may want to invest in more automated equipment. The equipment package used in this budget reflects what is common for Mississippi growers. Table 1 presents the estimated capital requirement of \$20,776 for one 24-foot by 96-foot Quonset-type greenhouse equipped for typical tomato production in Mississippi.

## **Production Budgets**

The production budgets were based on interviews with several growers in Mississippi, greenhouse tomato industry suppliers, researchers, and Extension specialists familiar with greenhouse tomato production in Mississippi. The engineering, or "synthesis," method was used to describe the production system and to estimate current costs for that system.

## **Fixed Costs**

The cost items in this budget follow generally accepted classification of fixed costs. Fixed costs are shown in Table 2 and represent a lump sum of total annual ownership costs divided proportionately among the production crops typical for Mississippi greenhouse tomato production. The fixed costs include interest on investment, depreciation, insurance, taxes, and some common overhead expenses.

Depreciation was estimated using the straight-line method with no salvage value. Assets were divided by their useful life expectancies to determine an annual cost for depreciation. Interest on investment was calculated by charging a rate of 5.25 percent on one-half of the initial cost of depreciable assets. Insurance and taxes were estimated to be 2 percent of the initial cost of depreciable assets.

Ownership costs also include general overhead expenses that are not directly related to producing the crop.

In this publication, overhead expenses include heating, water, electricity, telephone, lab fees, and repair and maintenance. Annual ownership costs for one 24 by 96 greenhouse totaled \$6,396.

## Variable Costs

Tables 3 through 8 present the variable costs of a spring crop, a fall crop, and a continuous crop of greenhouse tomatoes. The variable costs associated with crop production are all inputs that directly relate to producing tomatoes. The cultural practices in these budgets are typical of two tomato crops per year or one continuous crop for one greenhouse in Mississippi. Input prices are current prices of local and regional suppliers.

Interest on operating capital was charged at a rate of 4.25 percent on one-half of the total direct expense for each crop. Direct cost of producing a spring crop of tomatoes totaled \$2,866, and the direct cost of producing a fall crop totaled \$2,336. Direct cost of producing one continuous crop of tomatoes was \$4,580.

## Total Cost of Production

Total production cost is the sum of direct costs plus annual ownership costs. The total estimated annual cost of producing two tomato crops (spring and fall) in a 24-foot by 96-foot greenhouse is \$11,598, while the total estimated annual production cost for one continuous crop is \$10,976.

Item Structure	Description	Unit	Number	Cost per unit (\$)	Total initial cost (\$)	Useful life years
Greenhouse package <sup>2</sup>	24 ft. x 96 ft.	sq.ft.	2304	2.19	5,046	20
Personnel door	aluminum 42 in.	ea.	1	382	382	20
Heater system	gas 145,000 BTU	ea.	2	970	1,940	10
Cooling fans	48", 1 HP	ea.	2	999	1,998	5
Cooling pads	48" x 12" x 6"	ea.	24	32	768	3
Pump & plumbing	wet wall 300 gal.	ea.	1	655	655	5
Inlet shutters	33" x 33" motorized	ea.	4	184	736	7
Electrical	wiring package	ea.	1	560	560	20
Irrigation/fertigation	drip system	ea.	1	4,062	4,062	7
Ground cover	woven plastic	sq.ft.	2304	0.08	184	
Pea gravel		cu. yd.	7.5	9.75	73	
Bags (4 plants per bag)		ea.	100	0.50	50	
Pine bark soil media		cu. yd.	6.5	20.00	130	
<b>Sub-total greenhouse structure</b>					<b>16,584</b>	
<b>Auxiliary Equipment</b>						
Backpack sprayer	pump type	ea.	1	69	69	3
Thermostat	single stage	ea.	2	142	284	3
Respirator		ea.	1	88	88	3
Pollinator		ea.	1	259	259	3
Thermometer	high/low type	ea.	1	32	32	2
Transplant benches	wood	ea.	2	35	70	10
Meters	EC/pH combo	ea.	2	295	590	3
Backup generator	gasoline	ea.	1	895	895	10
<b>Subtotal auxiliary equipment</b>					<b>2,287</b>	
Assembly and installation <sup>3</sup>		hr.	95	14.90	1,416	
Utility hookup (electrical, gas, and water) <sup>4</sup>					490	
<b>Total</b>					<b>20,776</b>	

<sup>1</sup>Land and site preparation were not included in the budget. This cost will vary depending on location.  
<sup>2</sup>Greenhouse package includes frame, end walls, 6 mil plastic double layer, base locking rail and inflation kit.  
<sup>3</sup>Installation cost may vary significantly depending on location and owner's involvement.  
<sup>4</sup>Cost may increase if water well is required for water supply and if LP gas storage tanks must be purchased.

**Table 2. Estimated annual ownership costs for greenhouse tomato production in Mississippi, 2013.**

Item Structure	Depreciation (\$)	Interest (\$)	Insurance and taxes (\$)	Total (\$)
Greenhouse frame	252	132	101	486
Aluminum personnel door	19	10	8	37
Heater system	194	51	39	284
Cooling fans	400	52	40	492
Cooling pads	256	20	15	292
Pump & plumbing	131	17	13	161
Inlet shutters	105	19	15	139
Electrical	28	15	11	54
Irrigation/fertigation	580	107	81	768
<b>Auxiliary Equipment</b>				
Backpack sprayer	23	2	1	26
Thermostat	95	7	6	108
Respirator	29	2	2	33
Pollinator	86	7	5	98
Thermometer	16	1	1	17
Transplant benches	7	2	1	10
Meters	197	15	12	224
Backup generator	90	23	18	131
<b>Total greenhouse &amp; equipment</b>	<b>2,508</b>	<b>484</b>	<b>369</b>	<b>3,360</b>
<b>General overhead</b>				
Heating				904
Electricity				720
Telephone				660
Repairs and Maintenance				332
Lab fees				420
<b>Total general overhead</b>				<b>3,036</b>
<b>Total annual ownership costs</b>				<b>6,396</b>

**Table 3. Summary of spring input costs.**

Labor	\$1,352
Seed	\$226
Fertigation	\$394
Fungicide	\$150
Insecticide	\$36
Boxes	\$560

**Table 4. Summary of fall input costs.**

Labor	\$1,057
Seed	\$226
Fertigation	\$370
Fungicide	\$113
Insecticide	\$26
Boxes	\$420

**Table 5. Summary of one crop input costs.**

Labor	\$2,132
Seed	\$226
Fertigation	\$735
Fungicide	\$226
Insecticide	\$54
Boxes	\$980

**Table 6. Estimated resource use and direct costs for a spring crop of greenhouse tomatoes in Mississippi, 2013.**

Operation/Operating unit	Month	Unit/size	Quantity	Cost/unit	Total cost (\$)
Labor (potting)	Nov.	hr.	1	9.3	9.30
Potting mix	Nov.	3 cu. ft.	1	11	11.00
Seeding trays	Nov.	ea.	6	1.25	7.50
Transplant cell packs	Nov.	ea. (72 ct.)	6	1.7	10.20
Labor (seeding)	Nov.	hr.	3	9.3	27.90
Seed	Nov.	ea.	480	0.47	225.60
Labor (watering)	Nov.	hr.	1.65	9.3	15.35
Fertilizer	Nov.	lb.	0.71	1	0.71
Electricity	Nov.	day	7	0.5	3.50
Labor (watering)	Dec.	hr.	8.25	9.3	76.73
Fertilizer	Dec.	lb.	3.54	1	3.54
Electricity	Dec.	day	35	0.5	17.50
Labor (watering)	Jan.	hr.	2	9.3	18.60
Labor (transplanting)	Jan.	hr.	2	9.3	18.60
Labor (pollination)	Jan.	hr.	2	9.3	18.60
Labor (pruning)	Jan.	hr.	4	9.3	37.20
Fungicide	Jan.	oz.	32	0.47	15.04
Insecticide	Jan.	oz.	9	0.55	4.95
Labor (stringing)	Jan.	hr.	2	9.3	18.60
Twine	Jan.	bundle	0.4	24	9.60
Clips	Jan.	box	0.4	60	24.00
Labor (pollination)	Feb.	hr.	5	9.3	46.50
Labor (pruning)	Feb.	hr.	4	9.3	37.20
Fungicide	Feb.	oz.	64	0.47	30.08
Insecticide	Feb.	oz.	12	0.55	6.60
Labor (pollination)	Mar.	hr.	5	9.3	46.50
Labor (pruning)	Mar.	hr.	4	9.3	37.20
Fungicide	Mar.	oz.	80	0.47	37.60
Insecticide	Mar.	oz.	15	0.55	8.25
Labor (harvest)	Mar.	hr.	4.05	9.3	37.67
Labor (grade/pack)	Mar.	hr.	6.15	9.3	57.20
Labor (pollination)	Apr.	hr.	5	9.3	46.50
Labor (pruning)	Apr.	hr.	4	9.3	37.20
Fungicide	Apr.	oz.	64	0.47	30.08
Insecticide	Apr.	oz.	12	0.55	6.60
Labor (harvest)	Apr.	hr.	8.1	9.3	75.33
Labor (grade/pack)	Apr.	hr.	12.3	9.3	114.39
Labor (pollination)	May	hr.	2.5	9.3	23.25
Labor (pruning)	May	hr.	4	9.3	37.20
Fungicide	May	oz.	64	0.47	30.08
Insecticide	May	oz.	12	0.55	6.60
Labor (harvest)	May	hr.	8.1	9.3	75.33
Labor (grade/pack)	May	hr.	12.3	9.3	114.39
Labor (pruning)	Jun.	hr.	1	9.3	9.30
Fungicide	Jun.	oz.	16	0.47	7.52
Insecticide	Jun.	oz.	6	0.55	3.30
Labor (harvest)	Jun.	hr.	6.75	9.3	62.78

**Table 6, cont. Estimated resource use and direct costs for a spring crop of greenhouse tomatoes in Mississippi, 2013.**

Operation/Operating unit	Month	Unit/size	Quantity	Cost/unit (\$)	Total cost (\$)
Labor (grade/pack)	Jun.	hr.	10.25	9.3	95.33
Labor (misc.)	Jan. – Jun.	hr.	17	9.3	158.10
Fertigation	Jan. – Jun.	application	1	394	394.00
Boxes	Apr. – Jun.	ea.	400	1.4	560.00
<b>Subtotal</b>					<b>2,806</b>
<b>Interest on operating capital</b>					<b>60</b>
<b>Total direct costs</b>					<b>2,866</b>

**Table 7. Estimated resource use and direct costs for a fall crop of greenhouse tomatoes in Mississippi, 2013.**

Operation/Operating unit	Month	Unit/size	Quantity	Cost/unit (\$)	Total cost (\$)
Labor (potting)	Jul.	hr.	1	9.3	9.30
Potting mix	Jul.	3 cu. ft.	1	11	11.00
Seeding trays	Jul.	ea.	6	1.25	7.50
Transplant cell packs	Jul.	ea. (72 ct.)	6	1.7	10.20
Labor (seeding)	Jul.	hr.	3	9.3	27.90
Seed	Jul.	ea.	480	0.47	225.60
Labor (watering)	Jul.	hr.	1.65	9.3	15.35
Fertilizer	Jul.	lb.	0.71	1	0.71
Electricity	Jul.	day	7	0.5	3.50
Labor (watering)	Aug.	hr.	8.25	9.3	76.73
Fertilizer	Aug.	lb.	3.54	1	3.54
Electricity	Aug.	day	35	0.5	17.50
Labor (watering)	Sep.	hr.	2	9.3	18.60
Labor (transplanting)	Sep.	hr.	2	9.3	18.60
Labor (pollination)	Sep.	hr.	2	9.3	18.60
Labor (pruning)	Sep.	hr.	4	9.3	37.20
Fungicide	Sep.	oz.	32	0.470	15.04
Insecticide	Sep.	oz.	9	0.55	4.95
Labor (stringing)	Sep.	hr.	2	9.3	18.60
Twine	Sep.	bundle	0.25	24	6.00
Clips	Sep.	box	0.25	60	15.00
Labor (pollination)	Oct.	hr.	5	9.3	46.50
Labor (pruning)	Oct.	hr.	4	9.3	37.20
Fungicide	Oct.	oz.	64	0.470	30.08
Insecticide	Oct.	oz.	12	0.55	6.60
Labor (pollination)	Nov.	hr.	5	9.3	46.50
Labor (pruning)	Nov.	hr.	4	9.3	37.20
Fungicide	Nov.	oz.	80	0.47	37.60
Labor (harvest)	Nov.	hr.	7.74	9.3	71.98
Labor (grade/pack)	Nov.	hr.	11.95	9.3	111.17
Insecticide	Nov.	oz.	15	0.55	8.25
Labor (pollination)	Dec.	hr.	5	9.3	46.50
Labor (pruning)	Dec.	hr.	4	9.3	37.20
Labor (harvest)	Dec.	hr.	10.26	9.3	95.42
Labor (grade/pack)	Dec.	hr.	15.85	9.3	147.37
Fungicide	Dec.	oz.	64	0.47	30.08

**Table 7, cont. Estimated resource use and direct costs for a fall crop of greenhouse tomatoes in Mississippi, 2013.**

Operation/Operating unit	Month	Unit/size	Quantity	Cost/unit (\$)	Total cost (\$)
Insecticide	Dec.	oz.	12	0.55	\$6.60
Labor (misc.)	Jul. – Dec.	hr.	15	9.3	\$139.50
Fertigation	Sep. – Dec.	application	1	370	\$370.00
Boxes	Oct – Dec.	ea.	300	1.4	\$420.00
<b>Subtotal</b>					<b>\$2,287</b>
<b>Interest on operating capital</b>					<b>\$49</b>
<b>Total direct costs</b>					<b>\$2,336</b>

**Table 8. Estimated resource use and direct costs for one crop of greenhouse tomatoes in Mississippi, 2013.**

Operation/Operating unit	Month	Unit/size	Quantity	Cost/unit (\$)	Total cost (\$)
Labor (potting)	Aug.	hr.	1	9.3	\$9.30
Potting mix	Aug.	3 cu.ft.	1	11	\$11.00
Seeding trays	Aug.	ea.	6	1.25	\$7.50
Transplant cell packs	Aug.	ea.(72ct.)	6	1.7	\$10.20
Labor (seeding)	Aug.	hr.	3	9.3	\$27.90
Seed	Aug.	ea.	480	0.47	\$225.60
Labor (watering)	Aug.	hr.	1.65	9.3	\$15.35
Fertilizer	Aug.	lb.	0.71	1	\$0.71
Electricity	Aug.	day	7	0.5	\$3.50
Labor (watering)	Sep.	hr.	8.25	9.3	\$76.73
Fertilizer	Sep.	lb.	3.54	1	\$3.54
Electricity	Sep.	day	35	0.5	\$17.50
Labor (watering)	Oct.	hr.	2	9.3	\$18.60
Labor (transplanting)	Oct.	hr.	2	9.3	\$18.60
Labor (pollination)	Oct.	hr.	2	9.3	\$18.60
Labor (pruning)	Oct.	hr.	4	9.3	\$37.20
Fungicide	Oct.	oz.	32	0.470	\$15.04
Insecticide	Oct.	oz.	9	0.55	\$4.95
Labor (stringing)	Oct.	hr.	2	9.3	\$18.60
Twine	Oct.	bundle	0.6	24	\$14.40
Clips	Oct.	box	0.6	60	\$36.00
Labor (pollination)	Nov.	hr.	5	9.3	\$46.50
Labor (pruning)	Nov.	hr.	4	9.3	\$37.20
Fungicide	Nov.	oz.	64	0.470	\$30.08
Insecticide	Nov.	oz.	12	0.55	\$6.60
Labor (pollination)	Dec.	hr.	5	9.3	\$46.50
Labor (pruning)	Dec.	hr.	4	9.3	\$37.20
Fungicide	Dec.	oz.	80	0.47	\$37.60
Labor (harvest)	Dec.	hr.	7.74	9.3	\$71.98
Labor (grade/pack)	Dec.	hr.	11.95	9.3	\$111.17
Insecticide	Dec.	oz.	15	0.55	\$8.25
Labor (pollination)	Jan.	hr.	5	9.3	\$46.50
Labor (pruning)	Jan.	hr.	4	9.3	\$37.20
Labor (harvest)	Jan.	hr.	10.26	9.3	\$95.42
Labor (grade/pack)	Jan.	hr.	15.85	9.3	\$147.37
Fungicide	Jan.	oz.	64	0.47	30.08

**Table 8, cont. Estimated resource use and direct costs for one crop of greenhouse tomatoes in Mississippi, 2013.**

Operation/Operating unit	Month	Unit/size	Quantity	Cost/unit (\$)	Total cost (\$)
Insecticide	Jan.	oz.	12	0.55	6.60
Labor (pollination)	Feb.	hr.	5	9.3	46.50
Labor (pruning)	Feb.	hr.	4	9.3	37.20
Fungicide	Feb.	oz.	80	0.47	37.60
Insecticide	Feb.	oz.	15	0.55	8.25
Labor (harvest)	Feb.	hr.	4.05	9.3	37.67
Labor (grade/pack)	Feb.	hr.	6.15	9.3	57.20
Labor (pollination)	Mar.	hr.	5	9.3	46.50
Labor (pruning)	Mar.	hr.	4	9.3	37.20
Fungicide	Mar.	oz.	64	0.47	30.08
Insecticide	Mar.	oz.	12	0.55	6.60
Labor (harvest)	Mar.	hr.	8.1	9.3	75.33
Labor (grade/pack)	Mar.	hr.	12.3	9.3	114.39
Labor (pollination)	Apr.	hr.	2.5	9.3	23.25
Labor (pruning)	Apr.	hr.	4	9.3	37.20
Fungicide	Apr.	oz.	64	0.47	30.08
Insecticide	Apr.	oz.	12	0.55	6.60
Labor (harvest)	Apr.	hr.	8.1	9.3	75.33
Labor (grade/pack)	Apr.	hr.	12.3	9.3	114.39
Labor (pruning)	May	hr.	1	9.3	9.30
Fungicide	May	oz.	16	0.47	7.52
Insecticide	May	oz.	6	0.55	3.30
Labor (harvest)	May	hr.	6.75	9.3	62.78
Labor (grade/pack)	May	hr.	10.25	9.3	95.33
Labor (pruning)	Jun.	hr.	1	9.3	9.30
Fungicide	Jun.	oz.	16	0.47	7.52
Insecticide	Jun.	oz.	6	0.55	3.30
Labor (harvest)	Jun.	hr.	6.75	9.3	62.78
Labor (grade/pack)	Jun.	hr.	10.25	9.3	95.33
Labor (misc.)	Aug - Jun	hr.	22	9.3	204.60
Fertigation	Oct - Jun.	application	1	735	735.00
Boxes	Dec - Jun.	ea.	700	1.4	980.00
<b>Subtotal</b>					<b>4,484</b>
<b>Interest on operating capital</b>					<b>95</b>
<b>Total direct costs</b>					<b>4,580</b>

Publication 2766 (POD-02-14)

By **Dr. Kenneth Hood**, former Extension Professor, Agricultural Economics; **Dr. Richard Snyder**, Extension Professor, Plant and Soil Sciences; and Clay Gholston, former Graduate Student, Agricultural Economics.



**MISSISSIPPI STATE**  
UNIVERSITY™

**EXTENSION**

Copyright 2017 by Mississippi State University. All rights reserved. This publication may be copied and distributed without alteration for nonprofit educational purposes provided that credit is given to the Mississippi State University Extension Service.

Produced by Agricultural Communications.

We are an equal opportunity employer, and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, or any other characteristic protected by law.

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. GARY B. JACKSON, Director