2021 Enterprise Budgets for Missouri Crops and Livestock

November 2020

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Missouri Crop and Livestock Budgets for 2021

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Beef Backgrounding Planning Budget

This budget presents information useful to beef farmers. Table 1 presents estimates for the 2021 year for backgrounded steer calves in Missouri. Assumptions were based on price forecasts as of October 2020. Detailed prices and practices are summarized in Tables 2, 3, 4 and 5. The production practices used to develop these cost estimates are common for beef farms in Missouri. Farmers are encouraged to customize this budget to fit their operation.

Table 1. Missouri beef steer backgrounding planning budget for 2021.

	Winter backgrounding per steer[1]	Pasture backgrounding per steer[1]	Your estimate
Income			
Market steer sales	1,107.18	1,117.40	
Less death loss (1 percent)	11.07	11.17	
Total income	1,096.11	1,106.22	
Operating costs			
Purchased steer	858.51	902.07	
Pasture (rental rate)	0.00	37.94	
Feed, mineral and stored forage	123.35	40.32	
Labor	38.75	23.25	
Veterinary, drugs and supplies	18.00	15.00	
Marketing and hauling	27.68	27.93	
Machinery and utilities	56.24	26.34	
Livestock facility repair	3.75	0.75	
Professional fees (legal, accounting, etc.)	1.00	1.00	
Miscellaneous	3.50	3.50	
Operating interest	12.72	12.65	
Total operating costs	1,143.48	1,090.76	
Ownership costs			
Depreciation on livestock facilities	3.87	0.62	
Interest on livestock facilities	2.98	0.47	
Insurance and taxes on capital items	3.61	2.71	
Total ownership costs	10.46	3.80	
Total costs	1,153.94	1,094.56	
Income over operating costs	**-47.38**	**15.46**	
Income over total costs	**-57.84**	**11.66**	
Pounds of gain per steer purchased	216.85	187.25	
Feed cost per pound gain	0.57	0.42	
Breakeven steer price per pound	1.43	1.43	

[1] Totals may not sum due to rounding.

Written by
Joe Koenen, County Engagement Specialist, Agricultural Business; **Zachary Erwin**, Field Specialist, Livestock; **Joe Horner**, State Specialist, Agricultural Business

Table 2. Input assumptions used in beef steer winter backgrounding planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Steer purchase weight, pounds	590	Steer purchase price, per hundredweight	145.51
Market steer sale weight, pounds	815	Market steer sale price, per hundredweight	135.85
Labor, hours per head	2.5	Labor cost, per hour	15.50
Feeding period, days	105		
Average daily gain, pounds	2.14		

Table 3. Input assumptions used in beef steer pasture backgrounding planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Steer purchase weight, pounds	580	Steer purchase price, per hundredweight	155.53
Market steer sale weight, pounds	775	Market steer sale price, per hundredweight	144.18
Labor, hours per head	1.5	Labor cost, per hour	15.50
Feeding period, days	105		
Average daily gain, pounds	1.86		

Table 4. Feed and stored forage in beef steer backgrounding planning budgets for 2021, on a per steer basis.

		Winter backgrounding[1]		Pasture backgrounding[2]	
Feed description	Cost per unit	Pounds	Dollars	Pounds	Dollars
Mixed hay, per ton	90.00	1,221	54.95		
Corn, per bushel	3.50	754	47.12		
Protein supplement, per ton	185.00	107	9.90	315	29.14
Salt and minerals, per ton	800.00	27	10.80	27	10.80
Limestone, per hundredweight	9.50	6	0.57	4	0.38
Total		**2,115**	**123.35**	**346**	**40.32**

[1] Winter backgrounding ration assumes 105 days on feed and 2.14 pound average daily gain for a steer.

[2] Pasture backgrounding ration assumes 105 days on feed and 1.86 pound average daily gain for a steer

Table 5. Machinery assumptions used in beef steer backgrounding planning budgets for 2021.

		Winter backgrounding[1]		Pasture backgrounding[2]	
Description	Cost per hour	Hours	Dollars	Hours	Dollars
Front-wheel drive tractor	41.32	25	1,033.00		
Truck	30.00	20	600.00	10.0	300.00
Livestock trailer	28.00	8	224.00	8.0	224.00
4-wheeler	10.00	40	400.00	52.5	525.00
Total			**2,257.00**		**1,049.00**
Total per steer			**53.74**		**23.84**

[1] Machinery needs for winter backgrounding budget are based on 42 steers.

[2] Machinery needs for pasture backgrounding budget are based on 44 steers.

Farmers can develop custom enterprise budget by using the Missouri Beef Enterprise Tool (*https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/Beef/Docs/MissouriBeefEnterprise.xlsx*). This spreadsheet tool allows users to make an enterprise budget for a cow-calf (spring or fall calving), heifer or backgrounding (drylot or pasture) operation.

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Beef Heifer Planning Budget

This budget presents information useful to beef farmers. Table 1 presents estimates for the 2021 year for buying heifer calves and selling as bred replacement heifers in Missouri. Assumptions were based on price forecasts as of October 2020. Detailed assumptions are summarized in Tables 2-4. The production practices used to develop these cost estimates are common for beef farms in Missouri. Farmers are encouraged to customize this budget to fit their operation.

Table 1. Missouri beef heifer planning budget for 2021.

	Per heifer sold[1]	Your estimate
Income		
Bred heifer sales (0.875 head)	1,268.75	
Cull heifer sales (0.05 head)	67.50	
Yearling heifer sales (0.075 head)	72.00	
Less death loss (1 percent of heifer sales)	14.08	
Total income	1,394.17	
Operating costs		
Purchased heifer calf	741.51	
Pasture	130.73	
Feed, mineral and stored forage	173.40	
Labor	77.50	
Veterinary, drugs and supplies	30.00	
Marketing costs	42.25	
Breeding costs	37.50	
Machinery and utilities	93.96	
Livestock facility repairs	8.00	
Miscellaneous	6.00	
Operating and calf interest	48.10	
Total operating costs	1,388.95	
Ownership costs		
Depreciation on livestock facilities	8.45	
Interest on livestock facilities	6.77	
Insurance and taxes on capital items	13.15	
Total ownership costs	28.37	
Total costs	1,417.31	
Income over operating costs	**5.22**	
Income over total costs	**-23.15**	
Total cost per head per day (excluding calf price)	1.78	
Total cost per pound of gain	1.61	
Bred heifer breakeven price per head	1,477.24	

[1] Totals may not sum due to rounding.

Written by
Wesley Tucker, Field Specialist, Agricultural Business; **Eldon Cole**, Field Specialist, Livestock; **Joe Horner**, State Specialist, Agricultural Business and Policy

Table 2. Input assumptions used in replacement beef heifer planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Heifer purchase weight, pounds	550	Heifer purchase price, per hundredweight	134.82
Yearling cull heifer sale weight, pounds	750	Yearling cull heifer sale price, per hundredweight	128.00
Heavy cull heifer sale weight, pounds	1,000	Heavy cull heifer sale price, per hundredweight	135.00
Bred heifer sale weight, pounds	1,000	Bred heifer sale price, per head	1,450.00
Labor, hours	5	Labor cost, per hour	15.50
Pasture, animal unit months	8.17	Pasture, per animal unit month	16.00

Table 3. Feed and stored forage requirements in replacement beef heifer planning budget for 2021, on a per heifer basis.

		November to May[1]	May to October[2]	October to December[3]		
Feed description	Cost per unit	Pounds	Pounds	Pounds	Total pounds	Dollars[4]
Mixed hay, per ton	100.00	1,250			1,250	62.50
Processed corn, per ton	200.00	240		90	330	33.00
Protein supplement, per ton	220.00	240		90	330	36.30
Salt and minerals, per ton	800.00	49	39	16	104	41.60
Total		**1,779**	**39**	**196**	**2,014**	**173.40**

[1] Beginning weight of 550 pounds and ending weight of 750 pounds after a 170 day feeding period.

[2] Beginning weight of 750 pounds and ending weight of 925 pounds after a 150 day feeding period.

[3] Beginning weight of 925 pounds and ending weight of 1,000 pounds after a 60 day feeding period.

[4] Totals may not sum due to rounding.

Table 4. Machinery assumptions used in replacement beef heifer planning budget for 2021.

Description	Cost per hour	Hours	Total dollars[1]	Dollars attributed to total heifer operation[2]	Dollars per replacement heifer[3]
Tractor; 105 MFWD	41.32	50	2,066.00	268.58	35.81
Truck	30.00	15	450.00	58.50	7.80
Livestock trailer	28.00	24	672.00	87.36	11.65
4-wheeler	10.00	180	1,800.00	234.00	31.20
Total			**4,988.00**	**648.44**	**86.46**

[1] Total machinery costs are based on combined cow-calf and replacement heifer operation.

[2] 13 percent of the total machinery costs for the beef herd are attributed to the heifer operation.

[3] An average of 7.5 replacement heifers are assumed to be raised yearly in a 50 cow herd.

Abbreviations: MFWD = mechanical front-wheel drive tractor

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Northern Missouri Beef Cow-Calf Planning Budget

This budget presents information useful to beef farmers. Table 1 provides estimates for the 2021 year for a cow-calf operation (50-cow herd size and purchased replacements) in Northern Missouri for a fall and spring calving season. Assumptions were based on price forecasts as of October 2020. Detailed assumptions and feed requirements are summarized in Tables 2, 3 and 4. The production practices used to develop these cost estimates are common for beef farms in Missouri. Farmers are encouraged to modify this budget to fit their operation.

Table 1. Northern Missouri beef cow-calf planning budget for 2021.

	Fall calving	Spring calving	Your estimate
	per cow[1]	per cow[1]	
Income			
Steer calf sales	387.14	396.13	
Heifer calf sales	320.33	329.80	
Cull cow sales	90.00	105.00	
Total income	797.47	830.93	
Operating costs			
Pasture (rental rate)	147.52	147.52	
Feed and stored forage	236.32	190.98	
Labor	124.00	124.00	
Veterinary, drugs and supplies	38.00	38.00	
Marketing	19.94	20.77	
Machinery and utility costs	101.48	94.29	
Livestock facility repairs	8.00	8.00	
Cow replacement	201.50	232.50	
Bull cost	50.00	50.00	
Professional fees (legal, accounting, etc.)	1.00	1.00	
Miscellaneous	6.00	6.00	
Operating interest	16.79	15.61	
Total operating costs	950.54	928.67	
Ownership costs			
Depreciation on facilities and equipment	7.92	7.92	
Interest on breeding stock, facilities and equipment	82.21	83.60	
Insurance/taxes on breeding stock and capital items	33.73	34.04	
Total ownership costs	123.86	125.56	
Total costs	1,074.40	1,054.23	
Income over operating costs	**-153.07**	**-97.74**	
Income over total costs	**-276.92**	**-223.30**	

[1] Totals may not sum due to rounding.

Written by
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Table 2. Income assumptions used in Northern Missouri beef cow-calf planning budget for 2021.

Category	Percent	Weight (pounds)	Price per cwt	Calf crop (percent weaned)	Dollars per cow
Fall calving					
Steer	50	580	151.70	88	387.14
Heifers	50	540	134.82	88	320.33
Cull cows	12	1,250	60.00		90.00
Spring calving					
Steer	50	590	157.98	85	396.13
Heifers	50	550	141.09	85	329.80
Cull cows	14	1,250	60.00		105.00

Abbreviations: cwt = hundredweight

Table 3. Other assumptions used in Northern Missouri beef cow-calf planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Labor, hours	8	Labor cost, per hour	15.50
Fall calving heifers retained, percent	13	Heifer replacement value, per head	1,550.00
Spring calving heifers retained, percent	15	Bull value, per head	3,500.00

Table 4. Feed requirements in Northern Missouri beef cow-calf planning budget for 2021, on a per cow basis.

	Cost per unit	Cow (units)	Calf (units)	Bull[2] (units)	Total units	Total cost per cow[3]
Fall calving						
Pasture, per animal unit equivalent	16.00	8.7[1]		0.5	9.2	147.52
Harvested forage, per pound	0.04	3,660.0	425.0	200.0	4,285.0	171.40
Protein supplement, per pound	0.0925	300.0		7.2	307.2	28.42
Salt and mineral mix, per pound	0.40	91.3			91.3	36.50
					Total	**383.84**
Spring calving						
Pasture, per animal unit equivalent	16.00	8.7[1]		0.5	9.2	147.52
Harvested forage, per pound	0.04	3,445.5		200.0	3,645.5	145.82
Protein supplement, per pound	0.0925	90.0		3.6	93.6	8.66
Salt and mineral mix, per pound	0.40	91.3			91.3	36.50
					Total	**338.50**

[1] Cow and calf requirements are combined for pasture animal unit equivalents.

[2] Bull feed units are based on 4 percent of its total need being allocated to cow-calf enterprise.

[3] Totals may not sum due to rounding.

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Southern Missouri Beef Cow-Calf Planning Budget

This budget presents information useful to beef farmers. Table 1 provides estimates for the 2021 year on a cow-calf operation (50-cow herd size and purchased replacements) in Southern Missouri for a fall and spring calving season. Assumptions were based on price forecasts as of October 2020. Detailed assumptions and feed requirements are summarized in Tables 2, 3 and 4. The production practices used to develop these cost estimates are common for beef farms in Missouri. Farmers are encouraged to modify this budget to fit their operation.

Table 1. Southern Missouri beef cow-calf planning budget for 2021.

	Fall calving	Spring calving	Your estimate
	per cow[1]	per cow[1]	
Income			
Steer calf sales	393.81	396.13	
Heifer calf sales	326.26	329.80	
Cull cow sales	90.00	105.00	
Total income	810.08	830.93	
Operating costs			
Pasture (rental rate)	147.52	147.52	
Feed, mineral and stored forage	249.92	210.85	
Labor	124.00	124.00	
Veterinary, drugs and supplies	35.50	35.50	
Marketing	20.25	20.77	
Machinery and utility costs	101.48	94.29	
Livestock facility repairs	8.00	8.00	
Cow replacement	188.50	217.50	
Bull cost	28.00	28.00	
Professional fees (legal, accounting, etc.)	1.00	1.00	
Miscellaneous expense	6.00	6.00	
Operating interest	16.53	15.49	
Total operating costs	926.70	908.92	
Ownership costs			
Depreciation on facilities and equipment	7.92	7.92	
Interest on breeding stock, facilities and equipment	80.72	82.03	
Insurance/taxes on breeding stock and capital items	33.21	33.50	
Total ownership costs	121.85	123.44	
Total costs	1,048.55	1,032.36	
Income over operating costs	**-116.62**	**-77.99**	
Income over total costs	**-238.47**	**-201.43**	

[1] Totals may not sum due to rounding.

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Table 2. Income assumptions used in Southern Missouri beef cow-calf planning budget for 2021.

Category	Percent	Weight (pounds)	Price per cwt	Calf crop (percent weaned)	Dollars per cow
Fall calving					
Steer	50	590	151.70	88	393.82
Heifers	50	550	134.82	88	326.27
Cull cows	12	1,250	60.00		90.00
Spring calving					
Steer	50	590	157.98	85	396.13
Heifers	50	550	141.09	85	329.80
Cull cows	14	1,250	60.00		105.00

Abbreviations: cwt = hundredweight

Table 3. Other assumptions used in Southern Missouri beef cow-calf planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Labor, hours per cow	8	Labor cost, per hour	15.50
Fall calving heifers retained, percent	13	Heifer replacement value, per head	1,450.00
Spring calving heifers retained, percent	15	Bull value, per head	3,000.00

Table 4. Feed requirements in Southern Missouri beef cow-calf planning budget for 2021, on a per cow basis.

	Cost per unit	Cow (units)	Calf (units)	Bull[2] (units)	Total units	Total cost per cow[3]
Fall calving						
Pasture, per animal unit equivalent	16.00	8.7[1]		0.5	9.2	147.52
Harvested forage, per pound	0.045	3,660.0	425.0	200.0	4,285.0	192.83
Protein supplement, per pound	0.11	180.0		7.2	187.2	20.59
Salt and mineral mix, per pound	0.40	91.3			91.3	36.50
					Total	**397.44**
Spring calving						
Pasture, per animal unit equivalent	16.00	8.7[1]		0.5	9.2	147.52
Harvested forage, per pound	0.045	3,445.5		200.0	3,645.5	164.05
Protein supplement, per pound	0.11	90.0		3.6	93.6	10.30
Salt and mineral mix, per pound	0.40	91.3			91.3	36.50
					Total	**358.37**

[1] Cow and calf requirements are combined for pasture animal unit equivalents.
[2] Bull feed units are based on 4 percent of its total need being allocated to cow-calf enterprise.
[3] Totals may not sum due to rounding.

Farmers can develop custom enterprise budget by using the Missouri Beef Enterprise Tool (*https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/Beef/Docs/MissouriBeefEnterprise.xlsx*). This spreadsheet tool allows users to make an enterprise budget for a cow-calf (spring or fall calving), heifer or backgrounding (drylot or pasture) operation.

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Yearling Beef Steer Feeding Planning Budget

This budget presents information useful to beef farmers. Table 1 presents estimates for yearling beef steers in Missouri that were purchased in November 2020 and sold in April 2021 (5 month feeding period with a 3.65 average daily gain). Assumptions were based on price forecasts as of November 2020. Detailed assumptions and feed requirements are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common for beef farms in Missouri. Farmers are encouraged to modify this budget to fit their operation.

Table 1. Missouri yearling beef steer feeding planning budget for 2021.

	Per steer sold[1]	Your estimate
Income		
Market steer sales	1,404.00	
Less death loss (2 percent)	-28.08	
Total income	**1,375.92**	
Operating costs		
Purchased steer calf	937.50	
Purchased feed	333.00	
Labor	31.00	
Veterinary and drugs	11.75	
Commission, yardage, and hauling	25.00	
Machinery and feed preparation	8.00	
Utilities	5.00	
Operating interest	20.07	
Total operating costs	**1,371.32**	
Ownership costs		
Depreciation and interest on real estate	5.00	
Real estate and property taxes	4.00	
Total ownership costs	**9.00**	
Total costs	**1,380.32**	
Income over operating costs	**4.60**	
Income over total costs	**-4.40**	

[1] Totals may not sum due to rounding.

Written by
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Table 2. Assumptions in Missouri yearling beef steer feeding planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Steer purchase weight, pounds	750	Steer purchase price, per hundredweight	125.00
Market steer sale weight, pounds	1,300	Market steer sale price, per hundredweight	108.00
Labor, hours	2	Labor cost, per hour	15.50
Operating interest, percent	4.5		

Table 3. 2021 feed requirements per steer in Missouri.

Feed description	Cost per unit	Total pounds[1]	Dollars
Corn, per bushel	4.00	2,240	160
Distiller's grains, dry, per ton	180.00	1,500	135.00
Soybean meal, per ton	340.00	100	17.00
Salt and additives, per ton	400.00	30	6.00
Grass hay, per ton	60.00	500	15.00
Total		**4,370**	**333.00**

[1]Ration assumes 151 days on feed and 3.65 pound average daily gain for a steer.

Farmers can view or customize more existing Missouri budgets by visiting *https://extension.missouri.edu/programs/agricultural-business-and-policy-extension/missouri-crop-and-livestock-enterprise-budgets.*

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Feeder Pigs Planning Budget

This budget presents information useful to swine farmers. Table 1 presents estimates for a feeder pig operation in Missouri with a production system of 22 pigs per sow per year and pigs sold at 40 pounds each. Assumptions were based on price forecasts as of November 2020. Detailed assumptions and feed requirements are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common for swine farms in Missouri. Farmers are encouraged to modify this budget to fit their operation.

Table 1. Missouri feeder pigs planning budget for 2021.

	Per sow[1]	Your estimate
Income		
Feeder pigs sold (22 head)	968.00	
Cull sows sold (0.5 head)	70.00	
Total income	**1,038.00**	
Operating costs		
Purchased feed	450.96	
Labor	186.00	
Veterinary and medicine	60.00	
Breeding and replacement gilts	235.00	
Equipment operation, machine hire, and transportation	64.00	
Utilities, insurance and miscellaneous	72.00	
Personal property taxes	5.00	
Hog facility repair and maintenance	51.00	
Operating interest	21.10	
Total operating costs	**1,145.06**	
Ownership costs		
Real estate interest, depreciation, and taxes	107.00	
Interest on breeding herd	16.00	
Machinery and equipment interest and depreciation	64.00	
Total ownership costs	**187.00**	
Total costs	**1,332.06**	
Income over operating costs	**-107.06**	
Income over total costs	**-294.06**	

[1] Totals may not sum due to rounding.

Written by
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Table 2. Assumptions used in Missouri feeder pigs planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Feeder pig sale weight, pounds	40	Feeder pig sale price, per hundredweight	110.00
Cull sow sale weight, pounds	400	Cull sow sale price, per hundredweight	35.00
Labor, hours per sow	12	Labor cost, per hour	15.50
Operating interest, percent	4.5		

Table 3. Feed requirements used in Missouri feeder pigs planning budget for 2021, on a per sow basis.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Commercial feed, pounds	1,458	Commercial feed price, per ton	340.00
Grain and distiller's dried grains, pounds	2,708	Grain and distiller's dried grains price, per ton	150.00

Farmers can view or customize other existing Missouri budgets by visiting *https://extension.missouri.edu/programs/agricultural-business-and-policy-extension/missouri-crop-and-livestock-enterprise-budgets*.

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Farrow to Finish Swine Planning Budget

This budget presents information useful to swine farmers. Table 1 presents estimates for a farrow to finish operation in Missouri with production of 22 pigs per sow per year and selling market hogs at 280 pounds. Assumptions were based on price forecasts as of November 2020. Detailed assumptions and feed requirements are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common for swine farms in Missouri. Farmers are encouraged to modify this budget to fit their operation.

Table 1. Missouri farrow to finish swine planning budget for 2021.

	Per sow[1]	Your estimate
Income		
Market hogs sold (22 head)	2,772.00	
Cull sows sold (0.5 head)	70.00	
Total income	**2,842.00**	
Operating costs		
Purchased feed	1,817.37	
Labor	310.00	
Veterinary and medicine	122.00	
Breeding and replacement gilts	235.00	
Equipment operation, machine hire, and transportation	133.00	
Utilities, insurance and miscellaneous	128.00	
Personal property taxes	6.00	
Hog facility repair and maintenance	108.00	
Operating interest	57.36	
Total operating costs	**2,916.73**	
Ownership costs		
Real estate interest, depreciation, and taxes	220.00	
Interest on breeding herd	18.00	
Machinery and equipment interest and depreciation	118.00	
Total ownership costs	**356.00**	
Total costs	**3,272.73**	
Income over operating costs	**-74.73**	
Income over total costs	**-430.73**	

[1] Totals may not sum due to rounding.

Written by
Scott Brown, Associate Professor and Economist, Agricultural Business and Policy Extension

Table 2. Assumptions used in Missouri farrow to finish swine planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Market hog sale weight, pounds	280	Market hog sale price, per hundredweight	45.00
Cull sow sale weight, pounds	400	Cull sow sale price, per hundredweight	35.00
Labor, hours per sow	20	Labor cost, per hour	15.50
Operating interest, percent	4.5		

Table 3. Feed requirements used in Missouri farrow to finish swine planning budget for 2021, on a per sow basis.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Commercial feed, pounds	4,022	Commercial feed price, per ton	340.00
Grain and distiller's dried grains, pounds	15,115	Grain and distiller's dried grains price, per ton	150.00

Farmers can view or customize more existing Missouri budgets by visiting *https://extension.missouri.edu/programs/agricultural-business-and-policy-extension/missouri-crop-and-livestock-enterprise-budgets*.

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Hog Finishing Planning Budget

This budget presents information useful to swine farmers. Table 1 presents estimates for a hog finishing operation in Missouri that purchases 103 head of 40 pound pigs and sells 100 head of 280 pound market hogs. Assumptions were based on price forecasts as of November 2020. Detailed assumptions and feed requirements are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common for swine farms in Missouri. Farmers are encouraged to modify this budget to fit their operation.

Table 1. Missouri hog finishing planning budget for 2021.

	Per lot of 100 hogs[1]	Your estimate
Income		
Market hogs sold (100 head)	12,320.00	
Total income	**12,320.00**	
Operating costs		
Purchased pigs	4,120.00	
Purchased feed	5,664.53	
Labor	604.50	
Veterinary and medicine	455.00	
Livestock materials and services	25.00	
Equipment operation, machine hire, and transportation	530.00	
Utilities, insurance and miscellaneous	329.00	
Personal property taxes	25.00	
Hog facility repair and maintenance	193.00	
Operating interest	63.80	
Total operating costs	**12,009.83**	
Ownership costs		
Real estate interest, depreciation, and taxes	604.00	
Machinery and equipment interest and depreciation	367.00	
Total ownership costs	**971.00**	
Total costs	**12,980.83**	
Income over operating costs	**310.17**	
Income over total costs	**-660.83**	

[1] Totals may not sum due to rounding.

Written by
Scott Brown, Associate Professor and Economist, Agricultural Business and Policy Extension

Table 2. Assumptions used in Missouri hog finishing planning budget for 2021.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Market hog sale weight, hundredweight	280	Market hog sale price, per hundredweight	44.00
Pig purchase weight, pounds	40	Pig purchase price, per pound	1.00
Labor, hours per lot	39	Labor cost, per hour	15.50
Operating interest, percent	4.5		

Table 3. Feed requirements used in Missouri hog finishing planning budget for 2021, on a per lot (100 hogs) basis.

Selected input quantities	Per unit	Selected input prices	Dollars per unit
Commercial feed, pounds	10,159	Commercial feed price, per ton	340.00
Grain and distiller's dried grains, pounds	52,500	Grain and distiller's dried grains price, per ton	150.00

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Dairy (Confinement) Planning Budget

This budget presents information useful to dairy farmers. Table 1 presents estimates for the 2021 year on a 150-cow confinement dairy (replacements raised on farm) in Missouri. Assumptions were based on price forecasts as of October 2020. Detailed inputs, feed requirements and investments are summarized in Tables 2, 3 and 4. The production practices used to develop these cost estimates are common for confinement dairies in Missouri. Farmers are encouraged to customize this budget to fit their operation.

Table 1. Missouri dairy (confinement) planning budget for 2021.

	20,000 pounds milk sold		24,000 pounds milk sold		Your estimate
	Dollars per cow[1]	Dollars per cwt[1]	Dollars per cow[1]	Dollars per cwt[1]	
Income					
Milk sales	3,599.96	18.00	4,319.93	18.00	
Quality premium	50.00	0.25	60.00	0.25	
Bull and surplus heifer sales	59.83	0.30	59.83	0.25	
Cull cow sales	234.90	1.17	234.90	0.98	
Total income	3,944.68	19.72	4,674.66	19.48	
Operating costs					
Feed	2,040.06	10.20	2,260.58	9.42	
Labor	517.24	2.59	517.24	2.16	
Veterinary, drugs and supplies	114.00	0.57	115.00	0.48	
Utilities and water	60.00	0.30	75.00	0.31	
Fuel, oil and vehicle	65.00	0.33	65.00	0.27	
Milk hauling and promotion	200.00	1.00	240.00	1.00	
Building and equipment repair	225.58	1.13	225.58	0.94	
Breeding/genetic charges	54.00	0.27	54.00	0.23	
Professional fees (legal, accounting, etc.)	12.00	0.06	11.00	0.05	
Miscellaneous and insurance	28.40	0.14	34.08	0.14	
Operating interest	70.12	0.35	75.54	0.31	
Total operating costs	3,386.40	16.93	3,673.02	15.30	
Ownership costs					
Depreciation on buildings and equipment	395.68	1.98	395.68	1.65	
Interest on land, buildings and equipment	160.74	0.80	160.74	0.67	
Interest on breeding stock	56.25	0.28	56.25	0.23	
Insurance/tax on capital items	115.60	0.58	115.60	0.48	
Total ownership costs	728.27	3.64	728.27	3.03	
Total costs	**4,114.67**	**20.57**	**4,401.28**	**18.34**	
Income over operating costs	**558.29**	**2.79**	**1,001.64**	**4.17**	
Income over total costs	**-169.98**	**-0.85**	**273.37**	**1.14**	

[1] Totals may not sum due to rounding.
Abbreviations: cwt = hundredweight

Written by
Joe Horner and Ryan Milhollin, State Specialists, Agricultural Business and Policy Extension

Table 2. Input assumptions used in dairy (confinement) planning budget for 2021.

Selected input quantities	Quantity	Selected input prices	Dollars per unit
Cull cow sale weight, pounds	1,450	Cull cow sale price, per hundredweight	60
Labor, cows per worker	70	Annual labor salary and benefits, per worker	42,000
Calf crop, percent	95	Bull calf sale price, per head	100
Heifer replacement, percent	33	Surplus heifer calf sale price, per head	85
Operating interest, percent	4.5	Milk price, per hundredweight	18

Table 3. Feed requirements used in dairy (confinement) planning budget for 2021, on a per cow basis.

		20,000 pounds milk sold		24,000 pounds milk sold	
Feed description	**Cost per unit**	**Pounds**	**Dollars[2]**	**Pounds**	**Dollars[2]**
Corn silage, per ton	45.00	12,223	275.03	13,357	300.54
Alfalfa baleage, per ton	100.00	3,741	187.05	5,296	264.79
Corn, ground, per bushel	3.75	3,470	232.37	3,658	244.92
Alfalfa hay, per ton	200.00	1,708	170.78	1,934	193.41
Whole cotton seed, per ton	240.00	1,675	201.04	1,897	227.67
Soybean hulls, per ton	150.00	1,125	84.35	752	56.39
Soybean meal, per ton	350.00	1,095	191.59	1,354	237.03
Distillers grain, dry, per ton	190.00	1,005	95.49	949	90.12
Grass hay, per ton	80.00	914	36.54	914	36.54
Minerals/vitamins, per ton	1,100.00	577	317.38	656	360.72
Total lactating and dry cow feed cost			1,791.62		2012.13
Replacement heifer feed and forage cost[1]			248.44		248.44
Total feed cost per cow			**2,040.06**		**2,260.58**

[1] Total replacement heifer (0 to 24 months) feed cost is $752.85 and was adjusted to a 33% heifer replacement rate.
[2] Totals may not sum due to rounding.

Table 4. Investment assumptions in dairy (confinement) planning budget for 2021.

Description	Quantity	Dollars per unit	Total dollars	Dollars per cow[2]
Land, acres	4	3,500	14,000	93
Milking parlor, stalls	12	30,000	360,000	2,387
Breeding herd, cows	150	1,250	188,500	1,250
Free stall barn, stalls	130	2,750	357,500	2,371
Land improvements			5,000	33
Feed storage			56,826	377
Manure storage system			97,500	647
Equipment			81,100	538
Total[1]			**1,160,426**	**7,695**

[1] Totals may not sum due to rounding.
[2] Represents total cows in herd.

Farmers can also develop their own custom budget by using the Missouri Dairy Enterprise Tool (***https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/MODairyBudget.xlsx***). This spreadsheet tool allows users to develop a custom estimate for their costs and returns for dairy production and heifer raising in Missouri.

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Dairy (Grazing) Planning Budget

This budget presents information useful to dairy farmers. Table 1 presents estimates for the 2021 year on a 150-cow rotational grazing dairy (replacements raised on farm) in Missouri. Assumptions were based on price forecasts as of October 2020. Detailed inputs, feed requirements and investments are summarized in Tables 2, 3 and 4. The production practices used to develop these cost estimates are common for grazing dairies in Missouri. Farmers are encouraged to customize this budget to fit their operation.

Table 1. Missouri dairy (grazing) planning budget for 2021.

	11,000 pounds milk sold		14,000 pounds milk sold		Your estimate
	Dollars per cow[1]	Dollars per cwt[1]	Dollars per cow[1]	Dollars per cwt[1]	
Income					
Milk sales	1,980.04	18.00	2,520.05	18.00	
Quality premium	27.50	0.25	35.00	0.25	
Bull and surplus heifer sales	69.18	0.63	69.18	0.49	
Cull cow sales	118.80	1.08	118.80	0.85	
Total income	2,195.52	19.96	2,743.03	19.59	
Operating costs					
Feed	921.45	8.38	991.76	7.08	
Labor	350.00	3.18	350.00	2.50	
Veterinary, drugs and supplies	85.00	0.77	95.00	0.68	
Utilities and water	55.00	0.50	55.00	0.39	
Fuel, oil and vehicle	65.00	0.59	65.00	0.46	
Milk hauling and promotion	110.00	1.00	140.00	1.00	
Building and equipment repair	159.42	1.45	159.42	1.14	
Breeding/genetic charges	54.00	0.49	54.00	0.39	
Professional fees (legal, accounting, etc.)	12.00	0.11	12.00	0.09	
Miscellaneous and insurance	15.62	0.14	19.88	0.14	
Operating interest	38.64	0.35	40.55	0.29	
Total operating costs	1,866.13	16.96	1,982.61	14.16	
Ownership costs					
Depreciation on buildings and equipment	106.18	0.97	106.18	0.76	
Interest on land, buildings and equipment	210.27	1.91	210.27	1.50	
Interest on breeding stock	56.25	0.51	56.25	0.40	
Insurance/taxes on capital items	54.30	0.49	54.30	0.39	
Total ownership costs	427.00	3.88	427.00	3.05	
Total costs	**2,293.13**	**20.85**	**2,409.61**	**17.21**	
Income over operating costs	**329.38**	**2.99**	**760.42**	**5.43**	
Income over total costs	**-97.62**	**-0.89**	**333.42**	**2.38**	

[1] Totals may not sum due to rounding.
Abbreviations: cwt = hundredweight

Written by
Joe Horner and Ryan Milhollin, State Specialists, Agricultural Business and Policy Extension

Table 2. Input assumptions used in dairy (grazing) planning budget for 2021.

Selected input quantities	Quantity	Selected input prices	Dollars per unit
Cull cow sale weight, pounds	1,100	Cull cow sale price, per hundredweight	60
Labor, cows per worker	100	Annual labor salary and benefits, per worker	42,000
Calf crop, percent	95	Bull calf sale price, per head	100
Heifer replacement, percent	22	Surplus heifer calf sale price, per head	85
Operating interest, percent	4.5	Milk price, per hundredweight	18

Table 3. Feed requirements in dairy (grazing) planning budget for 2021, on a per cow basis.

		11,000 pounds milk sold		14,000 pounds milk sold	
Feed description	**Cost per unit**	**Pounds**	**Dollars[2]**	**Pounds**	**Dollars[2]**
Pasture (intensive dairy), dry matter per ton	80.00	7,335	293.41	7,658	306.31
Alfalfa hay, per ton	200.00	1,289	128.94	1,289	128.94
Corn, cracked, per bushel	3.75	910	60.94	1,384	92.70
Soybean hulls, per ton	150.00	910	68.25	1,068	80.11
Distillers grain, dry, per ton	190.00	791	75.10	949	90.12
Grass hay, per ton	80.00	670	26.80	639	25.58
Minerals/vitamins, per ton	1,100.00	186	102.38	186	102.38
Total lactating and dry cow feed cost			755.82		826.13
Replacement heifer feed and forage cost[1]			165.63		165.63
Total feed cost per cow			**921.45**		**991.76**

[1] Total replacement heifer (0 to 24 months) feed cost is $752.85 and was adjusted to a 22% heifer replacement rate.

[2] Totals may not sum due to rounding.

Table 4. Investment assumptions in dairy (grazing) planning budget for 2021.

Description	Quantity	Dollars per unit	Total dollars	Dollars per cow[2]
Land, acres	200	3,500	700,000	3,889
Milking parlor, stalls	24	7,000	168,000	933
Breeding herd, cows	180	1,250	225,000	1,250
Working facility			14,800	82
Feed storage			11,480	64
Manure storage system			31,250	174
Equipment			31,000	172
Total[1]			**1,181,530**	**6,564**

[1] Totals may not sum due to rounding.

[2] Represents total cows in herd.

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Dairy Heifer Planning Budget

This budget presents information useful to farmers raising dairy heifers. Table 1 presents estimates for the 2021 year for dairy calves purchased at birth, bred and sold at 24 months in Missouri. Assumptions were based on price forecasts as of October 2020. Detailed inputs and feed requirements are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to customize this budget to fit their operation.

Table 1. Missouri dairy heifer planning budget for 2021.

	Per heifer sold[1]	Your estimate
Income		
Springer heifer sales (0.95 head)	1,187.50	
Cull heifer sales (0.025 head)	24.38	
Yearling heifer sales (0.025 head)	18.13	
Less death loss (4 percent) of purchased calves	-3.40	
Total income	1,226.60	
Operating costs		
Purchased heifer calf and interest	92.96	
Feed (birth to 24 months of age)	752.85	
Labor	155.00	
Veterinary, drugs and supplies	25.00	
Breeding costs for artificial insemination services	45.00	
Transportation and marketing	15.00	
Utilities, fuel and oil	18.75	
Building and equipment repairs	9.68	
Miscellaneous	15.00	
Operating interest	23.32	
Total operating costs	1,152.55	
Ownership costs		
Depreciation on buildings and equipment	52.09	
Interest on buildings and equipment	23.95	
Insurance and taxes on buildings and equipment	14.08	
Total ownership costs	90.12	
Total costs	**1,242.66**	
Income over operating costs	**74.05**	
Income over total costs	**-16.06**	
Total cost per day per heifer sold	1.60	
Total cost per pound of gain per heifer sold	0.96	
Springer heifer breakeven price per head	1,266.91	

[1] Totals may not sum due to rounding.

Written by
Joe Horner and Ryan Milhollin, State Specialists, Agricultural Business and Policy Extension

Table 2. Input assumptions used in dairy heifer planning budget for 2021.

Selected input quantities	Quantity	Selected input prices	Dollars per unit
Cull heifer sale weight, pounds	1,300	Cull and yearling heifer sale price, per pound	0.75
Yearling heifer sale weight, pounds	725	Springer heifer sale price, per head	1,250.00
Labor, hours	10	Labor cost, per hour	15.50
		Heifer purchase price	85.00

Table 3. Feed requirements for dairy heifer planning budget for 2021.

Birth to 6 months (90 to 400 pounds)		Pre-weaning ration (90 to 180 pounds)		Transition ration (180 to 235 pounds)		Early growing ration (235 to 400 pounds)	
Feed description	**Cost per unit**	**Units**	**Dollars[1]**	**Units**	**Dollars[1]**	**Units**	**Dollars[1]**
Milk replacer, per pound	1.275	50	63.75				
Calf starter, per pound	0.150	100	15.00	100	15.00		
Alfalfa hay, per pound	0.100	20	2.00	90	9.00	225	22.50
Calf grower, per pound	0.140			50	7.00	450	63.00
Grass hay, per pound	0.040					225	9.00
Pasture, per animal unit month	15.00					0.4	6.13
Feed cost per period			**80.75**		**31.00**		**100.63**
Total feed costs[2]			**213.95**				
6 to 12 months (400 to 725 pounds)		**Winter ration**		**Spring/Fall ration**		**Summer ration**	
Feed description	**Cost per unit**	**Units**	**Dollars[1]**	**Units**	**Dollars[1]**	**Units**	**Dollars[1]**
Corn gluten feed, per pound	0.0863	525	45.28			270	23.29
Corn, cracked, per pound	0.0670	387	25.92	252	16.88	234	15.67
Soybean hulls, per pound	0.0750	263	19.69	360	27.00	270	20.25
Grass hay, per pound	0.0400	1,350	54.00				
Mineral, per pound	0.5375	36	19.35	36	19.35	36	19.35
Pasture, per animal unit month	15.00			1.1	16.88	1.7	25.31
Feed cost per period			**164.23**		**80.10**		**103.87**
Average total feed costs			**214.15**				
12 to 24 months (725 to 1,380 pounds)		**Winter ration**		**Spring/Fall ration**		**Summer ration**	
Feed description	**Cost per unit**	**Units**	**Dollars[1]**	**Units**	**Dollars[1]**	**Units**	**Dollars[1]**
Corn gluten feed, per pound	0.0863	225	19.41			207	17.85
Corn, cracked, per pound	0.0670	135	9.04	90	6.03	117	7.83
Soybean hulls, per pound	0.0750	90	6.75	180	13.50	207	15.53
Grass hay, per pound	0.0400	1,710	68.40				
Mineral, per pound	0.5375	18	9.68	18	9.68	18	9.68
Pasture, per animal unit month	15.00			2.1	31.58	3.2	47.36
Feed cost per period			**113.29**		**60.79**		**98.25**
Average total feed costs[3]			**324.75**				

[1] Totals may not sum due to rounding.

[2] Feed cost adjusted to account for death loss (4 percent).

[3] Feed cost adjusted to account for sale of yearling heifers (2.5 percent).

Farmers can also develop their own custom budget by using the Missouri Dairy Enterprise Tool (*https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/MODairyBudget.xlsx*). This spreadsheet allows users to develop cost and return estimates for dairy and heifer raising.

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Goats - Early Kidding Planning Budget

Table 1. Missouri meat goat planning budget for 2021: Early kidding, sell at weaning (50 does, 150% kidding rate).

	Head per doe	Quantity	Unit	Dollars per unit	Dollars per doe	Dollars per enterprise
Returns						
Heavy kids	0.50	60	pound	3.05	91.50	4,575.00
Light kids	0.92	50	pound	2.75	126.50	6,325.00
Culled does	0.16	125	pound	1.42	24.85	1,242.50
Culled bucks	0.02	175	pound	1.62	5.67	283.50
Total returns					**248.52**	**12,426.00**
Operating costs						
Doe replacement	0.17		head	150.00	25.50	1,275.00
Buck cost, breeding supplies	0.04		head	350.00	8.00	400.00
Pasture		0.35	acre	37.84	10.56	528.00
Hay		396	pound	0.05	19.82	990.78
Supplement		30	pound	0.11	3.16	158.12
Mineral		4.4	pound	0.40	3.53	176.52
Animal health					6.38	318.85
Guard dog replacement and food					8.87	443.65
Bedding and stock supplies					2.75	137.50
Marketing		7.5	percent		18.64	931.95
Machinery fuel, lube, repair					14.64	732.04
Facility maintenance					3.90	195.00
Operating interest		4.5	percent		2.64	131.83
Operator and hired labor		4.32	hour	15.50	66.96	3,348.00
Total operating costs					**195.34**	**9,767.25**
Ownership costs						
Business overhead (professional fees, utilities, miscellaneous)					4.50	225.00
Property taxes and insurance					3.51	175.60
Economic depreciation, facility and equipment					21.12	1,056.17
Opportunity interest on capital investment		4.5	percent		20.29	1,014.64
Total ownership costs					**49.43**	**2,471.40**
Total costs					**244.77**	**12,238.65**
Return over operating costs					**53.18**	**2,658.75**
Return over total costs					**3.75**	**187.35**
Return to labor and management					70.71	3,535.35
Shut-down kid price, all else equal, $ per pound					2.17	
Break-even kid price, all else equal, $ per pound					2.82	

Written by
Jennifer Lutes, County Engagement Specialist, Agriculture and Environment Extension

Table 2. Production rates for 2021: Early kidding, sell at weaning.

Rates	Quantity
Kiddings, per doe per year	1
Doe numbers, start of breeding season	50
Bucks for breeding	2
Kid crop (live birth per exposed), percent	150
Kid crop (raised to sale weight), percent	142
Adult death loss, percent	3
Kid death loss, pre-weaning, percent	3
Kid death loss, post-weaning, percent	3

Table 3. Feed and labor estimates for 2021: Early kidding, sell at weaning.

	Unit	Units per head, adults	Units per head, kids	Total units per doe	Weighted price (dollars per unit)	Total dollars per doe
Pasture	acre	0.2	0.1	0.35	37.84	13.32
Hay	pound	381.1		396.0	0.05	19.82
Supplement	pound	27.5	1.0	30.0	0.105	3.16
Mineral	pound	8.0	0.3	8.8	0.40	3.53
Labor	hour	3.0	0.8	4.32	15.50	66.96

Table 4. Land and capital investment estimates for 2021: Early kidding, sell at weaning.

	Unit	Quantity	Dollars per unit	Enterprise total dollars	Dollars per doe
Pastureland	acre	18	2,500	44,000	880
Breeding stock unit	doe	50	190	9,520	190
Buildings and facilities				11,500	230
Machinery, equipment and pickup				9,800	196
Total				**74,820**	**1,496**

Note: Building and machinery investment is allocated across multiple enteprises.

The meat goat budget is designed to reflect the economic costs and returns of a 50 doe, winter kidding flock (December and January) with kids marketed between 50 to 60 pounds in April. This management system takes advantage of seasonally high market prices for weaned kids. However, this management system has relatively high production risk due to summer breeding challenges and winter kidding.

Farmers can see other Missouri budgets or customize existing Missouri budgets by visiting ***https://extension.missouri.edu/programs/agricultural-business-and-policy-extension/missouri-crop-and-livestock-enterprise-budgets***.

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Goats - Late Kidding Planning Budget

Table 1. Missouri meat goat planning budget for 2021: Late kidding, sell at weaning (50 does, 160% kidding rate).

	Head per doe	Quantity	Unit	Dollars per unit	Dollars per doe	Dollars per enterprise
Returns						
Heavy kids	0.44	60	pound	2.70	71.28	3,564.00
Light kids	1.08	50	pound	2.40	129.60	6,480.00
Culled does	0.16	125	pound	1.63	28.53	1,426.25
Culled bucks	0.02	175	pound	1.87	6.55	327.25
Total returns					**235.95**	**11,797.50**
Operating costs						
Doe replacement	0.17		head	150.00	25.50	1,275.00
Buck cost, breeding supplies	0.04		head	350.00	8.00	400.00
Pasture		0.36	acre	37.80	10.86	543.00
Hay		395	pound	0.05	19.76	987.98
Supplement		30	pound	0.11	3.18	158.96
Mineral		4.4	pound	0.40	3.55	177.26
Animal health					6.41	320.60
Guard dog replacement and food					8.87	443.65
Bedding and stock supplies					2.75	137.50
Marketing		7.5	percent		17.70	884.81
Machinery fuel, lube, repair					14.64	732.04
Facility maintenance					3.90	195.00
Operating interest		4.5	percent		2.65	132.35
Operator and hired labor		4.4	hour	15.50	68.20	3,410.00
Total operating costs					**195.96**	**9,798.16**
Ownership costs						
Business overhead (professional fees, utilities, miscellaneous)					4.50	225.00
Property taxes and insurance					3.51	175.60
Economic depreciation, facility and equipment					21.12	1,056.17
Opportunity interest on capital investment		4.5	percent		20.29	1,014.64
Total ownership costs					**49.43**	**2,471.40**
Total costs					**245.39**	**12,269.56**
Return over operating costs					**39.99**	**1,999.34**
Return over total costs					**-9.44**	**-472.06**
Return to labor and management					58.76	2,937.94
Shut-down kid price, all else equal, $ per pound					2.00	
Break-even kid price, all else equal, $ per pound					2.62	

Written by
Jennifer Lutes, County Engagement Specialist, Agriculture and Environment Extension

Table 2. Production rates for 2021: Late kidding, sell at weaning.

Rates	Quantity
Kiddings, per doe per year	1
Doe numbers, start of breeding season	50
Bucks for breeding	2
Kid crop (live birth per exposed), percent	160
Kid crop (raised to sale weight), percent	152
Adult death loss, percent	3
Kid death loss, pre-weaning, percent	3
Kid death loss, post-weaning, percent	3

Table 3. Feed and labor estimates for 2021: Late kidding, sell at weaning.

	Unit	Units per head, adults	Units per head, kids	Total units per doe	Weighted price (dollars per unit)	Total dollars per doe
Pasture	acre	0.2	0.1	0.36	37.80	13.68
Hay	pound	380.0		395.0	0.05	19.76
Supplement	pound	27.5	1.0	30.1	0.106	3.18
Mineral	pound	8.0	0.3	8.9	0.40	3.55
Labor	hour	3.0	0.8	4.4	15.50	68.20

Table 4. Land and capital investment estimates for 2021: Late kidding, sell at weaning.

	Unit	Quantity	Dollars per unit	Enterprise total dollars	Dollars per doe
Pastureland	acre	18	2,500	45,250	905
Breeding stock unit	doe	50	190	9,520	190
Buildings and facilities				11,500	230
Machinery, equipment and pickup				9,800	196
Total				**76,070**	**1,521**

Note: Building and machinery investment is allocated across multiple enteprises.

The meat goat budget is designed to reflect the economic costs and returns of a 50 doe, spring kidding flock (March and April) with kids marketed between 50 to 60 pounds in July/August. This management system takes advantage of spring forage production and the natural breeding season. However, this management system has high price risk during summer marketing.

Farmers can see other Missouri budgets or customize existing Missouri budgets by visiting ***https://extension.missouri.edu/programs/agricultural-business-and-policy-extension/missouri-crop-and-livestock-enterprise-budgets***.

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Sheep - Early Lambing Planning Budget

Table 1. Missouri hair sheep planning budget for 2021: Early lambing, sell at weaning (50 ewes, 175% lambing rate).

	Head per ewe	Quantity	Unit	Dollars per unit	Dollars per ewe	Dollars per enterprise
Returns						
Heavy lambs	0.32	70	pound	1.95	43.68	2,184.00
Light lambs	1.32	60	pound	2.05	162.36	8,118.00
Culled ewes	0.14	120	pound	0.90	12.96	648.00
Culled rams	0.02	170	pound	1.05	3.57	178.50
Total returns					**224.94**	**11,128.50**
Operating costs						
Ewe replacement	0.15		head	150.00	22.50	1,125.00
Ram cost, breeding supplies	0.04		head	300.00	7.00	350.00
Pasture		0.34	acre	40.00	10.22	510.90
Hay		462	pound	0.05	22.87	1,143.56
Supplement		30	pound	0.11	3.20	160.02
Mineral		4.5	pound	0.40	3.56	178.14
Animal health					6.47	323.40
Guard dog replacement and food					8.87	443.65
Bedding and stock supplies					2.75	137.50
Marketing		7.5	percent		16.69	834.64
Machinery fuel, lube, repair					14.64	732.04
Facility maintenance					3.90	195.00
Operating interest		4.5	percent		2.73	136.68
Operator and hired labor		4.53	hour	15.50	70.18	3,509.20
Total operating costs					**195.59**	**9,779.73**
Ownership costs						
Business overhead (professional fees, utilities, miscellaneous)					4.50	225.00
Property taxes and insurance					3.51	175.60
Economic depreciation, facility and equipment					21.12	1,056.17
Opportunity interest on capital investment		4.5	percent		19.45	972.56
Total ownership costs					**48.59**	**2,429.33**
Total costs					**244.18**	**12,209.05**
Return over operating costs					**26.98**	**1,348.77**
Return over total costs					**-21.61**	**-1,080.55**
Return to labor and management					48.57	2,428.65
Shut-down lamb price, all else equal, $ per pound					1.76	
Break-even lamb price, all else equal, $ per pound					2.24	

Written by
Jennifer Lutes, County Engagement Specialist, Agriculture and Environment Extension

Table 2. Production rates for 2021: Early lambing, sell at weaning.

Rates	Quantity
Lambings, per ewe per year	1
Ewe numbers, start of breeding season	50
Rams for breeding	2
Lamb crop (live birth per exposed), percent	175
Lamb crop (raised to sale weight), percent	164
Adult death loss, percent	3
Lamb death loss, pre-weaning, percent	4
Lamb death loss, post-weaning, percent	2

Table 3. Feed and labor estimates for 2021: Early lambing, sell at weaning.

	Unit	Units per head, adults	Units per head, lambs	Total units per ewe	Weighted price (dollars per unit)	Total dollars per ewe
Pasture	acre	0.165	0.1	0.34	40.00	13.62
Hay	pound	443.8		462.0	0.05	22.87
Supplement	pound	27.5	1.0	30.2	0.106	3.20
Mineral	pound	8.0	0.3	8.9	0.40	3.56
Labor	hour	3.0	0.8	4.53	15.50	70.18

Table 4. Land and capital investment estimates for 2021: Early lambing, sell at weaning.

	Unit	Quantity	Dollars per unit	Enterprise total dollars	Dollars per ewe
Pastureland	acre	17	2,500	42,575	852
Breeding stock unit	ewe	50	172	8,585	172
Buildings and facilities				11,500	230
Machinery, equipment, and pickup				9,800	196
Total				**72,460**	**1,449**

Note: Building and machinery investment is allocated across multiple enteprises.

The sheep budget is designed to reflect the economic costs and returns of a 50 ewe, winter lambing flock (December/January) with lambs marketed between 60 to 70 pounds in April/May. This management system takes advantage of expected seasonally high market prices for light lambs. However, this management system also has relatively high production risk due to summer breeding challenges and winter lambing.

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Sheep - Late Lambing Planning Budget

Table 1. Missouri hair sheep planning budget for 2021: Late lambing, sell at weaning (50 ewes, 185% lambing rate).

	Head per ewe	Quantity	Unit	Dollars per unit	Dollars per ewe	Dollars per enterprise
Returns						
Heavy lambs	0.20	70	pound	1.60	22.40	1,120.00
Light lambs	1.56	60	pound	1.65	154.44	7,722.00
Culled ewes	0.14	120	pound	0.90	12.96	648.00
Culled rams	0.02	170	pound	1.05	3.57	178.50
Total returns					**193.37**	**9,668.50**
Operating costs						
Ewe replacement	0.15		head	150.00	22.50	1,125.00
Ram cost and breeding supplies	0.04		head	300.00	7.00	350.00
Pasture		0.35	acre	40.00	10.55	527.40
Hay		466	pound	0.05	23.10	1,154.76
Supplement		30	pound	0.11	3.22	161.03
Mineral		4.5	pound	0.40	3.58	179.02
Animal health					6.50	325.15
Guard dog replacement and food					8.87	443.65
Bedding and stock supplies					2.75	137.50
Marketing		7.5	percent		14.50	725.14
Machinery fuel, lube, repair					14.64	732.04
Facility maintenance					3.90	195.00
Operating interest		4.5	percent		2.75	137.74
Operator and hired labor		4.61	hour	15.50	71.42	3,571.20
Total operating costs					**195.29**	**9,764.62**
Ownership costs						
Business overhead (professional fees, utilities, miscellaneous)					4.50	225.00
Property taxes and insurance					3.51	175.60
Economic depreciation, facility and equipment					21.12	1,056.17
Opportunity interest on capital investment		4.5	percent		19.45	972.56
Total ownership costs					**48.59**	**2,429.33**
Total costs					**243.88**	**12,193.95**
Return over operating costs					**-1.92**	**-96.12**
Return over total costs					**-50.51**	**-2,525.45**
Return to labor and management					20.91	1,045.75
Shut-down lamb price, all else equal, $ per pound					1.66	
Break-even lamb price, all else equal, $ per pound					2.11	

Written by
Jennifer Lutes, County Engagement Specialist, Agriculture and Environment Extension

Table 2. Production rates for 2021: Late lambing, sell at weaning.

Rates	Quantity
Lambings, per ewe per year	1
Ewe numbers, start of breeding season	50
Rams for breeding	2
Lamb crop (live birth per exposed), percent	185
Lamb crop (raised to sale weight), percent	176
Adult death loss, percent	3
Lamb death loss, pre-weaning, percent	3
Lamb death loss, post-weaning, percent	2

Table 3. Feed and labor estimates for 2021: Late lambing, sell at weaning.

	Unit	Units per head, adults	Units per head, lambs	Total units per ewe	Weighted price (dollars per unit)	Total dollars per ewe
Pasture	acre	0.165	0.1	0.35	40.00	14.06
Hay	pound	448.1		466.0	0.05	23.10
Supplement	pound	27.5	1.0	30.4	0.106	3.22
Mineral	pound	8.0	0.3	9.0	0.40	3.58
Labor	hour	3.0	0.80	4.61	15.50	71.42

Table 4. Land and capital investment estimates for 2021: Late lambing, sell at weaning.

	Unit	Quantity	Dollars per unit	Enterprise total dollars	Dollars per ewe
Pastureland	acre	18	2,500	43,950	879
Breeding stock unit	ewe	50	172	8,585	172
Buildings and facilities				11,500	230
Machinery, equipment, and pickup				9,800	196
Total				**73,835**	**1,477**

Note: Building and machinery investment is allocated across multiple enteprises.

The sheep budget is designed to reflect the economic costs and returns of a 50 ewe, spring lambing flock (March/April) with lambs marketed between 50 to 60 pounds in July/August. This management system takes advantage of spring forage production and the natural breeding season. However, this management system has high price risk during summer marketing.

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Corn (Dryland) Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of corn for grain. Table 1 presents estimates for the 2021 crop year for dryland corn production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri corn (dryland) planning budget for 2021.

	Dollars per acre	Your estimate
Income		
Grain sales	577.50	
Other income	0.00	
Total income	**577.50**	
Operating costs		
Seed	93.75	
Fertilizer and soil amendments	98.71	
Crop protection chemicals	41.00	
Crop supplies, storage, and marketing	2.00	
Crop consulting and insurance	21.00	
Custom hire and rental	6.20	
Machinery fuel, drying, and irrigation energy	39.90	
Machinery repairs and maintenance	23.35	
Operator and hired labor	16.85	
Operating interest	7.71	
Total operating costs	**350.46**	
Ownership costs		
Farm business overhead	4.00	
Machinery overhead	24.31	
Machinery depreciation	33.10	
Real estate charge	154.00	
Total ownership costs	**215.41**	
Total costs	**565.88**	
Income over operating costs	**227.04**	
Income over total costs	**11.62**	
Operating costs per bushel	2.12	
Ownership costs per bushel	1.31	
Total costs per bushel	3.43	

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the dryland corn budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in corn (dryland) planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, bushels	165	Corn market price, per bushel	3.50
Seeding rate, count	30,000	Seed, per 80,000 seed bag	250.00
Nitrogen rate, pounds	165	Nitrogen, per pound N	0.27
Phosphorus rate, pounds P_2O_5	74	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	48	Potassium, per pound K_2O	0.28
Lime rate, tons	0.60	Lime, per ton	21.00
Sum of allocated labor, hours	0.97	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in corn (dryland) planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
V-ripper 30-inch (17 feet); 360 4WD	0.03	0.45	2.06	5.76	7.82	0.3
Row crop planter (16 row); 225 MFWD	0.05	0.53	5.26	10.85	16.11	1.0
Boom sprayer (90 feet); 160 MFWD	0.04	0.31	2.87	4.59	7.46	2.0
Anhydrous applicator (21 feet); 225 MFWD	0.09	0.88	5.15	7.23	12.38	1.0
Combine, corn head (8 row); 275 HP	0.15	1.78	21.28	17.74	39.02	1.0
Grain cart (500 bushel); 225 MFWD	0.07	0.73	3.84	5.51	9.36	
Grain auger (5,000 bushels per hour); 130 MFWD	0.03	0.19	1.19	1.16	2.35	
Semi, tractor and trailer		1.07	4.55	2.44	6.98	
Pickup truck		0.33	1.42	2.13	3.54	
Total[3]	**0.47**	**6.28**	**47.62**	**57.41**	**105.04**	**5.3**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 4WD = 4-wheel drive tractor; MFWD = mechanical front-wheel drive tractor; HP = horsepower

Farmers can also develop their own custom budget by using the Missouri Crop Budget Generator Tool (*https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/CropBudgetGenerator.xlsm*). This spreadsheet tool allows users to develop a custom estimate for their costs and returns for growing corn and other grain crops in Missouri.

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Corn (Irrigated) Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of irrigated corn. Table 1 presents estimates for the 2021 crop year for irrigated corn production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri corn (irrigated) planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Grain sales	735.00	
Other income	0.00	
Total income	**735.00**	
Operating costs		
Seed	100.00	
Fertilizer and soil amendments	122.48	
Crop protection chemicals	41.00	
Crop supplies, storage, and marketing	3.00	
Crop consulting and insurance	22.00	
Custom hire and rental	6.20	
Machinery fuel, drying, and irrigation energy	76.37	
Machinery repairs and maintenance	57.84	
Operator and hired labor	25.35	
Operating interest	10.18	
Total operating costs	**464.46**	
Ownership costs		
Farm business overhead	3.13	
Machinery overhead	47.65	
Machinery depreciation	60.23	
Real estate charge	210.00	
Total ownership costs	**321.00**	
Total costs	**785.46**	
Income over operating costs	**270.54**	
Income over total costs	**-50.46**	
Operating costs per bushel	2.21	
Ownership costs per bushel	1.53	
Total costs per bushel	3.74	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the irrigated corn budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in corn (irrigated) planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, bushels	210	Corn market price, per bushel	3.50
Seeding rate, count	32,000	Seed, per 80,000 seed bag	250.00
Nitrogen rate, pounds N	210	Nitrogen, per pound N	0.27
Phosphorus rate, pounds P_2O_5	95	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	61	Potassium, per pound K_2O	0.28
Lime rate, tons	0.6	Lime, per ton	21.00
Sum of allocated labor, hours	1.52	Skilled labor, per hour	21.00
Irrigation, inches	6	Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in corn (irrigated) planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Field cultivator (35 ft); 360 4WD	0.04	0.63	3.17	4.87	8.04	1
V-ripper 30" (17 feet); 360 4WD	0.03	0.45	2.06	5.76	7.82	0.3
Split row no-till planter (16/31 (30/15")); 225 MFWD	0.05	0.53	4.70	12.02	16.72	1
Boom sprayer (90 feet); 160 MFWD	0.04	0.31	2.87	4.59	7.46	2
Anhydrous applicator (21 feet); 225 MFWD	0.09	0.88	5.15	7.23	12.38	1
Combine, corn head (8 row); 275 HP	0.15	1.78	21.28	17.74	39.02	1
Grain cart (500 bushel); 225 MFWD	0.07	0.73	3.84	5.51	9.36	
Grain auger (5,000 bushels per hour); 130 MFWD	0.04	0.24	1.52	1.48	3.00	
Irrigation	0.50		57.37	44.00	101.37	1
Semi, tractor and trailer		1.34	5.69	3.03	8.71	
Pickup truck		0.26	1.11	1.65	2.76	
Total[3]	**1.02**	**7.15**	**108.75**	**107.88**	**216.63**	**7.3**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 4WD = four wheel drive tractor; MFWD = mechanical front-wheel drive tractor; HP = horsepower

Farmers can also develop their own custom budget by using the Missouri Crop Budget Generator Tool (*https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/CropBudgetGenerator.xlsm*). This spreadsheet tool allows users to develop a custom estimate for their costs and returns for growing corn and other grain crops in Missouri.

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Corn Silage Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of corn silage. Table 1 presents estimates for the 2021 crop year for corn silage production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri corn silage planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Silage sales	810.00	
Other income	0.00	
Total income per acre	**810.00**	
Operating costs per acre		
Seed	68.25	
Fertilizer and soil amendments	145.44	
Crop protection chemicals	41.00	
Crop supplies, storage, and marketing	5.50	
Custom hire and rental	78.20	
Machinery fuel and irrigation energy	14.48	
Machinery repairs and maintenance	22.25	
Operator and hired labor	23.38	
Operating interest	8.97	
Total operating costs per acre	**407.46**	
Ownership costs per acre		
Farm business overhead	8.00	
Machinery overhead	26.37	
Machinery depreciation	38.16	
Real estate charge	154.00	
Total ownership costs per acre	**226.53**	
Total costs per acre	**663.99**	
Income over operating costs per acre	**402.54**	
Income over total costs per acre	**176.01**	
Operating costs per ton, as-is basis	22.64	
Ownership costs per ton, as-is basis	12.59	
Total costs per ton, as-is basis	35.22	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the corn silage budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in corn silage planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Forage yield, tons, as-is basis	18	Corn silage market price, per ton	45.00
Seeding rate, corn	33,000	Seed, per 50 pound bag	210.00
Nitrogen rate, pounds	184	Nitrogen, per pound N	0.40
Phosphorus rate, pounds P_2O_5	139	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	139	Potassium, per pound K_2O	0.28
Lime rate, tons	0.5	Lime, per ton	21.00
Sum of allocated labor, hours	1.26	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in corn silage planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Field cultivator (18 ft); 160 MFWD	0.08	0.54	3.80	4.70	8.50	1
Row crop planter (12 row); 130 MFWD	0.07	0.41	5.27	11.80	17.06	1
Boom sprayer (90 ft); 105 2WD	0.04	0.21	2.58	4.28	6.87	2
Anhydrous applicator (21 feet); 160 MFWD	0.09	0.63	4.48	5.17	9.65	1
Silage chopper, 3 row (7.5 feet); 160 MFWD	0.48	3.40	32.68	33.29	65.96	1
Pickup truck		0.83	3.54	5.29	8.84	
Total[3]	**0.76**	**6.02**	**52.35**	**64.53**	**116.89**	**6**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 2WD = 2-wheel drive tractor; MFWD = mechanical front-wheel drive tractor

Farmers can see other Missouri budgets or customize existing Missouri budgets by visiting ***https://extension.missouri.edu/programs/agricultural-business-and-policy-extension/missouri-crop-and-livestock-enterprise-budgets***.

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Soybean (Dryland) Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of soybeans for grain. Table 1 presents estimates for the 2021 crop year for dryland soybean production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri soybean (dryland) planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Grain sales	495.00	
Other income	0.00	
Total income	**495.00**	
Operating costs		
Seed	60.07	
Fertilizer and soil amendments	50.38	
Crop protection chemicals	46.00	
Crop supplies, storage, and marketing	3.00	
Crop consulting and insurance	12.00	
Custom hire and rental	6.20	
Machinery fuel, drying, and irrigation energy	11.79	
Machinery repairs and maintenance	20.21	
Operator and hired labor	16.29	
Operating interest	5.08	
Total operating costs	**231.02**	
Ownership costs		
Farm business overhead	4.00	
Machinery overhead	19.06	
Machinery depreciation	28.28	
Real estate charge	154.00	
Total ownership costs	**205.33**	
Total costs	**436.35**	
Income over operating costs	**263.98**	
Income over total costs	**58.65**	
Operating costs per bushel	4.20	
Ownership costs per bushel	3.73	
Total costs per bushel	7.93	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the dryland soybean budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in soybean (dryland) planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, bushels	55	Soybean market price, per bushel	9.00
Seeding rate, count	170,000	Seed, per 150,000 seed bag	53.00
Phosphorus rate, pounds P_2O_5	46	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	80	Potassium, per pound K_2O	0.28
Lime rate, tons	0.5	Lime, per ton	21.00
Sum of allocated labor, hours	0.88	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in soybean (dryland) planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Tandem disk (30 feet); 360 4WD	0.06	0.91	4.67	7.89	12.56	1
Row crop planter (16 row); 225 MFWD	0.05	0.53	5.26	10.85	16.11	1
Boom sprayer (90 feet); 130 MFWD	0.04	0.25	2.66	4.49	7.15	2
Combine, flexible grain head (30 feet); 275 HP	0.07	1.63	19.03	14.48	33.51	1
Grain cart (500 bushel); 225 MFWD	0.08	0.83	4.57	6.31	10.87	
Grain auger (5,000 bushels per hour); 130 MFWD	0.01	0.06	0.42	0.39	0.81	
Semi, tractor and trailer		0.36	1.52	0.81	2.32	
Pickup truck		0.33	1.42	2.13	3.54	
Total[3]	**0.38**	**4.90**	**39.54**	**47.33**	**86.87**	**5**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 4WD = 4-wheel drive tractor; MFWD = mechanical front-wheel drive tractor; HP = horsepower

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Soybean (Double Crop) Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of double crop soybeans for grain, after wheat. Table 1 presents estimates for the 2021 crop year for double crop soybean production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri soybean (double crop) planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Grain sales	288.00	
Other income	0.00	
Total income	**288.00**	
Operating costs		
Seed	66.67	
Fertilizer and soil amendments	23.14	
Crop protection chemicals	8.50	
Crop supplies, storage, and marketing	0.00[2]	
Crop consulting and insurance	0.00	
Custom hire and rental	0.00[2]	
Machinery fuel, drying, and irrigation energy	6.55	
Machinery repairs and maintenance	14.60	
Operator and hired labor	11.79	
Operating interest	2.95	
Total operating costs	**134.19**	
Ownership costs		
Farm business overhead	5.00	
Machinery overhead	12.94	
Machinery depreciation	16.13	
Real estate charge	0.00[2]	
Total ownership costs	**34.07**	
Total costs	**168.26**	
Income over operating costs	**153.81**	
Income over total costs	**119.74**	
Operating costs per bushel	4.19	
Ownership costs per bushel	1.06	
Total costs per bushel	5.26	

[1] Totals may not sum due to rounding.

[2] These expenses were charged to wheat production since soybeans were planted in the same year wheat was harvested.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the double crop soybean budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge was not included but could be allocated between the soybean and wheat crops.

Table 2. Input assumptions used in soybean (double crop) planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, bushels	32	Soybean market price, per bushel	9.00
Seeding rate, count	200,000	Seed, per 150,000 seed bag	53.00
Phosphorus rate, pounds P_2O_5	27	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	46	Potassium, per pound K_2O	0.28
Sum of allocated labor, hours	0.69	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in soybean (double crop) planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Row crop planter (16 row); 225 MFWD	0.05	0.53	5.26	10.85	16.11	1
Boom sprayer (90 feet); 130 MFWD	0.02	0.12	1.33	2.86	4.19	1
Combine, flexible grain head (30 feet); 275 HP	0.11	1.36	15.64	11.74	27.37	1
Grain auger (5,000 bushels per hour); 130 MFWD	0.01	0.10	0.43	0.57	1.00	
Semi, tractor and trailer		0.18	0.76	0.40	1.16	
Pickup truck		0.42	1.77	2.65	4.42	
Total[3]	**0.19**	**2.71**	**25.18**	**29.07**	**54.25**	**3**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 4WD = 4-wheel drive tractor; MFWD = mechanical front-wheel drive tractor; HP = horsepower

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Winter Wheat Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of winter wheat for grain. Table 1 presents estimates for the 2021 crop year for winter wheat production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri winter wheat planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Grain sales	294.00	
Other income	0.00	
Total income	**294.00**	
Operating costs		
Seed	28.00	
Fertilizer and soil amendments	61.62	
Crop protection chemicals	16.50	
Crop supplies, storage, and marketing	3.00	
Crop consulting and insurance	14.00	
Custom hire and rental	12.40	
Machinery fuel, drying, and irrigation energy	10.09	
Machinery repairs and maintenance	15.89	
Operator and hired labor	14.31	
Operating interest	3.96	
Total operating costs	**179.77**	
Ownership costs		
Farm business overhead	5.00	
Machinery overhead	14.37	
Machinery depreciation	24.05	
Real estate charge	124.25	
Total ownership costs	**167.66**	
Total costs	**347.43**	
Income over operating costs	**114.23**	
Income over total costs	**-53.43**	
Operating costs per bushel	3.00	
Ownership costs per bushel	2.79	
Total costs per bushel	5.79	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the winter wheat budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in winter wheat planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, bushels	60	Wheat market price, per bushel	4.90
Seeding rate, 50 pound bag	100	Seed, per bag	14.00
Nitrogen rate, pounds N	81	Nitrogen, per pound N	0.40
Phosphorus rate, pounds P_2O_5	36	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	18	Potassium, per pound K_2O	0.28
Lime rate, tons	0.5	Lime, per ton	21.00
Sum of allocated labor, hours	0.83	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in winter wheat planning budget for 2020, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
No-till drill (20 feet); 225 MFWD	0.12	1.17	8.20	14.89	23.10	1
Boom sprayer (90 feet); 130 MFWD	0.02	0.12	1.33	2.86	4.19	1
Combine, fixed grain head (30 feet); 275 HP	0.11	1.36	15.63	11.53	27.16	1
Grain cart (500 bushel); 225 MFWD	0.07	0.69	3.66	5.25	8.91	
Grain auger (5,000 bushels per hour); 130 MFWD	0.01	0.07	0.43	0.42	0.86	
Semi, tractor and trailer		0.36	1.52	0.81	2.32	
Pickup truck		0.42	1.77	2.65	4.42	
Total[3]	**0.33**	**4.19**	**35.54**	**38.41**	**70.96**	**3**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.
[2] Machinery ownership cost is the sum of machinery overhead and depreciation.
[3] Totals may not sum due to rounding.
Abbreviations: MFWD = mechanical front-wheel drive tractor; HP = horsepower

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Grain Sorghum Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of grain sorghum. Table 1 presents estimates for the 2021 crop year for grain sorghum production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri grain sorghum planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Grain sales	320.00	
Other income	0.00	
Total income	**320.00**	
Operating costs		
Seed	11.40	
Fertilizer and soil amendments	75.72	
Crop protection chemicals	28.00	
Crop supplies, storage, and marketing	2.00	
Crop consulting and insurance	14.00	
Custom hire and rental	12.40	
Machinery fuel, drying, and irrigation energy	10.64	
Machinery repairs and maintenance	17.41	
Operator and hired labor	13.77	
Operating interest	4.17	
Total operating costs	**189.51**	
Ownership costs		
Farm business overhead	5.00	
Machinery overhead	19.01	
Machinery depreciation	22.79	
Real estate charge	124.25	
Total ownership costs	**171.04**	
Total costs	**360.55**	
Income over operating costs	**130.49**	
Income over total costs	**-40.55**	
Operating costs per bushel	1.90	
Ownership costs per bushel	1.71	
Total costs per bushel	3.61	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the grain sorghum budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in grain sorghum planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, bushels	100	Grain sorghum market price, per bushel	3.20
Seeding rate, count	90,000	Seed, per 750,000 seed bag	95.00
Nitrogen rate, pounds N	100	Nitrogen, per pound N	0.40
Phosphorus rate, pounds P_2O_5	45	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	29	Potassium, per pound K_2O	0.28
Lime rate, tons	0.5	Lime, per ton	21.00
Sum of allocated labor, hours	0.81	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in grain sorghum planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
V-ripper 30-inch (17 feet); 360 4WD	0.03	0.45	2.06	5.76	7.82	0.3
Row crop planter (16 row); 225 MFWD	0.05	0.53	5.26	10.85	16.11	1
Boom sprayer (90 feet); 130 MFWD	0.04	0.25	2.66	4.49	7.15	2
Combine, fixed grain head (30 feet); 275 HP	0.07	1.36	15.63	11.53	27.16	1
Grain cart (500 bushel); 225 MFWD	0.04	0.56	2.93	4.20	7.13	
Grain auger (5,000 bushels per hour); 130 MFWD	0.02	0.11	0.72	0.70	1.43	
Semi, tractor and trailer		0.71	3.03	1.61	4.64	
Pickup truck		0.42	1.77	2.65	4.42	
Total[3]	**0.31**	**4.39**	**34.07**	**41.79**	**75.86**	**4.3**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 4WD = 4-wheel drive tractor; MFWD = mechanical front-wheel drive tractor; HP = horsepower

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Alfalfa Establishment Planning Budget

This budget presents information useful to farmers planning the financing, establishment and marketing of alfalfa. Table 1 presents estimates for the 2021 crop year for alfalfa establishment in the fall for northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances. For example, spring established alfalfa would have a higher crop protection cost to account for necessary herbicides.

Table 1. Missouri alfalfa establishment planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Hay sales (60 pound bales)	420.00	
Other income	0.00	
Total income per acre	**420.00**	
Operating costs per acre		
Seed	43.50	
Fertilizer and soil amendments	114.80	
Crop protection chemicals	37.00	
Crop supplies, storage, and marketing	7.50	
Custom hire and rental	72.70	
Machinery fuel and irrigation energy	18.48	
Machinery repairs and maintenance	23.35	
Operator and hired labor	43.65	
Operating interest	8.12	
Total operating costs per acre	**369.10**	
Ownership costs per acre		
Farm business overhead	11.25	
Machinery overhead	24.29	
Machinery depreciation	44.44	
Real estate charge	105.00	
Total ownership costs per acre	**184.99**	
Total costs per acre	**554.09**	
Income over operating costs per acre	**50.90**	
Income over total costs per acre	**-134.09**	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the alfalfa establishment budget for small bale production. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in alfalfa establishment planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Forage yield, 60 pound bales	70	Alfalfa market price, per bale	6.00
Seeding rate, pounds	15	Alfalfa seed, per pound	2.90
Phosphorus rate, pounds P_2O_5	70	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	90	Potassium, per pound K_2O	0.28
Lime rate, tons	3	Lime, per ton	21.00
Sum of allocated labor, hours	2.47	Skilled labor, per hour	21.00
Operating Interest, %	4.5	Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in alfalfa establishment planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Chisel plow (15 feet); 130 MFWD	0.13	0.74	5.46	9.04	14.50	1
Tandem disk (21 feet); 130 MFWD	0.16	0.94	7.92	8.99	16.92	2
Roller harrow (12 feet); 105 2WD	0.13	0.65	4.76	5.49	10.25	1
No-till drill (15 feet); 130 MFWD	0.16	0.90	9.51	15.08	24.60	1
Disk mower-conditioner (9 feet); 105 2WD	0.35	1.71	14.42	10.82	25.25	2
Wheel rake (2-16'); 60 2WD	0.08	0.20	2.48	3.82	6.30	2
Small square baler; 75 2WD	0.46	1.51	20.99	8.87	29.86	2
Pickup truck		1.04	4.43	6.62	11.04	
Total[3]	**1.47**	**7.69**	**69.98**	**68.74**	**138.72**	**11**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 2WD = 2-wheel drive tractor; MFWD = mechanical front-wheel drive tractor

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Alfalfa Baleage Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of alfalfa baleage. Establishment costs for alfalfa can be found in MU Extension publication, G661, *Alfalfa Establishment Planning Budget*. Table 1 presents estimates for the 2021 crop year for established alfalfa baleage production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri alfalfa baleage planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Baleage sales	810.00	
Other income	0.00	
Total income per acre	**810.00**	
Operating costs per acre		
Seed	0.00	
Fertilizer and soil amendments	82.60	
Crop protection chemicals	16.00	
Crop supplies, storage, and marketing	100.00	
Custom hire and rental	48.40	
Machinery fuel and irrigation energy	32.38	
Machinery repairs and maintenance	48.96	
Operator and hired labor	65.44	
Operating interest	8.86	
Total operating costs per acre	**402.65**	
Ownership costs per acre		
Farm business overhead	11.25	
Machinery overhead	30.93	
Machinery depreciation	63.06	
Real estate charge	105.00	
Total ownership costs per acre	**210.24**	
Total costs per acre	**612.89**	
Income over operating costs per acre	**407.35**	
Income over total costs per acre	**197.11**	
Operating costs per ton, as fed	44.74	
Ownership costs per ton, as fed	23.36	
Total costs per ton, as fed	68.10	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the alfalfa baleage budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in alfalfa baleage planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Yield, tons, as fed	9	Market price, per ton	90.00
Phosphorus rate, pounds P_2O_5	70	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	200	Potassium, per pound K_2O	0.28
Lime rate, tons	0	Lime, per ton	0
Sum of allocated labor, hours	3.71	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in alfalfa baleage planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Boom sprayer (90 feet); 105 2WD	0.04	.0.21	2.58	4.28	6.87	2
Disk mower-conditioner (9 feet); 105 2WD	0.71	3.41	28.84	18.18	47.02	4
Wheel rake (2-16'); 75 2WD	0.15	0.50	5.35	7.12	12.48	4
Round baler, silage kit (1500 pound); 105 2WD	0.71	3.41	34.00	28.04	62.04	4
Round bale wrapper haylage; 75 2WD	1.50	4.95	62.28	29.75	92.03	1
Pickup truck		1.04	4.43	6.62	11.04	
Total[3]	**3.11**	**13.53**	**137.49**	**93.99**	**231.48**	**15**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 2WD = 2-wheel drive tractor

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Alfalfa Small Bales Planning Budget

This budget presents information useful to farmers planning the production, financing and marketing of alfalfa small bales. Establishment costs for alfalfa can be found in MU Extension publication, G661, *Alfalfa Establishment Planning Budget*. Table 1 presents estimates for the 2021 crop year for established alfalfa small bale production in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances. For example, an alfalfa large round bale planning budget could be developed by modifying machinery activities and hay sales.

Table 1. Missouri alfalfa small bales planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Hay sales (60 pound bales)	1,000.02	
Other income	0.00	
Total income per acre	**1,000.02**	
Operating costs per acre		
Seed	0.00	
Fertilizer and soil amendments	82.60	
Crop protection chemicals	16.00	
Crop supplies, storage, and marketing	12.00	
Custom hire and rental	161.07	
Machinery fuel and irrigation energy	22.55	
Machinery repairs and maintenance	29.77	
Operator and hired labor	52.78	
Operating interest	8.48	
Total operating costs per acre	**385.25**	
Ownership costs per acre		
Farm business overhead	11.25	
Machinery overhead	13.02	
Machinery depreciation	57.28	
Real estate charge	105.00	
Total ownership costs per acre	**186.55**	
Total costs per acre	**571.80**	
Income over operating costs per acre	**614.77**	
Income over total costs per acre	**428.22**	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the alfalfa small bales budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in alfalfa small bales planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Forage yield, 60 pound bales	166.67	Alfalfa market price, per bale	6.00
Phosphorus rate, pounds P_2O_5	70	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	200	Potassium, per pound K_2O	0.28
Lime rate, tons	0	Lime, per ton	0
Sum of allocated labor, hours	2.74	Skilled labor, per hour	0
		Farm diesel, per gallon	3.04

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in alfalfa small bales planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Boom sprayer (90 feet); 75 hp	0.04	0.14	2.32	3.89	6.22	2
Swather mower-conditioner (9 feet); 105 MFWD	0.92	4.24	38.62	35.01	73.63	4
Hay tedder (8.5 feet); 60 2WD	0.21	0.55	5.03	2.65	7.68	2
Wheel rake (2-16'); 60 2WD	0.15	0.40	4.96	6.71	11.67	4
Small square baler; 75 2WD	0.92	3.03	41.99	15.42	57.41	4
Pickup truck		1.04	4.43	6.62	11.04	
Total[3]	**2.24**	**9.40**	**97.35**	**70.30**	**167.65**	**16**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 2WD = 2-wheel drive tractor; MFWD = mechanical front-wheel drive tractor; hp = horsepower

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Cool Season Pasture Establishment Planning Budget

This budget presents information useful to farmers planning the financing, establishment and grazing of cool season pasture. Table 1 presents estimates for the 2021 crop year for cool season pasture establishment in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri cool season pasture establishment planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Grazing	30.00	
Other income	0.00	
Total income per acre	**30.00**	
Operating costs per acre		
Seed, orchardgrass and red clover	33.00	
Fertilizer and soil amendments	100.90	
Crop protection chemicals	9.75	
Crop supplies, storage, and marketing	4.00	
Custom hire and rental	25.20	
Machinery fuel and irrigation energy	5.03	
Machinery repairs and maintenance	3.55	
Operator and hired labor	12.83	
Operating interest	4.37	
Total operating costs per acre	**198.62**	
Ownership costs per acre		
Farm business overhead	5.63	
Machinery overhead	7.00	
Machinery depreciation	10.41	
Real estate charge	43.70	
Total ownership costs per acre	**66.73**	
Total costs per acre	**265.36**	
Income over operating costs per acre	**-168.62**	
Income over total costs per acre	**-235.36**	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the cool season pasture establishment budget. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in cool season pasture establishment planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Pasture yield, animal unit month	2	Pasture price, per animal unit month	15.00
Seeding rate, pounds orchardgrass	6	Orchardgrass seed, per pound	2.30
Seeding rate, pounds clover	8	Clover seed, per pound	2.40
Nitrogen rate, pounds N	30	Nitrogen, per pound N	0.40
Phosphorus rate, pounds P_2O_5	35	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	45	Potassium, per pound K_2O	0.28
Lime rate, tons	3	Lime, per ton	21.00
Sum of allocated labor, hours	0.77	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in cool season pasture establishment planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Rent, no-till drill (15 feet); 130 MFWD	0.16	0.90	18.55	5.29	23.85	1
Rotary mower (12 feet); 130 MFWD	0.11	0.66	4.89	8.81	13.70	1
Pickup truck		0.52	2.21	3.31	5.52	
Total[3]	**0.27**	**2.07**	**25.65**	**17.41**	**43.06**	**2**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: MFWD = mechanical front-wheel drive tractor

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Fescue - Clover Hay Planning Budget

This budget presents information useful to farmers planning the production, financing, grazing and marketing of fescue-clover hay. Table 1 presents estimates for the 2021 crop year for established fescue-clover hay in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri fescue-clover hay planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Hay	270.00	
Grazing	15.00	
Other income	0.00	
Total income per acre	**285.00**	
Operating costs per acre		
Seed	0.00	
Fertilizer and soil amendments	60.78	
Crop protection chemicals	0.00	
Crop supplies, storage, and marketing	11.50	
Custom hire and rental	24.20	
Machinery fuel and irrigation energy	5.47	
Machinery repairs and maintenance	11.90	
Operator and hired labor	10.39	
Operating interest	2.80	
Total operating costs per acre	**127.03**	
Ownership costs per acre		
Farm business overhead	5.63	
Machinery overhead	8.74	
Machinery depreciation	12.76	
Real estate charge	57.00	
Total ownership costs per acre	**84.12**	
Total costs per acre	**211.15**	
Income over operating costs per acre	**157.97**	
Income over total costs per acre	**73.85**	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the fescue-clover hay budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in fescue-clover hay planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Hay yield, tons, 10% moisture	3	Hay price, per ton	90.00
Pasture yield, animal unit month	1	Pasture price, per animal unit month	15.00
Nitrogen rate, pounds N	40	Nitrogen, per pound N	0.40
Phosphorus rate, pounds P_2O_5	46	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	60	Potassium, per pound K_2O	0.28
Lime rate, tons	0.5	Lime, per ton	21.00
Sum of allocated labor, hours	0.57	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in fescue-clover hay planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Disk mower-conditioner (9 feet); 130 MFWD	0.18	1.01	7.90	8.90	16.79	1
Wheel rake (2-16'); 75 2WD	0.04	0.13	1.34	2.53	3.87	1
Round baler, net wrap (1500 pound); 130 MFWD	0.11	0.61	12.43	6.76	19.19	1
Pickup truck		0.52	2.21	3.31	5.52	
Total[3]	**0.32**	**2.26**	**23.88**	**21.49**	**45.37**	**3**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 2WD = 2-wheel drive tractor; MFWD = mechanical front-wheel drive tractor

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Fescue Seed and Forage Planning Budget

This budget presents information useful to farmers planning the production, financing, grazing and marketing of fescue. Table 1 presents estimates for the 2021 crop year for established fescue used for seed, hay and grazing purposes in northern, central and southwest Missouri. Assumptions were based on price conditions as of October 2020. Detailed prices and practices are summarized in Tables 2 and 3. The production practices used to develop these cost estimates are common in Missouri. Farmers are encouraged to modify this budget based on their circumstances.

Table 1. Missouri fescue seed and forage planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income per acre		
Fescue hay	224.00	
Fescue seed	84.00	
Grazing	15.00	
Other income	0.00	
Total income per acre	**323.00**	
Operating costs per acre		
Seed	0.00	
Fertilizer and soil amendments	72.30	
Crop protection chemicals	0.00	
Crop supplies, storage, and marketing	7.00	
Custom hire and rental	37.40	
Machinery fuel and irrigation energy	6.20	
Machinery repairs and maintenance	13.63	
Operator and hired labor	15.42	
Operating interest	3.42	
Total operating costs per acre	**155.38**	
Ownership costs per acre		
Farm business overhead	3.00	
Machinery overhead	9.74	
Machinery depreciation	15.50	
Real estate charge	57.00	
Total ownership costs per acre	**85.24**	
Total costs per acre	**240.62**	
Income over operating costs per acre	**167.62**	
Income over total costs per acre	**82.38**	

[1] Totals may not sum due to rounding.

Written by
Raymond Massey, Professor, Agricultural Business and Policy Extension

Table 2 shows input assumptions used to estimate the fescue seed and forage budget. Price estimates reflect harvest time prices. Costs or returns from storage or other marketing methods are not included. No income from government programs are added. Farm business overhead includes liability insurance, utilities, accounting, etc. Real estate charge is an estimated rental rate for above average land.

Table 2. Input assumptions used in fescue seed and forage planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Hay yield, tons	4	Hay price, per ton	56.00
Seed yield, pounds	300	Seed price, per pound	0.28
Pasture yield, animal unit month	1	Pasture price, per animal unit month	15.00
Nitrogen rate, pounds N	70	Nitrogen, per pound N	0.40
Phosphorus rate, pounds P_2O_5	30	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	80	Potassium, per pound K_2O	0.28
Lime rate, tons	0.5	Lime, per ton	21.00
Sum of allocated labor, hours	0.82	Skilled labor, per hour	21.00
		Farm diesel, per gallon	2.38

Table 3 details the field activities assumed in this budget and their machinery costs. Machinery costs were estimated using an economic engineering approach.

Table 3. Machinery assumptions used in fescue seed and forage planning budget for 2021, on a per acre basis.

Machine activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Swather mower-conditioner (9 feet); 105 MFWD	0.23	1.06	9.66	12.27	21.92	1
Wheel rake (2-16'); 60 2WD	0.04	0.10	1.24	2.37	3.62	1
Round baler, net wrap (1500 pound); 105 MFWD	0.11	0.49	12.01	6.06	18.07	1
Combine, fixed grain head (15 feet); 100 horsepower	0.15	0.66	6.52	2.78	9.30	1
Pickup truck		0.28	1.18	1.76	2.95	
Total[3]	**0.52**	**2.59**	**30.61**	**25.24**	**55.85**	**4**

[1] Machinery operating cost is the sum of fuel, repairs, maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of machinery overhead and depreciation.

[3] Totals may not sum due to rounding.

Abbreviations: 2WD = 2-wheel drive tractor; MFWD = mechanical front-wheel drive tractor

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Industrial Hemp for Grain Planning Budget

This guide presents information useful to farmers considering industrial hemp production for grain in the 2021 crop year. Table 1 presents income and cost estimates for industrial hemp grain production in Missouri based on prices in October 2020. Assumptions are summarized in Tables 2 and 3. Assumed production is 40 acres. Several assumptions used in this budget are from states such as Kentucky, Tennessee, and North Dakota that have recently grown hemp. Farmers should understand that these assumptions may not fit Missouri production due to lack of Missouri data and different growing conditions in areas where data has been collected. A sensitivity analysis showing the impact on profit of various yields and market prices is included in Table 4.

Table 1. Missouri industrial hemp for grain planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Hemp grain	600.00	
Total income	**600.00**	
Operating costs		
Seed	105.00	
Fertilizer	60.60	
Machinery operating cost	22.14	
Custom hire and rental	74.90	
Registration and background check	20.00	
Sampling costs	5.63	
Operating interest	6.49	
Total operating costs	**294.75**	
Ownership costs		
Machinery ownership	71.89	
Real estate charge	150.00	
Total ownership costs	**221.89**	
Total costs	**516.65**	
Income over operating costs	**305.25**	
Income over total costs	**83.35**	

[1] Totals may not sum due to rounding.

Industrial hemp is more regulated than most other Missouri agricultural commodities. These budgets contain cost estimates for state registration, grower background checks and product sampling and testing costs. It is suggested that producers contact the Missouri Department of Agriculture Industrial Hemp Program to learn the latest regulations surrounding industrial hemp production.

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Table 2. Input assumptions used in Missouri industrial hemp for grain planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Grain yield, pounds	1000	Grain price, per pound	0.60
Seeding rate, pounds	30	Seed, per pound	3.50
Nitrogen rate, pounds N	100	Nitrogen, per pound N	0.31
Phosphorus rate, pounds P_2O_5	30	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	20	Potassium, per pound K_2O	0.28
Lime rate, tons	0.6	Lime, per ton	21.00
Fuel for machinery and drying, gallons	5.16	Fuel, per gallon	2.38
Labor, hours	0.64	Labor, per hour	15.50

Table 3. Machinery used in Missouri industrial hemp for grain planning budget for 2021, on a per acre basis.

Machinery activity (including custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[1] (dollars)	Total costs (dollars)	Trips across field
Anhydrous application, 200 MFWD	0.08	0.64	2.72	7.30	10.02	1
Tandem disk, fold (21 feet), 160 MFWD	0.16	1.48	6.06	19.92	25.98	2
Presswheel drill (16 feet), 105 MFWD	0.15	0.61	3.74	10.05	13.79	1
Combine flex platform (25 feet), 275 HP	0.13	2.04	6.94	27.29	34.22	1
Rotary mower/conditioner (12 feet), 75 HP	0.11	0.38	2.68	7.35	10.02	1
Dry fertilizer application, custom charge					12.40	2
Grain drying, custom charge					11.00	
Hauling grain to bin, custom charge					2.50	
Hauling grain to market, custom charge					9.00	
Seed cleaning, custom charge					40.00	
Total[2]	**0.64**	**5.16**	**22.14**	**71.89**	**168.94**	**8**

[1] Machinery operating cost is the sum of fuel, repairs and maintenance, and the value of labor.

[2] Machinery ownership cost is the sum of overhead and depreciation.

Totals may not sum due to rounding. Abbreviations: MFWD = mechanical front-wheel drive tractor; HP = horsepower.

Market price (dollars per pound)	Grain yield (pounds per acre)				
	800	900	1000	1100	1200
0.40	-196.65	-156.65	-116.65	-76.65	-36.65
0.50	-116.65	-66.65	-16.65	33.35	83.35
0.60	-36.65	23.35	83.35	143.35	203.35
0.70	43.35	113.35	183.35	253.35	323.35
0.80	123.35	203.35	283.35	363.35	443.35

Farmers can also develop their own cost and return estimates by using the Missouri Industrial Hemp Budget Generator *(https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/IndustrialHempBudget.xlsx)*.

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Industrial Hemp for Fiber Planning Budget

This guide presents information useful to farmers considering industrial hemp production for fiber in the 2021 crop year. Table 1 presents income and cost estimates for industrial hemp fiber production in Missouri based on prices in October 2020. Production and necessary inputs are poorly documented for Missouri. Information from Missouri and other states have been used to develop this budget. Farmers should understand production assumptions used in this budget may not describe their production activities. Assumptions are summarized in Tables 2 and 3. Assumed production is 40 acres. To account for the increased uncertainty in hemp production and marketing, a sensitivity analysis showing the impact on profit of various yields and market prices is included in Table 4.

Table 1. Missouri industrial hemp for fiber planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Hemp fiber bales	650.00	
Total income	**650.00**	
Operating costs		
Seed	175.00	
Fertilizer	58.30	
Machinery operating cost	16.69	
Custom hire and rental	154.90	
Registration and background check	20.00	
Sampling costs	5.63	
Operating interest	9.69	
Total operating costs	**440.20**	
Ownership costs		
Machinery ownership	47.21	
Real estate charge	150.00	
Total ownership costs	**197.21**	
Total costs	**637.42**	
Income over operating costs	**209.80**	
Income over total costs	**12.58**	

[1] Totals may not sum due to rounding.

Industrial hemp is more regulated than most other Missouri agricultural commodities. These budgets contain cost estimates for state registration, grower background checks and product sampling and testing costs. It is suggested that producers contact the Missouri Department of Agriculture Industrial Hemp Program to learn the latest regulations surrounding industrial hemp production.

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Table 2. Input assumptions used in Missouri industrial hemp for fiber planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Fiber yield, tons	5	Fiber price, per ton	130.00
Seeding rate, pounds	50	Seed, per pound	3.50
Nitrogen rate, pounds N	50	Nitrogen, per pound N	0.31
Phosphorus rate, pounds P_2O_5	50	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	40	Potassium, per pound K_2O	0.28
Lime rate, tons	0.6	Lime, per ton	21.00
Fuel for machinery and drying, gallons	3.22	Fuel, per gallon	2.38
Labor, hours	0.58	Labor, per hour	15.50

Table 3. Machinery used in Missouri industrial hemp for fiber planning budget for 2021, on a per acre basis.

Machinery activity (including custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[1] (dollars)	Total costs (dollars)	Trips across field
Anhydrous application, 200 MFWD	0.08	0.64	2.72	7.30	10.02	1
Tandem disk, fold (21 feet), 160 MFWD	0.16	1.48	6.06	19.92	25.98	2
Presswheel drill (16 feet), 105 MFWD	0.15	0.61	3.74	10.05	13.79	1
Sickle mower, 75 HP tractor	0.12	0.35	2.66	6.90	9.56	1
Hay rake (30 feet), 40 HP tractor	0.08	0.13	1.50	3.05	4.55	2
Dry fertilizer application, custom charge					12.40	2
Large rectangular bales, custom charge					85.00	1
Moving large rectangular bales, custom charge					57.50	1
Total[2]	**0.58**	**3.22**	**16.69**	**47.21**	**218.80**	**10**

[1] Machinery operating cost is the sum of fuel, repairs and maintenance, and the value of labor. Machinery ownership cost is the sum of overhead and depreciation.
[2] Totals may not sum due to rounding.
Abbreviations: MFWD = mechanical front-wheel drive tractor; HP = horsepower.

Table 4. Sensitivity analysis: income over total costs per acre.

Market price (dollars per ton)	Fiber yield (tons per acre)				
	3	4	5	6	7
90	-$367.42	-277.42	-187.42	-97.42	-7.42
110	-307.42	-197.42	-87.42	22.58	132.58
130	-247.42	-117.42	12.58	142.58	272.58
150	-187.42	-37.42	112.58	262.58	412.58
170	-127.42	42.58	212.58	482.58	552.58

Farmers can also develop their own cost and return estimates by using the Missouri Industrial Hemp Budget Generator *(https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/IndustrialHempBudget.xlsx)*.

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Industrial Hemp for Grain and Fiber Planning Budget

This guide presents information useful to farmers considering industrial hemp production for grain and fiber in the 2021 crop year. Table 1 presents income and cost estimates for industrial hemp grain and fiber production in Missouri based on prices in October 2020. Information from Missouri and other hemp growing states have been used to develop this budget and production assumptions used in this budget may not describe all production activities. Assumptions are summarized in Tables 2 and 3. Assumed production is 40 acres. A sensitivity analysis showing the impact on profit of various yield and price combinations for grain is included in Table 4. Table 5 presents a sensitivity analysis of various yields for both fiber and grain assuming known prices for each.

Table 1. Missouri industrial hemp for grain and fiber planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Hemp fiber bales	250.00	
Hemp grain	450.00	
Total income	**700.00**	
Operating costs		
Seed	140.00	
Fertilizer	89.30	
Machinery operating cost	28.63	
Custom hire and rental	142.15	
Registration and background check	20.00	
Sampling costs	5.63	
Operating interest	9.58	
Total operating costs	**435.28**	
Ownership costs		
Machinery ownership	74.50	
Real estate charge	150.00	
Total ownership costs	**224.50**	
Total costs	**659.78**	
Income over operating costs	**264.72**	
Income over total costs	**40.22**	

[1] Totals may not sum due to rounding.

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Table 2. Input assumptions used in Missouri industrial hemp for grain and fiber planning budget for 2021.

Selected input quantities	Per acre	Selected input prices	Dollars per unit
Fiber yield, tons	2.5	Fiber price, per ton	100.00
Grain yield, pounds	750	Grain price, per pound	0.60
Seeding rate, pounds	40	Seed, per pound	3.50
Nitrogen rate, pounds N	150	Nitrogen, per pound N	0.31
Phosphorus rate, pounds P_2O_5	50	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	40	Potassium, per pound K_2O	0.28
Lime rate, tons	0.6	Lime, per ton	21.00
Fuel for machinery and drying, gallons	5.26	Fuel, per gallon	2.38
Labor, hours	0.72	Labor, per hour	15.50

Table 3. Machinery used in Missouri industrial hemp for grain and fiber planning budget for 2021, on a per acre basis.

Machinery activity (not custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[2] (dollars)	Total costs (dollars)	Trips across field
Anhydrous application, 200 MFWD	0.08	0.64	2.72	7.30	10.02	1
Tandem disk, fold (21 feet), 160 MFWD	0.16	1.48	6.06	19.92	25.98	2
Presswheel drill (16 feet), 160 MFWD	0.15	0.61	3.74	10.05	13.79	1
Sickle mower, 75 HP tractor	0.12	0.35	2.66	6.90	9.56	1
Hay rake (30 feet), 40 HP tractor	0.08	0.14	1.50	3.06	4.56	2
Combine flex platform (25 feet), 275 HP	0.13	2.04	6.94	27.29	34.22	1
Dry fertilizer application, custom charge					12.40	2
Large rectangular bales, custom charge					51.00	
Moving large rectangular bales, custom charge					34.50	
Grain drying, custom charge					9.00	
Hauling grain to bin, custom charge					1.88	
Hauling grain to market, custom charge					3.38	
Seed cleaning, custom charge					30.00	
Total[3]	**0.72**	**5.26**	**30.32**	**74.50**	**240.28**	**10**

[1] Machinery operating cost is the sum of fuel, repairs and maintenance, and the value of labor.
[2] Machinery ownership cost is the sum of overhead and depreciation.
[3] Totals may not sum due to rounding.
Abbreviations: MFWD = mechanical front-wheel drive tractor; HP = horsepower.

Industrial hemp is more regulated than most Missouri agricultural commodities. These budgets contain cost estimates for state registration, grower background checks, product sampling and testing costs. It is suggested that producers contact the Missouri Department of Agriculture Industrial Hemp Program to learn the latest regulations surrounding industrial hemp production.

Table 4. Sensitivity analysis: income over total costs per acre.

Market price (dollars per pound)	Grain yield (pounds per acre)				
	550	650	750	850	950
0.40	-189.78	-149.78	-109.78	-69.78	-29.78
0.50	-134.78	-84.78	-34.78	15.22	65.22
0.60	-79.78	-19.78	40.22	100.22	160.22
0.70	-24.28	45.22	115.22	185.22	255.22
0.80	30.22	110.22	190.22	270.22	350.22

Table 5. Sensitivity analysis: income over total costs per acre assuming grain price of $0.60/pound and fiber price of $100/ton.

Fiber yield (tons per acre)	Grain yield (pounds per acre)				
	550	650	750	850	950
1.0	-229.78	-169.78	-109.78	-49.78	10.22
2.0	-129.78	-69.78	-9.78	50.22	110.22
2.5	-79.78	-19.78	40.22	100.22	160.22
3.0	-29.78	30.22	90.22	150.22	210.22
4.0	70.22	130.22	190.22	250.22	310.22

Farmers can also develop their own custom budget by using the Missouri Industrial Hemp Budget Generator Tool *(https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/IndustrialHempBudget.xlsx).*

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Industrial Hemp for CBD Planning Budget

This guide presents information useful to farmers considering industrial hemp production for cannabidiol (CBD) in the 2021 crop year. Table 1 presents income and cost estimates for industrial hemp CBD production in Missouri based on prices in October 2020. Industrial hemp is more regulated than most Missouri agricultural commodities. This budgets contain cost estimates for state registration, grower background checks and product sampling and testing costs. It is suggested that producers contact the Missouri Department of Agriculture Industrial Hemp Program to learn the latest regulations surrounding industrial hemp production.

Table 1. Missouri industrial hemp for CBD planning budget for 2021.

	Dollars per acre[1]	Your estimate
Income		
Hemp CBD biomass	9,000.00	
Total income	**9,000.00**	
Operating costs		
Clones	5,717.25	
Fertilizer	99.70	
Irrigation - supplies and fuel	554.25	
Custom hire, machinery fuel, and variable costs	119.26	
Supplies	624.21	
Labor	3,839.73	
Registration and background check	320.00	
Sampling costs	300.00	
Operating interest	260.39	
Total operating costs	**11,834.83**	
Ownership costs		
Machinery ownership	41.90	
Real estate charge	150.00	
Drying and storage facility	1,950.00	
Irrigation well and pump	284.00	
Total ownership costs	**2,425.90**	
Total costs	**14,259.20**	
Income over operating costs	**-2,834.83**	
Income over total costs	**-5,260.73**	

[1] Totals may not sum due to rounding.

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Table 2 summarizes quantities of yield and inputs along with their prices. This budget assumes a labor-intensive method of production. Table 3 summarizes how this labor is allocated to various production activities. Assumed production is 2.5 acres. Table 4 details the equipment used to estimate the cost of production in this budget. To account for the increased uncertainty in industrial hemp production and marketing, a sensitivity analysis showing the impact on profit of various CBD yield and price combinations for grain is included in Table 5. Table 6 presents a sensitivity analysis of various CBD yields and biomass yields assuming a known price for percent CBD in the biomass.

Table 2. Input assumptions used in Missouri industrial hemp for CBD planning budget for 2021.

Selected quantities	Per acre	Selected prices	Dollars per unit
Biomass yield, pounds	1,500	Biomass price, per pound per percent CBD	0.75
CBD content, percentage	8		
Clones purchased	1,906	Clone, per plant	3.00
Nitrogen rate, pounds N	150	Nitrogen, per pound N	0.31
Phosphorus rate, pounds P_2O_5	70	Phosphorus, per pound P_2O_5	0.38
Potassium rate, pounds K_2O	50	Potassium, per pound K_2O	0.28
Lime rate, tons	0.6	Lime, per ton	21.00
Fuel for machinery and drying, gallons	2.9	Fuel, per gallon	2.38
Labor, hours	246.3	Unskilled labor, per hour	15.50

Table 3. Labor assumptions used in Missouri industrial hemp for CBD planning budget for 2021, on a per acre basis.

Labor activity	Hours per acre	Dollars per hour	Total cost (dollars)	Description
Labor for pre-plant and planting	4.8	20	96.48	Disking, fertilizer, laying plastic and drip tape, planting clones
Labor for irrigation	10.0	15.50	155.00	
Labor for in-season weed control	50.0	15.50	775.00	Hand hoeing
Labor for in-season "trimming"	61.0	15.50	937.75	Two minutes per plant to increase bud development
Labor for harvest	61.0	15.50	937.75	Cut and haul plants to barn
Labor for post-harvest	61.0	15.50	937.75	Harvest dried material and load into totes
Total	**246.3**		**3,839.73**	

Table 4. Machinery used in Missouri industrial hemp for CBD planning budget for 2021, on a per acre basis.

Machinery activity (including custom fieldwork)	Labor (hours)	Fuel (gallons)	Operating costs[1] (dollars)	Ownership costs[1] (dollars)	Total costs (dollars)	Trips across field
Anhydrous application, 200 MFWD	0.08	0.64	3.07	7.30	10.37	1
Tandem disk, fold (21 feet), 160 MFWD	0.16	1.48	3.54	19.92	23.46	2
Black plastic mulch layer, 80 HP	1.41	0.38	0.90	7.35	8.25	1
Water wheel planter, 80 HP	3.17	0.38	0.90	7.35	8.25	1
Dry fertilizer, custom rate					12.40	2
Hauling hemp to processor, custom rate					100.00	
Total[2]	**4.82**	**2.88**	**8.40**	**41.90**	**162.70**	**7**

[1] Machinery operating cost is the sum of repairs and maintenance. Machinery ownership cost is the sum of overhead and depreciation.

[2] Totals may not sum due to rounding.

Abbreviations: MFWD = mechanical front-wheel drive tractor; HP = horsepower.

Table 5. Sensitivity analysis: income over total costs per acre, assuming 1,200 pounds of biomass per acre.

Market price (dollars per percent CBD content per pound)	CBD yield (percent CBD content per pound biomass)							
	5	6	7	8	9	10	11	12
0.50	-10,511	-9,761	-9,011	-8,261	-7,511	-6,761	-6,011	-5,261
0.75	-8,636	-7,511	-6,386	-5,261	-4,136	-3,011	-1,886	-761
1.00	-6,761	-5,261	-3,761	-2,261	-761	739	2,239	3,739
1.50	-3,011	-761	1,489	3,379	5,989	8,239	10,489	12,739
2.50	4,489	8,239	11,989	15,739	19,489	23,239	26,989	30,739

Table 6. Sensitivity analysis: income over total costs per acre, assuming $0.75 per percent CBD.

Biomass yield (pounds biomass per acre)	CBD yield (percent CBD content per pound biomass)							
	7	8	9	10	11	12	13	14
800	-10,061	-9,461	-8,861	-8,261	-7,661	-7,061	-6,461	-5,861
1,000	-9,011	-8,261	-7,511	-6,761	-6,011	-5,261	-4,511	-3,761
1,200	-7,961	-7,061	-6,161	-5,261	-4,361	-3,461	-2,561	-1,661
1,400	-6,911	-5,861	-4,811	-3,761	-2,711	-1,661	-611	439
1,600	-5,861	-4,661	-3,461	-2,261	-1,061	139	1,339	2,539

Farmers can also develop their own custom budget by using the Missouri Industrial Hemp Budget Generator *(https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/IndustrialHempBudget.xlsx).*

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