

# 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 <sup>1</sup>	Your estimate
<b>Income</b>		
Hemp fiber bales	250.00	
Hemp grain	450.00	
<b>Total income</b>	<b>700.00</b>	
<b>Operating costs</b>		
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	
<b>Total operating costs</b>	<b>435.28</b>	
<b>Ownership costs</b>		
Machinery ownership	74.50	
Real estate charge	150.00	
<b>Total ownership costs</b>	<b>224.50</b>	
<b>Total costs</b>	<b>659.78</b>	
<b>Income over operating costs</b>	<b>264.72</b>	
<b>Income over total costs</b>	<b>40.22</b>	

<sup>1</sup> Totals may not sum due to rounding.

Written by  
**Ray Massey**, Professor, Agricultural Business and Policy Extension  
**Joe Horner**, State Specialist, Agriculture Business and Policy Extension

**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 <sub>2</sub> O <sub>5</sub>	50	Phosphorus, per pound P <sub>2</sub> O <sub>5</sub>	0.38
Potassium rate, pounds K <sub>2</sub> O	40	Potassium, per pound K <sub>2</sub> O	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 <sup>1</sup> (dollars)	Ownership costs <sup>2</sup> (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	
<b>Total<sup>3</sup></b>	<b>0.72</b>	<b>5.26</b>	<b>30.32</b>	<b>74.50</b>	<b>240.28</b>	<b>10</b>

<sup>1</sup> Machinery operating cost is the sum of fuel, repairs and maintenance, and the value of labor.

<sup>2</sup> Machinery ownership cost is the sum of overhead and depreciation.

<sup>3</sup> 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>).