
Estimated Costs of Crop Production in Iowa—2023

The estimated costs of corn, corn silage, soybeans, alfalfa, and pasture maintenance in this report are based on data from several sources. They include the annual Iowa Farm Business Association record summaries, production and costs data from the Departments of Economics, Agricultural and Biosystems Engineering, and Agronomy at Iowa State University, and a survey of selected agricultural cooperatives and other input suppliers around the state.

These cost estimates intend to represent average costs for farms in Iowa. Very large or small farms may have lower or higher fixed costs per acre. Starting in 2023, projected land costs are based on the previous year's results in the [Cash Rental Rates for Iowa Survey](https://store.extension.iastate.edu/product/1841), store.extension.iastate.edu/product/1841, and a poll of the ISU Extension and Outreach Farm Management team and Farm Financial Associates.

Due to differences in soil potentials, quantity of inputs used, and other factors, production costs will vary from farm to farm. Price shifts for inputs can change production costs in both the short and long run. The data reflect average cost of purchased inputs and a return to land and labor resources, but do not provide a margin for profit or a return to management. They reflect production costs only, and do not include costs of storage.

Labor has been treated as a fixed cost because most labor on Iowa farms is supplied by the operator, family, or permanent hired labor. However, when deciding among alternative crops, labor should be considered a variable cost. The wage rate used here is \$18.00 per hour. The hours assumed per crop are presented in the budgets. The hours per crop acre include not only the field work but also time for maintenance, travel, and other activities related to crop production. The land charge is based on cash rent equivalent. Owned land may require a greater or lesser cash outlay.

In the short run, cash income must be sufficient to pay cash costs, including seed, fertilizer, chemicals, insurance, cash rent, and hired labor, as well as machinery fuel and repairs, and interest on operating capital. In the long run, income should be sufficient to pay all costs of production for resources to be used in their most profitable alternative.

Starting in 2019, reference yields for corn and soybeans budgets reflect 30-year trend yields and are updated annually. Corn yields reflect rotation effects. Fertilizer rates have been adjusted to reflect current data on removal and application rates. Starting in 2021, nitrogen rates on corn budgets reflect recommendations from the [Corn Nitrogen Calculator](https://cnrc.agron.iastate.edu), cnrc.agron.iastate.edu. For 2023, the projected corn to nitrogen price ratio is 7.11. Crop insurance costs reflect revenue crop protection at 80% coverage for a typical farm in Central Iowa. Starting in 2020, the average cost of lime is adjusted to account for regional differences in lime application practices (ag lime quality, quantity, and frequency of application).

Machinery costs reflect both new and used equipment. The machine operations assumed are based on the 2016 Crop Production Practices Survey conducted by the Iowa Agricultural Statistics Service and Iowa State University Extension and Outreach publication: [Estimating the Field Capacity of Farm Machines](https://store.extension.iastate.edu/product/4032), store.extension.iastate.edu/product/4032. In 2022, machinery costs were adjusted to reflect the 7% increase between 2016 and 2020 reported by [USDA Economic Research Service](https://www.ers.usda.gov/data-products/commodity-costs-and-returns/), www.ers.usda.gov/data-products/commodity-costs-and-returns/, in the budget line “Capital recovery of machinery and equipment” for corn production in the Heartland Region.

Estimates represent typical costs and are only intended to be guidelines. Actual costs will vary considerably and can be entered in the column for “Your Estimates.” Decision Tool spreadsheets for developing crop production budgets are available on the [Ag Decision Maker website](https://www.extension.iastate.edu/agdm), www.extension.iastate.edu/agdm.

Budgets for alfalfa hay establishment with an oat companion crop and by direct seeding are included in this publication. Annual production costs for established alfalfa or alfalfa-grass hay as well as a budget for maintaining grass pastures are included. The APH-90 insurance policy for oats was discontinued in 2022. The producer premium for oat insurance is assumed to increase by 5% in 2023.

Two low-till budgets, one for corn and one for soybeans, are included. The major differences between the low-till and conventional budgets are the preharvest machinery, labor, herbicide, and seeding costs. The soybean budgets are for herbicide tolerant varieties. A strip-till budget is also included.

Corn Following Corn

| | 167 bushels per acre | | 185 bushels per acre | | 204 bushels per acre | | Your Estimate |
|--|-------------------------|----------|-------------------------|----------|-------------------------|----------|-------------------------------|
| | Fixed | Variable | Fixed | Variable | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$28.30 | \$27.10 | \$28.30 | \$27.10 | \$28.30 | \$27.10 | \$ |
| Seed, Chemical, etc. | Units | | Units | | Units | | |
| Seed, \$3.54 per 1,000 kernels | 28,000 | \$99.12 | 30,000 | \$106.20 | 35,000 | \$123.90 | \$ |
| Nitrogen, \$0.83 per pound | 167 | 138.61 | 177 | 146.91 | 187 | 155.21 | |
| Phosphate, \$0.75 per pound | 63 | 47.25 | 69 | 51.75 | 77 | 57.75 | |
| Potash, \$0.72 per pound | 50 | 36.00 | 56 | 40.32 | 61 | 43.92 | |
| Lime (yearly cost) | | 8.70 | | 8.70 | | 8.70 | |
| Herbicide | | 53.50 | | 53.50 | | 53.50 | |
| Insecticide | | 16.00 | | 16.00 | | 16.00 | |
| Crop insurance | | 19.10 | | 21.00 | | 22.70 | |
| Miscellaneous | | 10.40 | | 11.60 | | 12.70 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 22.18 | | 23.51 | | 25.38 | |
| Total | | \$450.86 | | \$479.49 | | \$519.76 | \$ |
| Harvest Machinery | | | | | | | |
| Combine | \$15.90 | \$8.80 | \$15.90 | \$8.80 | \$15.90 | \$8.80 | \$ |
| Grain cart | 7.60 | 3.90 | 7.60 | 3.90 | 7.60 | 3.90 | |
| Haul | 8.85 | 8.52 | 9.81 | 9.44 | 10.81 | 10.40 | |
| Dry (LP gas, \$3.30 per gallon) | 8.35 | 66.13 | 9.25 | 73.26 | 10.20 | 80.78 | |
| Handle (auger) | 3.61 | 4.64 | 4.00 | 5.14 | 4.41 | 5.67 | |
| Total | \$44.31 | \$91.99 | \$46.55 | \$100.54 | \$48.92 | \$109.56 | \$ |
| Labor | | | | | | | |
| 2.80 hours, \$18.00 per hour | \$50.40 | | \$50.40 | | \$50.40 | | \$ |
| Land | | | | | | | |
| Cash rent equivalent | \$242.00 | | \$285.00 | | \$331.00 | | \$ |
| Total fixed, variable | | | | | | | |
| Per acre | \$365.01 | \$569.95 | \$410.25 | \$607.13 | \$458.62 | \$656.42 | Yield: bushels per acre |
| Per bushel | \$2.19 | \$3.41 | \$2.22 | \$3.28 | \$2.25 | \$3.22 | |
| Total cost per acre | \$934.96 | | \$1,017.38 | | \$1,115.04 | | \$ |
| Total cost per bushel | \$5.60 | | \$5.50 | | \$5.47 | | \$ |

^{1/} Chisel plow, tandem disk, apply nitrogen, field cultivate, plant, and spray. See the Estimated Machinery Costs table.

Corn Following Soybeans

| | 182 bushels per acre | | 202 bushels per acre | | 222 bushels per acre | | Your Estimate |
|--|-------------------------|-----------------|-------------------------|-----------------|-------------------------|-----------------|-------------------------------|
| | Fixed | Variable | Fixed | Variable | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$23.90 | \$21.80 | \$23.90 | \$21.80 | \$23.90 | \$21.80 | \$ |
| Seed, Chemical, etc. | Units | | Units | | Units | | |
| Seed, \$3.54 per 1,000 kernels | 28,000 | \$99.12 | 30,000 | \$106.20 | 35,000 | \$123.90 | \$ |
| Nitrogen, \$0.83 per pound | 124 | 102.92 | 134 | 111.22 | 144 | 119.52 | |
| Phosphate, \$0.75 per pound | 68 | 51.00 | 76 | 57.00 | 83 | 62.25 | |
| Potash, \$0.72 per pound | 55 | 39.60 | 61 | 43.92 | 67 | 48.24 | |
| Lime (yearly cost) | | 8.70 | | 8.70 | | 8.70 | |
| Herbicide | | 53.50 | | 53.50 | | 53.50 | |
| Crop insurance | | 19.10 | | 21.00 | | 22.70 | |
| Miscellaneous | | 10.40 | | 11.60 | | 12.70 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 19.77 | | 21.17 | | 23.03 | |
| Total | | \$404.11 | | \$434.31 | | \$474.54 | \$ |
| Harvest Machinery | | | | | | | |
| Combine | \$15.90 | \$8.80 | \$15.90 | \$8.80 | \$15.90 | \$8.80 | \$ |
| Grain cart | 7.60 | 3.90 | 7.60 | 3.90 | 7.60 | 3.90 | |
| Haul | 9.65 | 9.28 | 10.71 | 10.30 | 11.77 | 11.32 | |
| Dry (LP gas, \$3.30 per gallon) | 9.10 | 72.07 | 10.10 | 79.99 | 11.10 | 87.91 | |
| Handle (auger) | 3.93 | 5.06 | 4.36 | 5.62 | 4.80 | 6.17 | |
| Total | \$46.18 | \$99.11 | \$48.67 | \$108.61 | \$51.16 | \$118.11 | \$ |
| Labor | | | | | | | |
| 2.55 hours, \$18.00 per hour | \$45.90 | | \$45.90 | | \$45.90 | | \$ |
| Land | | | | | | | |
| Cash rent equivalent | \$242.00 | | \$285.00 | | \$331.00 | | \$ |
| Total fixed, variable | | | | | | | |
| Per acre | \$357.98 | \$525.02 | \$403.47 | \$564.72 | \$451.96 | \$614.45 | Yield: bushels per acre |
| Per bushel | \$1.97 | \$2.88 | \$2.00 | \$2.80 | \$2.04 | \$2.77 | |
| Total cost per acre | \$883.00 | | \$968.19 | | \$1,066.41 | | \$ |
| Total cost per bushel | \$4.85 | | \$4.79 | | \$4.80 | | \$ |

^{1/}Apply nitrogen, tandem disk, field cultivate, plant, and spray. See the Estimated Machinery Costs table.

Corn Silage Following Corn

| | 21 tons per acre | | 24 tons per acre | | 26 tons per acre | | Your Estimate |
|--|---------------------|----------|---------------------|----------|---------------------|----------|----------------------------|
| | Fixed | Variable | Fixed | Variable | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$28.30 | \$27.10 | \$28.30 | \$27.10 | \$28.30 | \$27.10 | \$ |
| Seed, Chemical, etc. | Units | | Units | | Units | | |
| Seed, \$3.54 per 1,000 kernels | 32,200 | \$113.99 | 34,500 | \$122.13 | 40,250 | \$142.49 | \$ |
| Nitrogen, \$0.83 per pound | 150 | 124.50 | 150 | 124.50 | 150 | 124.50 | |
| Phosphate, \$0.75 per pound | 74 | 55.50 | 84 | 63.00 | 91 | 68.25 | |
| Potash, \$0.72 per pound | 168 | 120.96 | 192 | 138.24 | 208 | 149.76 | |
| Lime (yearly cost) | | 8.70 | | 8.70 | | 8.70 | |
| Herbicide | | 53.50 | | 53.50 | | 53.50 | |
| Insecticide | | 16.00 | | 16.00 | | 16.00 | |
| Crop insurance | | 19.10 | | 21.00 | | 22.70 | |
| Miscellaneous | | 10.40 | | 11.60 | | 12.70 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 26.75 | | 28.51 | | 30.45 | |
| Total | | \$549.40 | | \$587.18 | | \$629.05 | \$ |
| Harvest Machinery | | | | | | | |
| Silage harvester | \$59.70 | \$39.80 | \$59.70 | \$39.80 | \$59.70 | \$39.80 | \$ |
| Haul | 34.23 | 37.59 | 39.12 | 42.96 | 42.38 | 46.54 | |
| Store silage (unloader) | 10.92 | 2.94 | 12.48 | 3.36 | 13.52 | 3.64 | |
| Total | \$104.85 | \$80.33 | \$111.30 | \$86.12 | \$115.60 | \$89.98 | \$ |
| Labor | | | | | | | |
| 4.95 hours, \$18.00 per hour | \$89.10 | | \$89.10 | | \$89.10 | | \$ |
| Land | | | | | | | |
| Cash rent equivalent | \$242.00 | | \$285.00 | | \$331.00 | | \$ |
| Total fixed, variable | | | | | | | |
| Per acre | \$464.25 | \$656.83 | \$513.70 | \$700.40 | \$564.00 | \$746.13 | Yield: tons per acre |
| Per ton | \$22.11 | \$31.28 | \$21.40 | \$29.18 | \$21.69 | \$28.70 | |
| Total cost per acre | \$1,121.08 | | \$1,214.10 | | \$1,310.13 | | \$ |
| Total cost per ton | \$53.38 | | \$50.59 | | \$50.39 | | \$ |

^{1/} Chisel plow, tandem disk, apply nitrogen, field cultivate, plant, and spray. See the Estimated Machinery Costs table.

Herbicide Tolerant Soybeans Following Corn

| | 53 bushels per acre | | 59 bushels per acre | | 65 bushels per acre | | Your Estimate |
|--|------------------------|----------|------------------------|----------|------------------------|----------|-------------------------------|
| | Fixed | Variable | Fixed | Variable | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$25.80 | \$24.10 | \$25.80 | \$24.10 | \$25.80 | \$24.10 | \$ |
| Seed, Chemical, etc. | Units | | Units | | Units | | |
| Seed, \$65.50 per 140,000 kernels | 140,000 | \$65.50 | 140,000 | \$65.50 | 140,000 | \$65.50 | \$ |
| Phosphate, \$0.75 per pound | 42 | 31.50 | 47 | 35.25 | 52 | 39.00 | |
| Potash, \$0.72 per pound | 80 | 57.60 | 89 | 64.08 | 98 | 70.56 | |
| Lime (yearly cost) | | 8.70 | | 8.70 | | 8.70 | |
| Herbicide | | 72.50 | | 72.50 | | 72.50 | |
| Crop insurance | | 13.00 | | 14.70 | | 16.10 | |
| Miscellaneous | | 10.40 | | 11.60 | | 12.70 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 13.79 | | 14.43 | | 15.05 | |
| Total | | \$272.99 | | \$286.76 | | \$300.11 | \$ |
| Harvest Machinery | | | | | | | |
| Combine | \$10.10 | \$5.50 | \$10.10 | \$5.50 | \$10.10 | \$5.50 | \$ |
| Grain cart | 7.60 | 3.90 | 7.60 | 3.90 | 7.60 | 3.90 | |
| Haul | 2.81 | 2.70 | 3.13 | 3.01 | 3.45 | 3.32 | |
| Handle (auger) | 1.14 | 1.47 | 1.27 | 1.64 | 1.40 | 1.81 | |
| Total | \$21.65 | \$13.58 | \$22.10 | \$14.05 | \$22.55 | \$14.52 | \$ |
| Labor | | | | | | | |
| 2.20 hours, \$18.00 per hour | \$39.60 | | \$39.60 | | \$39.60 | | \$ |
| Land | | | | | | | |
| Cash rent equivalent | \$242.00 | | \$285.00 | | \$331.00 | | \$ |
| Total fixed, variable | | | | | | | |
| Per acre | \$329.05 | \$310.66 | \$372.50 | \$324.91 | \$418.95 | \$338.73 | Yield: bushels per acre |
| Per bushel | \$6.21 | \$5.86 | \$6.31 | \$5.51 | \$6.45 | \$5.21 | |
| Total cost per acre | \$639.72 | | \$697.41 | | \$757.68 | | \$ |
| Total cost per bushel | \$12.07 | | \$11.82 | | \$11.66 | | \$ |

^{1/} Chisel plow, tandem disk, field cultivate, plant, and two sprays. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Strip Tillage Corn and Soybeans

| Corn Following Soybeans | | | | Herbicide Tolerant Soybeans Following Corn | | | |
|--|----------------------|----------|-------------------------|--|---------------------|----------|-------------------------|
| | 202 bushels per acre | | Your Estimate | | 59 bushels per acre | | Your Estimate |
| | Fixed | Variable | | | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$13.50 | \$12.40 | \$ | Preharvest Machinery ^{1/} | \$16.40 | \$14.20 | \$ |
| Seed, Chemical, etc. | Units | | | Seed, Chemical, etc. | Units | | |
| Seed, \$3.54 per 1,000 kernels | 30,000 | \$106.20 | \$ | Seed, \$65.50 per 140,000 kernels | 160,000 | \$74.86 | \$ |
| Nitrogen, \$0.83 per pound | 134 | \$111.22 | | | | | |
| Phosphate, \$0.75 per pound | 76 | 57.00 | | Phosphate, \$0.75 per pound | 47 | 35.25 | |
| Potash, \$0.72 per pound | 61 | 43.92 | | Potash, \$0.72 per pound | 89 | 64.08 | |
| Lime (yearly cost) | | 8.70 | | Lime (yearly cost) | | 8.70 | |
| Herbicide ^{2/} | | 75.00 | | Herbicide ^{2/} | | 46.57 | |
| Crop insurance | | 21.00 | | Crop insurance | | 14.70 | |
| Miscellaneous | | 11.60 | | Miscellaneous | | 11.60 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 21.76 | | Interest on preharvest variable costs (8 months at 7.3%) | | 13.14 | |
| Total | | \$456.40 | \$ | Total | | \$268.90 | \$ |
| Harvest Machinery | | | | | | | |
| Combine | \$15.90 | \$8.80 | \$ | Combine | \$10.10 | \$5.50 | \$ |
| Grain cart | 7.60 | 3.90 | | Grain cart | 7.60 | 3.90 | |
| Haul | 10.71 | 10.30 | | Haul | 3.13 | 3.01 | |
| Dry (LP gas, \$3.30 per gallon) | 10.10 | 79.99 | | | | | |
| Handle (auger) | 4.36 | 5.62 | | Handle (auger) | 1.27 | 1.64 | |
| Total | \$48.67 | \$108.61 | \$ | Total | \$22.10 | \$14.05 | \$ |
| Labor | | | | | | | |
| 2.25 hours, \$18.00 | \$40.50 | | \$ | 1.70 hours, \$18.00 | \$30.60 | | \$ |
| Land | | | | | | | |
| Cash rent equivalent | \$285.00 | | \$ | Cash rent equivalent | \$285.00 | | \$ |
| Total fixed, variable | | | | | | | |
| Per acre | \$387.67 | \$577.41 | Yield: bushels per acre | Per acre | \$354.10 | \$297.14 | Yield: bushels per acre |
| Per bushel | \$1.92 | \$2.86 | | Per bushel | \$6.00 | \$5.04 | |
| Total cost per acre | \$965.07 | | \$ | Total cost per acre | \$651.25 | | \$ |
| Total cost per bushel | \$4.78 | | \$ | Total cost per bushel | \$11.04 | | \$ |

^{1/} Strip till, plant, and spray for corn. No-till drill, two sprays for soybeans. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Non-Herbicide Tolerant Soybeans Following Corn

| | Soybeans Following Corn | | | Drilled Soybeans Following Corn | | |
|--|-------------------------|----------|----------------------------|---------------------------------|----------|----------------------------|
| | 59 bushels per acre | | Your Estimate | 59 bushels per acre | | Your Estimate |
| | Fixed | Variable | | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$26.30 | \$24.70 | \$ | \$22.60 | \$20.00 | \$ |
| Seed, Chemical, etc. | Units | | | Units | | |
| Seed, \$54.06 per 140,000 kernels | 130,000 | \$50.20 | \$ | 150,000 | \$57.90 | \$ |
| Phosphate, \$0.75 per pound | 47 | 35.25 | | 47 | 35.25 | |
| Potash, \$0.72 per pound | 89 | 64.08 | | 89 | 64.08 | |
| Lime (yearly cost) | | 8.70 | | | 8.70 | |
| Herbicide ^{2/} | | 82.00 | | | 46.57 | |
| Crop insurance | | 14.70 | | | 14.70 | |
| Miscellaneous | | 11.60 | | | 11.60 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 14.17 | | | 12.59 | |
| Total | | \$280.70 | \$ | | \$251.39 | \$ |
| Harvest Machinery | | | | | | |
| Combine | \$10.10 | \$5.50 | \$ | \$10.10 | \$5.50 | \$ |
| Grain cart | 7.60 | 3.90 | | 7.60 | 3.90 | |
| Haul | 3.13 | 3.01 | | 3.13 | 3.01 | |
| Handle (auger) | 1.27 | 1.64 | | 1.27 | 1.64 | |
| Total | \$22.10 | \$14.05 | \$ | \$22.10 | \$14.05 | \$ |
| Labor | | | | | | |
| 2.40 hours, \$18.00 per hour | \$43.20 | | \$ | | | |
| 1.72 hours, \$18.00 per hour | | | | \$30.96 | | \$ |
| Land | | | | | | |
| Cash rent equivalent | \$285.00 | | \$ | \$285.00 | | \$ |
| Total fixed, variable | | | | | | |
| Per acre | \$376.60 | \$319.45 | | \$360.66 | \$285.44 | |
| Per bushel | \$6.38 | \$5.41 | Yield: bushels per acre | \$6.11 | \$4.84 | Yield: bushels per acre |
| Total cost per acre | \$696.05 | | \$ | \$646.11 | | \$ |
| Total cost per bushel | \$11.80 | | \$ | \$10.95 | | \$ |

^{1/} Chisel plow, tandem disk, field cultivate, plant, cultivate, and spray.
Tandem disk, field cultivate, drill, and spray for drilled soybeans. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Low-till Corn and Soybeans

| Corn Following Soybeans | | | | Herbicide Tolerant Drilled Soybeans Following Corn | | | |
|--|----------------------|----------|-------------------------|--|---------------------|----------|-------------------------|
| | 202 bushels per acre | | Your Estimate | | 59 bushels per acre | | Your Estimate |
| | Fixed | Variable | | | Fixed | Variable | |
| Preharvest Machinery ^{1/} | \$18.30 | \$17.30 | \$ | Preharvest Machinery ^{1/} | \$16.50 | \$14.50 | \$ |
| Seed, Chemical, etc. | Units | | | Seed, Chemical, etc. | Units | | |
| Seed, \$3.54 per 1,000 kernels | 30,000 | \$106.20 | \$ | Seed, \$65.50 per 140,000 kernels | 160,000 | \$74.90 | \$ |
| Nitrogen, \$0.83 per pound | 134 | 111.22 | | | | | |
| Phosphate, \$0.75 per pound | 76 | 57.00 | | Phosphate, \$0.75 per pound | 47 | 35.25 | |
| Potash, \$0.72 per pound | 61 | 43.92 | | Potash, \$0.72 per pound | 89 | 64.08 | |
| Lime (yearly cost) | | 8.70 | | Lime (yearly cost) | | 8.70 | |
| Herbicide ^{2/} | | 75.00 | | Herbicide ^{2/} | | 46.57 | |
| Crop insurance | | 21.00 | | Crop insurance | | 14.70 | |
| Miscellaneous | | 11.60 | | Miscellaneous | | 11.60 | |
| Interest on preharvest variable costs (8 months at 7.3%) | | 21.99 | | Interest on preharvest variable costs (8 months at 7.3%) | | 13.15 | |
| Total | | \$456.63 | \$ | Total | | \$268.95 | \$ |
| Harvest Machinery | | | | | | | |
| Combine | \$15.90 | \$8.80 | \$ | Combine | \$10.10 | \$5.50 | \$ |
| Grain cart | 7.60 | 3.90 | | Grain cart | 7.60 | 3.90 | |
| Haul | 10.71 | 10.30 | | Haul | 3.13 | 3.01 | |
| Dry (LP gas, \$3.30 per gallon) | 10.10 | 79.99 | | | | | |
| Handle (auger) | 4.36 | 5.62 | | Handle (auger) | 1.27 | 1.64 | |
| Total | \$48.67 | \$108.61 | \$ | Total | \$22.10 | \$14.05 | \$ |
| Labor | | | | | | | |
| 2.25 hours, \$18.00 | \$40.50 | | \$ | 1.70 hours, \$18.00 | \$30.60 | | \$ |
| Land | | | | | | | |
| Cash rent equivalent | \$285.00 | | \$ | Cash rent equivalent | \$285.00 | | \$ |
| Total fixed, variable | | | | | | | |
| Per acre | \$392.47 | \$582.54 | Yield: bushels per acre | Per acre | \$354.20 | \$297.50 | Yield: bushels per acre |
| Per bushel | \$1.94 | \$2.88 | | Per bushel | \$6.00 | \$5.04 | |
| Total cost per acre | \$975.01 | | \$ | Total cost per acre | \$651.71 | | \$ |
| Total cost per bushel | \$4.83 | | \$ | Total cost per bushel | \$11.05 | | \$ |

^{1/} Apply nitrogen, cultivate, plant, and spray for corn. Disk, drill, and spray for soybeans. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Oats and Hay Production-Seeding Year Costs

| Establishment Costs | Alfalfa-Grass Seeded with Oat Companion Crop ^{1/} | | Alfalfa Seeded with Herbicide ^{2/} | | Your Estimate |
|--|---|-----------------|--|-----------------|------------------|
| | Fixed | Variable | Fixed | Variable | |
| Preharvest Machinery | | | | | |
| Spray herbicide | | | \$2.70 | \$2.40 | \$ |
| Tandem disk (2 times) | \$11.20 | \$9.00 | 11.20 | 9.00 | |
| Spread fertilizer | 2.40 | 2.10 | 2.40 | 2.10 | |
| Harrow | 2.50 | 2.00 | 2.50 | 2.00 | |
| Seed (drill) | 5.50 | 5.20 | 5.50 | 5.20 | |
| Total preharvest machinery | \$21.60 | \$18.30 | \$24.30 | \$20.70 | \$ |
| Seed ^{3/} | | | | | |
| Oats | 2 bushels | \$20.50 | | | \$ |
| Alfalfa | 8 pounds | 40.32 | 15 pounds | \$75.60 | |
| Bromegrass | 6 pounds | 27.06 | | | |
| Orchardgrass | 3 pounds | 8.46 | | | |
| Total seed cost | | \$96.34 | | \$75.60 | \$ |
| Herbicide | | | | \$28.10 | \$ |
| Lime (total cost for hay lifetime) | | \$30.00 | | 30.00 | |
| Labor: 1 hour, \$18.00 per hour | \$18.00 | | \$18.00 | | \$ |
| Total establishment costs | \$39.60 | \$144.64 | \$42.30 | \$154.40 | \$ |
| Annual Costs | Fixed | Variable | Fixed | Variable | Your Estimate |
| One-third of Establishment Costs (for establishment year) | \$13.20 | \$48.21 | \$14.10 | \$51.47 | \$ |
| Fertilizer | | | | | |
| Nitrogen | 60 pounds | \$49.80 | | | \$ |
| Phosphorus | 45 pounds | 33.75 | 35 pounds | \$26.25 | |
| Potash | 130 pounds | 93.60 | 125 pounds | 90.00 | |
| Total fertilizer | | \$177.15 | | \$116.25 | \$ |
| Insurance, oats | | \$2.80 | | | \$ |
| Labor, \$18.00 per hour | 4 hours | \$72.00 | 3 hours | \$54.00 | \$ |
| Land: Cash rent equivalent | \$169.00 | | \$169.00 | | \$ |
| Harvest Machinery | | | | | |
| Oats: combine and haul grain | \$13.34 | \$8.18 | | | \$ |
| Oats: rake, bale, and haul straw | 14.76 | 12.32 | | | |
| Alfalfa: mower-conditioner, rake, bale, and haul hay | 22.63 | 18.87 | \$46.43 | \$39.87 | |
| Total harvest cost | \$50.73 | \$39.36 | \$46.43 | \$39.87 | \$ |
| Total fixed and variable costs | \$304.93 | \$267.53 | \$283.53 | \$207.58 | \$ |
| Total cost per acre | \$572.46 | | \$491.12 | | \$ |

^{1/} Assumes 80 bushels oat yield, one ton straw yield, and one ton per acre alfalfa yield from one cutting.

^{2/} Assumes two and a half tons per acre from two alfalfa cuttings with herbicide-assisted seeding.

^{3/} Omit oats from August seedings. Higher priced seed varieties or different seed mixtures could vary these costs by 1.2 to 2.0 times.

Annual Production Costs for Established Alfalfa or Alfalfa-Grass Hay

| | Hay Production Level | | | | Your Estimate |
|--|-------------------------------|----------|-------------------------------|----------|---------------|
| | 4 tons per acre ^{1/} | | 6 tons per acre ^{1/} | | |
| | Fixed | Variable | Fixed | Variable | |
| One-third of establishment costs Machinery, seed, lime, labor, and herbicide ^{2/} | \$13.20 | \$48.21 | \$14.10 | \$51.47 | \$ |
| Annual fertilizer ^{3/} 0-13-50 pounds per ton removed plus spreading and insurance | \$2.40 | \$189.20 | \$4.80 | \$284.85 | \$ |
| Harvesting Costs: Large Round Bales ^{4/} | | | | | |
| Mower-conditioner, rake, baling, and hauling | \$70.23 | \$60.87 | \$95.20 | \$84.00 | \$ |
| Labor costs: 1.33 hours per cutting, \$18.00 per hour | \$72.00 | | \$96.00 | | \$ |
| Land: Cash rent equivalent | \$169.00 | | \$209.00 | | \$ |
| Total fixed and variable cost using large round bales per acre | \$326.83 | \$298.28 | \$419.10 | \$420.32 | \$ |
| Fixed, variable cost per ton | \$81.71 | \$74.57 | \$69.85 | \$70.05 | \$ |
| Total cost per acre | \$625.11 | | \$839.42 | | \$ |
| Total cost per ton | \$156.28 | | \$139.90 | | \$ |
| Harvesting Costs: Small Square Bales ^{4/} | | | | | |
| Mower-conditioner, rake, baling, haul and stack | \$66.55 | \$58.66 | \$90.37 | \$81.29 | \$ |
| Labor costs: 2 hours per cutting, \$18.00 per hour | \$108.00 | | \$144.00 | | \$ |
| Land: Cash rent equivalent | \$169.00 | | \$209.00 | | \$ |
| Total fixed and variable cost using small square bales per acre | \$359.15 | \$296.07 | \$462.27 | \$417.61 | \$ |
| Fixed, variable cost per ton | \$89.79 | \$74.02 | \$77.04 | \$69.60 | \$ |
| Total cost per acre | \$655.22 | | \$879.88 | | \$ |
| Total cost per ton | \$163.81 | | \$146.65 | | \$ |

^{1/} For harvest as silage, use machine cost estimates from the Estimated Machinery Costs table.

^{2/} Assumes alfalfa-grass seeded with oat companion crop. If alfalfa seeded with preplant herbicide, then use other costs (see previous page).

^{3/} For 6-ton yield goal, a split application of fertilizer is assumed.

^{4/} Harvest cost estimates assume 3 cuttings for 4 tons and 4 cuttings for 6 tons.

Maintaining Grass Pastures - Annual Cost per Acre

| | Improved Grass ^{2/} | | Improved Grass-Legume ^{3/} | | Your Estimate |
|---|------------------------------|----------|-------------------------------------|----------|---------------|
| | Fixed | Variable | Fixed | Variable | |
| Machinery Costs | | | | | |
| Spreading fertilizer | \$2.40 | \$2.10 | \$2.40 | \$2.10 | \$ |
| Spraying herbicide | 2.70 | 2.40 | | | |
| Clipping weeds | 8.00 | 5.40 | 8.00 | 5.40 | |
| Total machinery cost | \$13.10 | \$9.90 | \$10.40 | \$7.50 | \$ |
| Fertilizer and Herbicide ^{1/} | | | | | |
| Nitrogen, \$0.83 per pound | 80 pounds | \$66.40 | | | \$ |
| Phosphate, \$0.75 per pound | 30 pounds | 22.50 | 30 pounds | \$22.50 | |
| Potash, \$0.72 per pound | | | 40 pounds | 28.80 | |
| Herbicide | | 5.00 | | | |
| Total fertilizer and herbicide | | \$93.90 | | \$51.30 | \$ |
| Labor | | | | | |
| Growing practices .5 hours, \$18.00 per hour | \$9.00 | | \$9.00 | | \$ |
| Fence maintenance 1 hours, \$18.00 per hour | 18.00 | | 18.00 | | |
| Total labor | \$27.00 | | \$27.00 | | \$ |
| Land | | | | | |
| Cash rent equivalent | \$67.00 | | \$95.00 | | \$ |
| Total annual cost | \$107.10 | \$103.80 | \$132.40 | \$58.80 | \$ |
| Total annual cost per acre | | \$210.90 | | \$191.20 | \$ |

^{1/} These are average rates and may vary with soil test and the level of management on a particular field. Different herbicide alternatives could vary this cost.

^{2/} Improved grass pastures assume a dominance of cool season grasses such as smooth bromegrass, orchardgrass, tall fescue, or reed canarygrass.

^{3/} Improved grass-legume pasture assumed one-third of the forage is made up of red clover, birdsfoot trefoil, or alfalfa.

Estimated Machinery Costs

The following cost estimates are for on-farm use, excluding labor. Depreciation is based on current replacement cost; interest is based on average market rates. Fixed costs will be greater for newer machinery. If annual machine use is greater than that assumed, fixed costs per acre will be lower, and vice versa. Hauling costs are based on a round trip of one mile. Remember these are estimates and they should not take the place of accurate recordkeeping. **Diesel fuel is estimated to cost \$3.91 per gallon, delivered to the farm in bulk.**

| Operation | Hours of Use Assumed per Year | Fixed Cost per Acre (depreciation, interest, insurance, housing) | Variable Cost per Acre (fuel, oil, repairs) |
|---|----------------------------------|--|---|
| Subsoiling (V-ripper) | 120 | \$7.70 | \$10.50 |
| Moldboard plow | 120 | 11.10 | 12.70 |
| Chisel plow | 120 | 4.40 | 5.30 |
| Chop stalks | 120 | 6.00 | 6.50 |
| Tandem disk | 120 | 5.60 | 4.50 |
| Offset disk | 120 | 4.70 | 4.40 |
| Peg tooth harrow | 60 | 2.50 | 2.00 |
| Sprayer/disk | 120 | 4.50 | 3.80 |
| Field cultivator | 120 | 3.30 | 3.70 |
| Disk/Field cultivator | 120 | 3.20 | 3.60 |
| Strip tiller | 120 | 3.70 | 4.20 |
| Bulk fertilizer spreader | 60 | 2.40 | 2.10 |
| NH ₃ applicator | 120 | 5.20 | 5.40 |
| Chisel plow, NH ₃ applicator | 120 | 7.40 | 8.40 |
| Grain drill | 100 | 5.50 | 5.20 |
| Broadcast seeder | 100 | 3.60 | 2.20 |
| Planter | 100 | 7.10 | 5.80 |
| No-till planter | 100 | 9.10 | 7.70 |
| No-till drill | 100 | 11.00 | 9.40 |
| Rotary hoe | 60 | 2.20 | 1.50 |
| Cultivator | 120 | 3.20 | 3.00 |
| Sprayer | 150 | 2.70 | 2.40 |
| Combine corn | 180 | 15.90 | 8.80 |
| Combine soybeans | 120 | 10.10 | 5.50 |
| Combine small grain | 120 | 9.10 | 4.10 |
| Haul grain (on farm) | 600 | 0.053/bushel | 0.051/bushel |
| Grain cart | 200 | 7.60 | 3.90 |
| Store grain (auger) | | 0.0216/bushel | 0.0278/bushel |
| Silage harvester | 200 | 59.70 | 39.80 |
| Haul silage | 140 | 1.63/ton | 1.79/ton |
| Store silage (unloader) | | 0.52/ton | 0.14/ton |
| Rotary mower | 120 | 8.00 | 5.40 |
| Mower-conditioner | 120 | 6.60 | 5.70 |
| Rake | 120 | 3.80 | 2.60 |
| Small square baler | 120 | 8.50/cutting | 5.10/cutting |
| Round baler | 120 | 9.90 | 6.30 |
| Large square baler | 120 | 10.40 | 7.50 |
| Windrower | 200 | 3.70 | 2.80 |
| Forage chopper | 200 | 21.80 | 17.10 |
| Haul small square bales | 120 | 2.46/ton | 4.62/ton |
| Haul large round bales | 120 | 2.33/ton | 4.27/ton |

Estimated Crop Production Costs in Iowa, 2014-2023

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 ^{1/} | 2020 | 2021 | 2022 ^{2/} | 2023 |
|--|----------|----------|----------|----------|----------|--------------------|----------|----------|--------------------|----------|
| Corn Following Corn | | | | | | | | | | |
| Machinery | \$155.29 | \$144.99 | \$129.92 | \$119.83 | \$132.80 | \$134.38 | \$128.46 | \$126.73 | \$146.56 | \$202.49 |
| Seed, chemicals, etc. | 340.27 | 357.80 | 330.55 | 287.19 | 279.81 | 313.70 | 299.79 | 311.84 | 415.55 | 479.49 |
| Labor | 37.05 | 37.05 | 37.05 | 36.40 | 39.20 | 39.90 | 41.30 | 42.70 | 47.60 | 50.40 |
| Land | 287.00 | 273.00 | 266.00 | 230.00 | 219.00 | 223.00 | 219.00 | 222.00 | 232.00 | 285.00 |
| Total cost per acre | 819.61 | 812.83 | 763.52 | 673.41 | 670.80 | 710.98 | 688.54 | 703.28 | 841.70 | 1,017.38 |
| Assumed yield | 165 bu. | 165 bu. | 165 bu. | 165 bu. | 165 bu. | 182 bu. | 182 bu. | 184 bu. | 180 bu. | 185 bu. |
| Total cost per bushel | \$4.97 | \$4.93 | \$4.63 | \$4.08 | \$4.07 | \$3.91 | \$3.78 | \$3.82 | \$4.68 | \$5.50 |
| Corn Following Soybeans | | | | | | | | | | |
| Machinery | \$152.28 | \$142.18 | \$126.74 | \$116.56 | \$130.47 | \$132.22 | \$126.10 | \$125.17 | \$145.48 | \$202.98 |
| Seed, chemicals, etc. | 298.80 | 311.84 | 292.47 | 251.48 | 241.86 | 279.96 | 259.59 | 278.36 | 363.93 | 434.31 |
| Labor | 33.80 | 33.80 | 33.80 | 33.15 | 35.70 | 36.34 | 37.61 | 38.89 | 43.35 | 45.90 |
| Land | 287.00 | 273.00 | 266.00 | 230.00 | 219.00 | 223.00 | 219.00 | 222.00 | 232.00 | 285.00 |
| Total cost per acre | 771.88 | 760.81 | 719.01 | 631.18 | 627.03 | 671.51 | 642.30 | 664.42 | 784.76 | 968.19 |
| Assumed yield | 180 bu. | 180 bu. | 180 bu. | 180 bu. | 180 bu. | 198 bu. | 199 bu. | 201 bu. | 198 bu. | 202 bu. |
| Total cost per bushel | \$4.29 | \$4.23 | \$3.99 | \$3.51 | \$3.48 | \$3.39 | \$3.23 | \$3.31 | \$3.96 | \$4.79 |
| Soybeans Following Corn ^{3/} | | | | | | | | | | |
| Machinery | \$84.70 | \$79.17 | \$75.43 | \$67.40 | \$68.67 | \$68.43 | \$68.11 | \$63.86 | \$72.74 | \$86.05 |
| Seed, chemicals, etc. | 155.65 | 166.38 | 162.63 | 157.11 | 154.41 | 183.61 | 168.52 | 181.24 | 232.82 | 286.76 |
| Labor | 29.25 | 29.25 | 29.25 | 28.60 | 30.80 | 31.35 | 32.45 | 33.55 | 37.40 | 39.60 |
| Land | 287.00 | 273.00 | 266.00 | 230.00 | 219.00 | 223.00 | 219.00 | 222.00 | 232.00 | 285.00 |
| Total cost per acre | 556.60 | 547.80 | 533.30 | 483.11 | 472.89 | 506.38 | 488.09 | 500.65 | 574.96 | 697.41 |
| Assumed yield | 50 bu. | 50 bu. | 50 bu. | 50 bu. | 50 bu. | 56 bu. | 56 bu. | 56 bu. | 57 bu. | 59 bu. |
| Total cost per bushel | \$11.13 | \$10.96 | \$10.67 | \$9.66 | \$9.46 | \$9.04 | \$8.72 | \$8.94 | \$10.09 | \$11.82 |
| Alfalfa Hay, annual production, 6 ton per acre, large round bales | | | | | | | | | | |
| One-third of est. costs | \$58.17 | \$60.62 | \$57.93 | \$60.03 | \$51.43 | \$48.50 | \$49.65 | \$51.97 | \$68.97 | \$65.57 |
| Annual fertilizer | 164.14 | 166.88 | 148.21 | 109.05 | 121.48 | 135.37 | 129.37 | 129.37 | 228.76 | 289.65 |
| Harvest machinery | 179.60 | 167.60 | 159.20 | 140.80 | 144.40 | 141.60 | 141.20 | 130.80 | 150.00 | 179.20 |
| Labor | 69.33 | 69.33 | 69.33 | 69.33 | 74.67 | 76.00 | 78.67 | 81.33 | 90.67 | 96.00 |
| Land | 167.00 | 167.00 | 170.00 | 165.00 | 157.00 | 157.00 | 160.00 | 164.00 | 174.00 | 209.00 |
| Total cost per acre | 638.24 | 631.43 | 604.67 | 544.22 | 548.97 | 558.47 | 558.89 | 557.47 | 712.39 | 839.42 |
| Assumed yield | 6 ton | 6 ton | 6 ton | 6 ton | 6 ton | 6 ton | 6 ton | 6 ton | 6 ton | 6 ton |
| Total cost per ton | \$106.37 | \$105.24 | \$100.78 | \$90.70 | \$91.49 | \$93.08 | \$93.15 | \$92.91 | \$118.73 | \$139.90 |

^{1/} Starting in 2019, reference yields for corn and soybean budgets reflect 30-year trend yields.

^{2/} Starting in 2022, reference yields are adjusted by the percent of the maximum yield attainable at the maximum return to nitrogen (MRTN) rate according to the [Corn Nitrogen Rate Calculator](https://www.cnr.org/corn-nitrogen-rate-calculator), cncr.agron.iastate.edu.

^{3/} Soybean estimates are for herbicide tolerant varieties.

Prepared by Alejandro Plastina, extension economist, 515-294-6160, plastina@iastate.edu
www.extension.iastate.edu/agdm
store.extension.iastate.edu

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