

2023 Kentucky Vegetable & Fruit Input Costs: Changes and Trends

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Summary

Prices for many crop inputs have increased since 2020. This report updates 2023 Kentucky price trends for key vegetable and fruit crop inputs: fuel and fertilizer, labor, plant protection products and seed. These representative data may be used to help producers identify input costs and trends and update production budget estimates for 2024.

Nationally, there has been a sharp increase in many farm inputs connected with the vegetable sector, especially over the past 3 years. Kentucky farmers have similarly seen significant increases in some inputs, while others have stayed relatively steady or even dropped since last year. In the summer and fall of 2023, we completed a regional summary of input prices for Kentucky producers for both conventional and organic inputs on vegetable farms. A more detailed summary of specific inputs can be found [here](#).

For John Bell at Elmwood Stock Farm, a certified organic farm in Georgetown, KY, three things have been significantly over budget in the fall of 2023: cardboard and plastics, seed, and interest expense. Significantly, Bell noted that, “drip irrigation supplies are around 20% more than what we had expected.” This article details some of the farm inputs that are affecting Kentucky growers in 2023 and will likely continue to affect Kentucky growers into 2024.

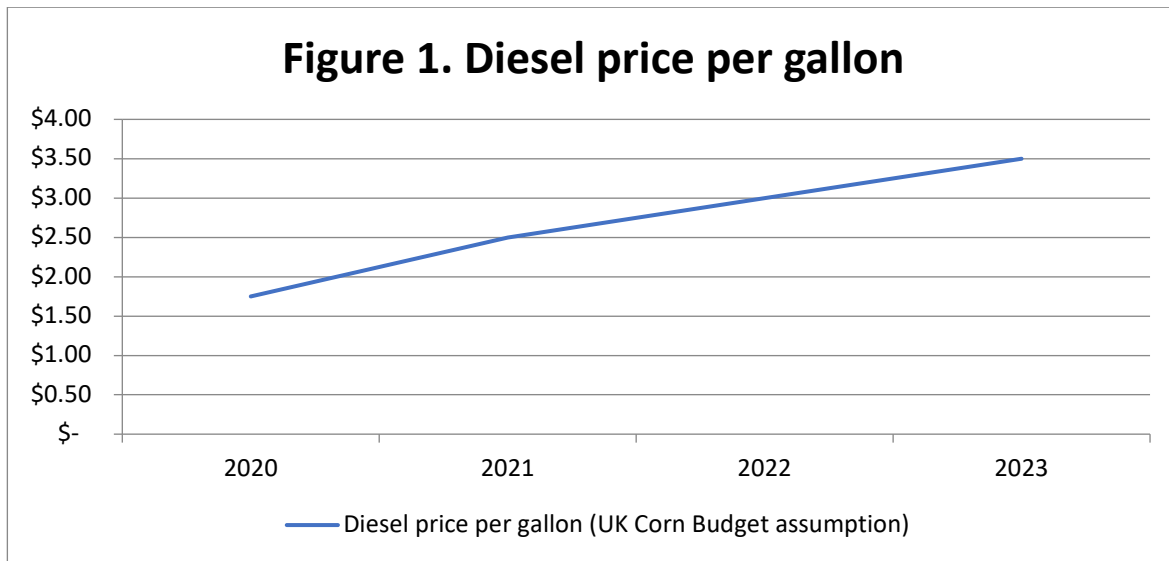
DISCLAIMER: This is a summary report that may not accurately represent local costs of inputs. Cost trends are based on a survey of producer prices paid and selling prices at certain input suppliers from fall 2022 to summer 2023. Producers should verify actual costs with their local supplier. Costs do not include freight costs that may be incurred when purchasing some products. Plant protection products may vary by manufacturer and formulation. The mention of commercial product names is for identification only and does not constitute endorsement or recommendation for their use.

Fuel and fertilizer

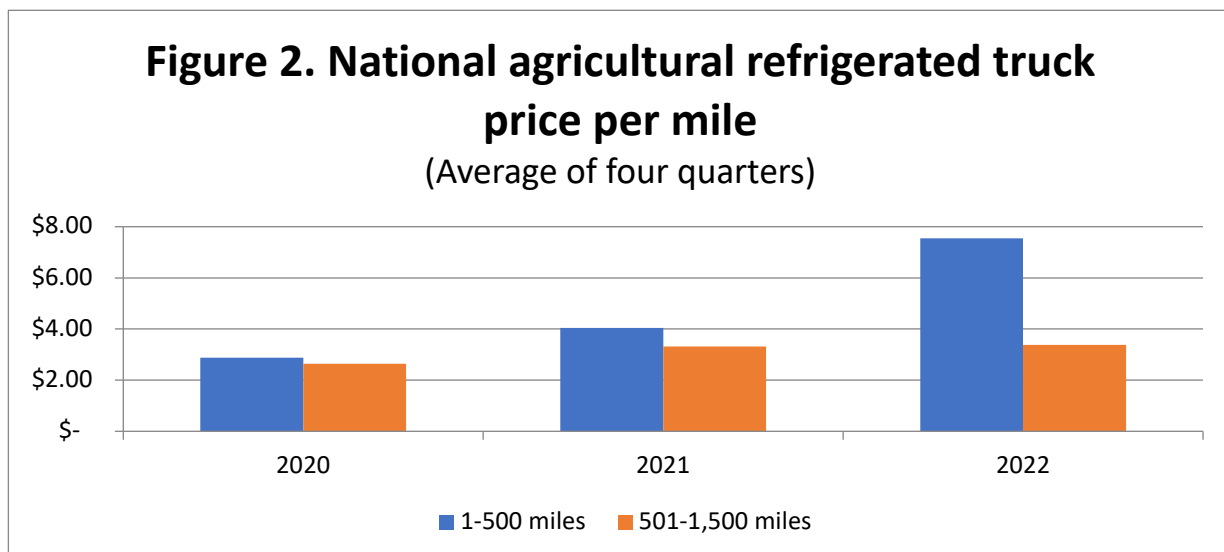
Fuel

Higher fuel costs increase fruit and vegetable production and marketing costs. Nationally, prices paid by farmers for diesel fuel more than doubled from 2020 to 2022 (Appendix 1). Nationwide increases in gasoline prices paid by farmers were nearly as steep as diesel. Prices paid in 2023 did not sharply increase over 2022 price levels.

In Kentucky, one indicator of the increase in fuel prices paid by farmers is the price per gallon assumed for diesel fuel in the UK Extension corn production budgets. The assumed price per gallon of diesel has doubled since 2020, to \$3.50 per gallon in 2023 (Figure 1).



Higher diesel fuel prices more likely impact larger-scale producers and contractual marketing agreements. Nationally, ways in which increases in diesel prices affect the produce sector can be illustrated by a rise in refrigerated truck quarterly rates from 2021 to 2022 (Figure 2, Appendix 2).



Source: USDA Agricultural Refrigerated Truck Quarterly Datasets

Smaller-scale and niche producers may be more impacted by rises in the cost of gasoline, which is used in both field implements and vehicles used to deliver products to direct market outlets like farmers markets. Producers of all sizes are impacted by increased prices for automobile and machinery oils and lubricants.

Vegetable producers may also incur fuel costs for heating greenhouses and other protected structures. Common fuels used to heat small greenhouses growing transplants in Kentucky are natural gas, electricity, and wood. Natural gas prices, which were impacted by weather events and geopolitics in 2021-22, have at times increased at rates greater than diesel price increases.

Fertilizer

Natural gas is the major feedstock for synthetic nitrogen fertilizers (CARD 2022). The U.S. industrial price for natural gas increased about 50 percent from April 2021 to March 2022, and prices again increased 50 percent from March to September 2022 (EIA 2023). For 2022, this meant farmer prices paid for nitrogen fertilizer were twice or more than prices paid in 2020. Natural gas prices then decreased by half between December 2022 and April 2023. Synthetic nitrogen fertilizer prices decreased slightly in 2023 but 2023 prices were still nearer 2022 levels than 2021 levels (Table 1).

Table 1. Kentucky corn fertilizer cost assumptions, dollars per unit

	N (Anhydrous)	Phosphorous (P2O5)	Potassium (K20)
2020	0.40	0.30	0.30
2021	0.50	0.47	0.35
2022	0.85	0.55	0.65
2023	0.70	0.65	0.50

Source: UK Department of Agricultural Economics Extension corn production budgets, archived at Ag Risk + Farm Managements Library, agrisk.umn.edu

Urea, which is 46 percent nitrogen, is a common synthetic nitrogen source. In past years, the price per unit of nitrogen from anhydrous ammonia would typically be less than the price per unit of nitrogen from urea. However, the University of Illinois reported in June 2023, “anhydrous ammonia and urea have the same cost per pound of nitrogen on June 1, 2023, an unusual event” (Schnitkey).

Most phosphorous and potassium fertilizers are sourced from mining. Canada is a main producer of potash. U.S. prices paid for potassium fertilizers decreased somewhat in 2023, although still significantly greater than 2021 prices (Jasinski 2023). Prices paid for phosphorous fertilizers,

relatively more important for some fruit and vegetable production than for many row crops, continued to increase in 2023.

Fruit and vegetable producers in Kentucky commonly seek fertilizers that meet certified organic requirements or fulfill other production guidelines or preferences. Commercially produced fertilizers that meet certified organic production requirements have also increased in price. Higher labor and freight costs have had an outsized impact on prices of some fertilizers listed in the OMRI database. Freight costs and local access remain important cost components for organic fertilizers and soil additives.

Labor

Finding and retaining reliable labor has long been a challenge for Kentucky agricultural producers. Producers continue to experience increasing wage rates, including increases in guest worker wages. Retaining reliable labor continues to be a challenge.

Trends in Kentucky agricultural worker wage rates are reported in Table 2. These show a 15 percent increase from 2020 to 2023 wage rates. The largest recent increase was from 2021 to 2022. Producers will incur additional costs for H-2A labor. Local (resident) field workers, if they can be located, often require higher wages for annual retention. Kentucky H2A wages were \$11.63/hour in 2019, climbing 23% to \$14.26 in 2023. Labor comprises 30-40% for typical produce enterprises, so this is a significant figure. Labor is also a significant portion of post-harvest costs related to packing, grading, and shipping. These costs have increased throughout the supply chain.

Table 2. Kentucky labor assumptions

	KY Adverse Effect Wage Rate (H-2A)
2020	12.40
2021	12.96
2022	13.89
2023	14.26

Source: USDA, *Federal Register*

Plant protection products

Plant protection expenses vary across different crops and by season. However, prices reported by major suppliers for Kentucky growers in the 2022 and 2023 seasons showed relative stability across synthetic products. Price ranges for selected major products are reported here.

Product	Range (Fall 2022 – Summer 2023)	Unit	Comments (> 10% increase/decrease)
Insecticides			
Acramite 50 WS	\$4.04 - \$4.28	oz	
AdmirePro (Generic-Montana)	\$0.94 - \$1.08	oz	
Assail	\$3.01 - \$3.20	oz	
Belay 2.13	\$2.34 - \$2.60	oz	
Brigade 2EC	\$0.84 - \$1.25	oz	Decrease
Coragen	\$6.77 - \$7.19	oz	
Dipel ES	\$15.00 - \$16.00	lb	
Mustang Maxx	\$1.20 - \$1.50	oz	
Permethrin	\$0.46 - \$0.55	oz	
Radiant	\$8.03 - \$8.34	oz	
Sevin XLR	\$18.89 - \$19.50	qt	
Warrior II	\$0.99 (generic) - \$1.33	oz	
Fungicides			
Actigard 50W	\$42.96 - \$47.13	oz	Increase
Botran	\$17.98	lb	
Bravo Weatherstik	\$4.13 - \$4.40	oz	
Champ 2	\$5.75 - \$6.11	pt	
Dithane F45	\$9.74 - \$10.80	qt	Increase
Endura	\$5.48	oz	
Fontelis	\$1.85 - \$1.93	oz	
Inspire Super	\$245	gal	
Kocide	\$7.05 - \$7.28	lb	

Manzate	\$3.81	lb	
Previcur Flex	\$10.11 - \$10.95	pt	
Quadris	\$1.23 - \$1.37	oz	
Ranman	\$7.17 - \$7.48	oz	
Ridomil Gold	\$90.91 - \$97.35	pt	
Tebucrop	\$1.25	oz	
Tilt	\$1.02	oz	
Herbicides			
Command 3ME	\$15.63 - \$16.63	pt	
Dual II Magnum	\$9.50 - \$12.45	pt	Decrease
Goal	\$9.50	pt	
Poast	\$14.13 - \$14.35	pt	
Prowl	\$5.89	pt	
Reglone (Diquat)	\$12.00 - \$12.50	pt	
Roundup (GENERIC)	\$4.50 - \$4.94	pt	
Sandea	\$29.00 - \$31.25	oz	Decrease
Select (GENERIC)	\$75.25	gal	Decrease
Tender (Goaltender)	\$137.50	gal	
Treflan (Triflurex 4E)	\$4.50 - \$5.00	pt	
Tricor	\$14.50 - 15.80	lb	

Inputs for certified organic production may be more difficult to obtain locally, depending on the crop and the region. Generally speaking, product prices for OMRI-approved materials showed less variability in 2022 and 2023 than in previous years. Availability and shipping costs are often more significant factors for obtaining plant protection products for certified organic production.

The table below lists inputs used in certified organic vegetable and fruit production in Kentucky. The breadth of products and the differences in local availability contribute to substantial variation in these prices.

Table 3. Inputs used by Kentucky certified organic growers (Source: OAK)

all stock sweet feed	fish emulsion	ProMix potting soil
azomite granular	kelp meal	raw food scraps
buckwheat grain	laying hen manure (fresh)	Re-Vita fertilizers
cattle manure (fresh)	liquid kelp	soybeans
compost (Charlie's, Creech, Whinny the Poo, and other local sources)	Monte's liquid carbon	sunflower seeds
compost tea	mushroom compost	vermiculite
dry beans	mushroom spawn	Vermont Compost potting mixes
dry peas	NatureSafe fertilizers	woods chips
fescue hay	peat	wood pellets

Seed

Seed costs, as reported by USDA for vegetable farms on a national basis, increased slightly from 2020 to 2022 (Appendix 1). The USDA survey reported no year-on-year increase in seed costs for the first quarter of 2023, as compared to 2022.

Kentucky vegetable producers reported only modest, if any, increases in seed prices for 2023. The vegetable seed cost category is similar to the plant protection category: some increases to be expected over time, but large percentage increases continue to be unusual.

Plant material for perennial crops (asparagus, berries, tree fruit, nuts) has increased more significantly since 2020. This is tied to robust demand and producers passing along higher costs (e.g., labor and fertilizer) to buyers. In some cases, higher freight costs have an outsized impact on the cost of acquiring plant stock for perennial crops.

Summary and 2024 Outlook

Nationally, prices for many crop inputs have increased since 2020 and we see the same for Kentucky growers. International market trends, trade and geopolitics have an outsized impact on the prices that Kentucky farmers pay for fuel. Producers with the storage and/or financial capacity to pre-purchase fuels may be able to guard against some of the risks of price increases. Price uncertainty will likely remain in 2024.

Prices for nitrogen fertilizers were still very high in 2023. Going into fall 2023, “fundamental factors suggest an easing in nitrogen fertilizer prices,” according to the University of Illinois (Schnitkey). However, as the Illinois report acknowledges, this is an easing from very high nitrogen prices. Price relief for synthetic nitrogen sources in 2024 is unlikely to reach back to price levels seen in 2021, let alone 2020.

Global factors in the phosphate industry supply chain portend that 2024 phosphate fertilizer prices could remain at 2023 levels (Jasinski). Potash prices are also likely to remain similar to 2023 prices because of similar supply and demand.

In short: Input prices rose sharply across the board for specialty crop producers through the pandemic both in Kentucky and nationally. Some costs have moderated in 2023, even come down sharply relative to peak costs in 2022. Labor costs remain a challenge and the era of higher fuel, fertilizer, chemical, and seed prices is likely to persist for Kentucky fruit and vegetable growers in 2024, though there is evidence to suggest that the prices will stabilize at their current high price point, rather than see more sharp increases.

Sources

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Location

Appendix 1. Selected U.S. indices of prices paid by farmers, 2020-23

Input	Annual average			QTR 1 (Jan. to Mar.)		Change <i>Percent</i>
	2020	2021	2022	2022	2023f	
Seeds and plants	113.1	117.6	117.3	117.3	117.3	0.0
Fertilizer, nitrogen	69.9	90.9	151.6	150.0	123.3	-17.8
Fertilizer, potash/phosphate	68.1	85.1	110.1	111.0	93.3	-15.9
Chemicals, insecticides	93.2	98.7	137.6	110.7	135.6	22.5
Chemicals, herbicides	96.4	105.3	146.8	118.1	144.7	22.5
Chemicals, fungicides/other	94.7	97.8	136.4	109.8	134.5	22.5
Fuels, diesel	52.5	73.3	112.9	96.9	99.7	3.0
Fuels, gasoline	59.6	78.5	104.4	97.1	89.9	-7.4
Farm machinery	124.8	145.6	171.4	163.7	176.3	7.7
Farm supplies	117.4	127.5	142.1	137.5	145.0	5.4
Custom services	119.6	114.7	126.0	126.0	126.0	0.0
Building materials	120.8	140.5	163.6	160.1	164.7	2.9
Cash rent	124.5	124.5	126.1	126.1	129.0	2.3
Interest	110.9	111.4	112.9	128.6	142.7	11.0
Taxes	126.8	130.0	134.9	138.1	143.8	4.1
Wage rates	138.2	146.1	156.9	157.6	158.4	0.5
Crop sector	111.1	119.0	134.5	132.0	137.0	3.8
Vegetable sector	113.1	121.3	138.8	135.5	137.0	1.1

f forecast

Source: USDA, Economic Research Service, Vegetables and Pulses Outlook: April 2023, VGS-370, April 27,2023

Appendix 2. Quarterly agricultural refrigerated truck cost

		QTR 1	QTR 2	QTR 3	QTR 4	ANNUAL (average of all quarters)
2020	Local	2.73	2.57	2.95	3.26	\$ 2.88
2020	Long	1.6	1.55	1.44	1.66	\$ 1.56
2020	Medium	2.36	2.27	2.53	2.85	\$ 2.50
2020	Short	2.56	2.51	2.56	2.92	\$ 2.64
2021	Local	2.7	3.13	3.32	7.01	\$ 4.04
2021	Long	1.76	1.92	1.8	1.9	\$ 1.85
2021	Medium	2.57	2.97	3.03	3.34	\$ 2.98
2021	Short	2.9	3.7	3.21	3.48	\$ 3.32
2022	Local	6.86	8.09	8.4	6.81	\$ 7.54
2022	Long	1.96	1.64	1.5	1.39	\$ 1.62
2022	Medium	3.19	2.87	2.86	2.81	\$ 2.93
2022	Short	3.61	3.65	3.23	3.03	\$ 3.38

Local	500 miles or less
Short	501 to 1,500 miles
Medium	1,501 and 2,500 miles
Long	Greater than 2,500 miles

Source:
USDA/AMS