



Non-GMO Food-grade Soybeans Quantification Study

Final Report September 2024



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Executive Highlights

Background

The primary purpose of this study is to provide USSEC with updated information about non-GMO food-grade soybean production in the U.S., their end-use, and trends in non-GMO planting. Information in this report is based on online surveys with 142 non-GMO soybean growers, 15 processors/purchasers/traders of U.S.-produced non-GMO food-grade soybeans, and phone interviews with three State Soybean Associations (Indiana, North Dakota, and Michigan). Data was collected between July 2024 and August 2024. Additional input is provided by secondary sources including the United States Department of Agriculture (USDA) and its various agencies.

Current Non-GMO Soybean Production

As shown in the table below, 87.1 million total soybean acres were planted in the U.S. in 2024, of which 4%, or 3.5 million acres, are non-GMO soybeans. Of the 3.5 million non-GMO acres, 92% or 3.2 million were sold for a premium. Despite that planted soybean acres are up 4% in 2024 from 83.6 million in 2023, non-GMO soybean acres are down 16% in 2024 compared to 2023.

Of the 3.2 million non-GMO soybeans that are sold at a premium, 64% or 2.2 million are IP non-GMO food-grade soybeans. About 79% of the non-GMO food-grade soybeans or 1.8 million acres will be produced under contract in 2024. IP non-GMO feed-grade acres account for 1.2 million non-GMO soybean acres that are marketed at a premium in 2024. Of these, roughly 1.0 million are contracted.

2024 U.S. Soybeans Acres	
Total Soybean Acres	87,100,000
Any Non-GMO Soybeans Acres	3,484,000
Non-GMO soybeans sold at a premium	3,201,965
Non-GMO Food-grade Soybean Acres Sold at a Premium	2,246,808
Contracted Non-GMO Food-grade Soybean Acres	1,779,472
Any Non-GMO Feed-grade sold for premium	1,237,192
Contracted Non-GMO Feed-grade Soybean Acres	853,850

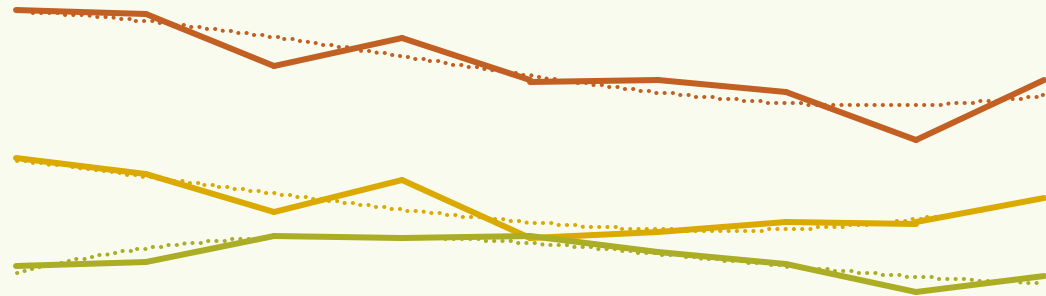


Executive Highlights Continued

Non-GMO Soybean Production Trends

- The decline in non-GMO acres in 2024 is mostly accounted for by fewer non-GMO feed-grade soybean acres, which account for roughly one-third of non-GMO planted acres (36%) in 2024. Non-GMO feed-grade acres decreased by 25% from 1.6 million acres in 2023 to 1.2 million acres in 2024. During the same time, non-GMO food-grade acres remained stable at 2.2 million acres.
- Purchasers estimate they will meet about 95% of the demand for food-grade soybeans in 2024, but express that it will not be an easy task (67%) given the supply and current market conditions, including competition from other countries.

No-GMO Acres (Millions)



	2017	2018	2019	2020	2021	2022	2023	2024	2025
All Non-GMO soybean Acres	5.4	5.4	4.6	5.0	4.4	4.4	4.2	3.5	4.4
Non-GMO Food-grade Acres	3.2	3.0	2.4	2.9	2.0	2.1	2.2	2.2	2.6
Non-GMO Feed-grade Acres	1.6	1.7	2.1	2.0	2.1	1.8	1.6	1.2	1.5

Non-GMO Food-grade Soybean Markets

- While the U.S. is expected to export more soybeans overall in 2024, non-GMO food-grade soybeans will account for about 17% fewer exported soybeans in 2024 than in 2023. In 2023, food-grade soybeans accounted for about 1.6% of exported soybeans. In 2024, this figure is down to 1.3% of exported soybeans.

All U.S. Soybean Production (millions) ¹	2023	2024
Metric Tons of All Soybeans Produced in U.S.	116.38	112.84
Metric Tons of All U.S. Produced Soybeans Exported	46.27	50.35
Metric Tons of Non-GMO Food-grade U.S. Produced Soybeans Exported	0.76	0.63

- Most U.S. non-GMO food-grade soybeans are destined for Japan, which is expected to import 400 thousand metric tons of non-GMO food-grade soybeans in 2024 based on information from this study. This figure is down from .44 thousand metric tons in 2023, a decline of about 8%. In 2024, a weakened Yen made U.S. food-grade soybeans less competitive in the global market and incentivized greater international domestic production. According to the April 2024 Oilseeds And Products Annual Report, *“as the price of food-grade soybeans has elevated, Japanese wholesalers and food processors increased stocks of food-grade soybeans around the beginning of MY 2023/24. Due to the weak Japanese yen against other major currencies, the price competitiveness of North American food-grade soybeans has heavily weakened against domestic food-grade soybeans. Thus, North American food-grade IP soybeans will face challenging market conditions in near future.”*
- The single largest percentage of U.S.-produced non-GMO food-grade soybeans are destined for the tofu market (39%). Another 28% will be used for soymilk. Natto accounts for 13% and miso accounts for 9%. This hierarchy is similar to that reported in 2023 and prior years.

Incentives and Challenges to Non-GMO Production

- **Weed control** remains the biggest challenge and risk for growers who wish to increase IP non-GMO food-grade production. One grower states, *more weeds, hard to keep them under control if you don't get early rains after planting to wash in preemergent spraying*. Growers are also concerned about herbicide resistance and lack of weed control options. For 42% of growers, production practices differ between GMO and non-GMO soybean acres, with additional chemical applications being the primary difference. Growers estimate they pay about \$9 more per acre to produce non-GMO soybeans. Concern about herbicide resistance and increasing production costs has led some growers to resort to changing tillage practices, as one grower states in response to mitigating risks, *A different mindset. Reverting practices back to the 1980's with tillage*.
- Perceptions of a **yield gap** between GMO and non-GMO soybeans remain a challenge. Among the 44% of growers who perceive a difference in yields, 73% report they get more bushels/acre from GMO soybeans than non-GMO soybeans. In 2024, growers estimate getting between two and five bushels less from their non-GMO soybeans.



Executive Highlights Continued

Incentives and Challenges to Non-GMO Production Continued

- **Contamination** is the third most mentioned risk associated with non-GMO production. There is no one practice that growers employ to reduce the risk of contamination. Rather it is a combination of planting practices and careful management as one grower states how he mitigates the risk of contamination, *Planting in 30-in rows, no till, planter, truck, and combine Sanitation.*

Future Non-GMO Food-grade Soybean Production

- The current market supports slow production growth for non-GMO soybeans. However, it is still early in the decision-making process. Most growers will decide on their non-GMO production for the 2025/26 season starting in September 2024 but will reevaluate up until March 2025. This is also true for purchasers. Some of those unfavorable conditions abroad could ease over the next year, as one purchaser notes, *The exchange rates and interest costs have us in a scary market situation.*



Background & Methodology

Non-GMO Food-grade Soybeans Quantification Study
September 2024



Secondary Data

Both primary data from growers, purchasers, and QSSBs and secondary information are used as input to quantify the number of food-grade soybean acres and contracted food-grade soybean acres in the U.S. from 2023 to 2025.


Secondary data sources were compiled from the *USDA National Agricultural Statistics Service (USDA NASS)* reports, including the most recent *Crop Production Reports, Economic Research Services (ERS), World Agricultural Supply and Demand Estimates (WASDE)* data, and *Foreign Agricultural Service*. The following secondary information is assumed to be accurate and is used in this study as known quantities.


	2023	2024
Total U.S. Soybean acres planted (millions) ¹	83.6	87.1
Total U.S. Soybean Bushels (millions)	4,165	4,589
U.S. Non-GM Soybean acres (millions) ¹	4.18	3.84
% of U.S. Non-GM Soybeans marketed without premium ²	7.0%	8.0%
U.S. Non-GM Soybeans marketed without premium	286,117	282,035
U.S. Non-GM Soybeans marketed for premium (millions)	3.89	3.20
Average GM soybean yield (bushels/acre) ¹	50.6	53.2
Estimated metric tons of U.S. soybeans exported (millions) ³	49.67	50.35
Estimated bushels of U.S. soybeans exported (millions) ³	1,700	1,850


¹Source: USDA/NASS, September 2024.


² Estimated from current study. Source: How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? Non-GMO sold as commodity beans (include any non-GMO food-grade or non-GMO feed-grade soybeans for which you did/will not receive a premium).


³ USDA/World Agricultural Supply and Demand Estimates (WASDE) September 2024.


-  Users of this information should note that if secondary estimates are revised from the original sources/figures, results in this report will not reflect such changes. Estimates in this report are based on secondary information available as of September 2024.

-  The margin of error varies based on sample groups and response proportions. The following margins of error are based on equal response proportions (e.g., 50% yes and 50% no). A sample size of 100 producers of non-GMO soybeans has a margin of error of +/- 8.2 percentage points at a 95% level of confidence and +/- 6.9 percentage points at a 90% level of confidence. Among food-grade producers only, a sample size of 86 yields a margin of error of 10.6 percentage points at a 95% level of confidence and 8.8 percentage points at a 90% level of confidence. To gain more confidence in the results, efforts have been made to verify estimates using more than one method.

-  A couple of large non-GMO soybean producers are included in the analysis when reporting percentages, but not raw acres due to the potential to falsely inflate actual acres, especially central tendency measures that include means and medians.

-  A sample size of 15 purchasers of food-grade soybeans has a margin of error of +/- 27.6 percentage points at a 95% level of confidence and 23.7 percentage points at a 90% level of confidence. Given the small sample size of purchasers and the wide margin of error, information from this key stakeholder group will be considered directional only.

-  The sample list of purchasers includes purchasers who contract for or cash purchase food-grade soybeans. Excluded from this sample are purchasers who contract for non-GMO soybeans to the exclusion of food-grade soybeans.

-  QSSBs and industry expert interviews provide qualitative insights into how these groups view the non-GMO market. Their opinions may or may not reflect actual market trends.



Results From Non-GMO Growers

**Non-GMO Food-grade Soybeans Quantification Study
September 2024**



Non-GMO Growers Sampled by State

- Growers participating in this study are concentrated primarily in Illinois, Ohio, Indiana, and Iowa. In aggregate, these states represent 50% of the sampled growers. No geographical quotas were imposed on the final sample. Approximately 61% of non-GMO growers sampled for this study produce non-GMO food-grade soybeans that are identity-preserved (IP) and 49% of non-GMO growers produce non-GMO feed-grade soybeans. Note, that growers had to plant either IP food-grade or IP feed-grade soybeans to participate in this study.

2024 Sampled Growers

	Growers Who Produce Non-GMO Soybeans in 2024		Non-GMO Growers Who Produce Food-grade Soybeans in 2024		Non-GMO Growers Who Produce Feed-grade Soybeans in 2024	
	Count	Percent	Count	Percent	Count	Percent
Illinois	25	18%	14	56%	13	52%
Ohio	16	11%	13	81%	6	38%
Indiana	15	11%	9	60%	6	40%
Iowa	14	10%	7	50%	7	50%
Minnesota	8	6%	4	50%	4	50%
Michigan	8	6%	6	75%	3	38%
Nebraska	6	4%	4	67%	3	50%
North Dakota	6	4%	6	100%	0	0%
Wisconsin	4	3%	3	75%	1	25%
Pennsylvania	4	3%	1	25%	4	100%
Others	20	14%	8	40%	16	80%
Unknown	16	11%	11	69%	7	44%
Total	142	100%	86	61%	70	49%

*Other states include S. Dakota and Arkansas (3 each), Texas and Montana (2 each), Virginia, S. Carolina, Oregon, Oklahoma, Missouri, Kentucky, Kansas, Florida, Colorado, and Alabama (1 each).



Non-GMO Soybean Production

Non-GMO Food-grade Soybeans Quantification Study
September 2024



Types of Soybeans Planted by Non-GMO Growers

- Roughly 60% of non-GMO growers plant GMO soybeans in addition to non-GMO varieties. In the current crop season (2024), more non-GMO growers plant food-grade soybeans (61%) and feed-grade soybeans (49%), compared to the previous crop season, and fewer growers planted GM varieties.
- About 14% of non-GMO growers sold their non-GMO soybeans without receiving a premium (14%).
- Growers' planting intentions in the 2025 crop season are expected to be similar to the current crop season, except for fewer growers who intend to plant non-GMO feed-grade soybeans in 2025 than in 2024.

% of Non-GMO Growers Who Planted Indicated Soybeans

	2023	2024	2025
GMO soybeans	60%	55%	56%
Non-GMO food-grade soybeans	53%	61%	58%
Non-GMO feed-grade soybeans	36%	49%	41%
Non-GMO sold as commodity	13%	14%	8%
Organic soybeans	10%	10%	9%
Commercial soybeans (for seed)	6%	7%	8%
<i>Base growers:</i>	142	142	142

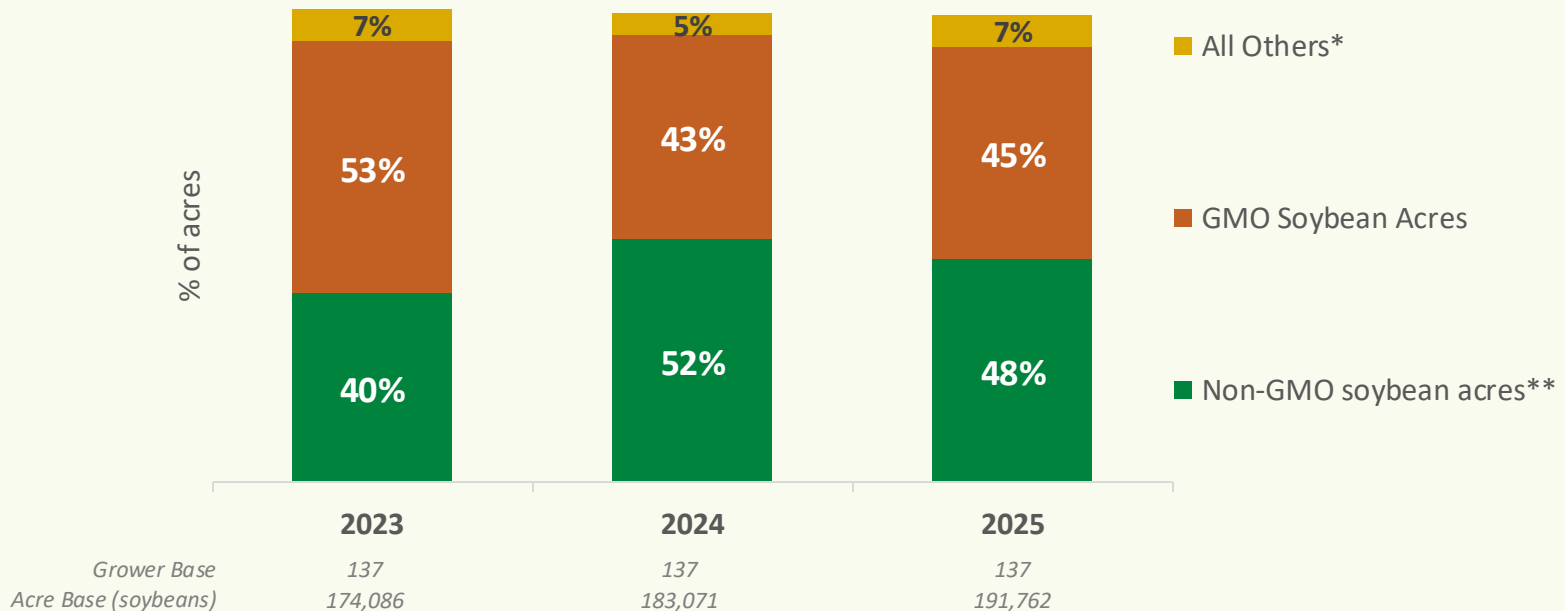
Source (2024 study): Select all the types of soybeans you planted this year, in 2024. Select all the types of soybeans you planted last year, in 2023. Which of the following types of soybeans do you intend to plant next year, in 2025? Multiple answers accepted.



Distribution of Non-GMO Growers' Soybean Acres

- The proportion of soybean acres non-GMO growers planted to non-GMO soybean varieties is up 29% in 2024 from 40% in 2023 to 52% in 2024. Conversely, GMO acres are down among non-GMO producers during the same time.
- In 2025, non-GMO growers expect to plant roughly half of their acres to non-GMO soybeans (48%), still more than in the 2023 crop season, but slightly less than they are currently planting.

% of Non-GMO Growers' Soybean Acres



Source (2024 study): How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? How many of your 2023 soybean acres did you plant to the following types of soybeans? How many acres of the soybeans you intend to plant next year, in 2025 will be planted to the following types of soybeans?

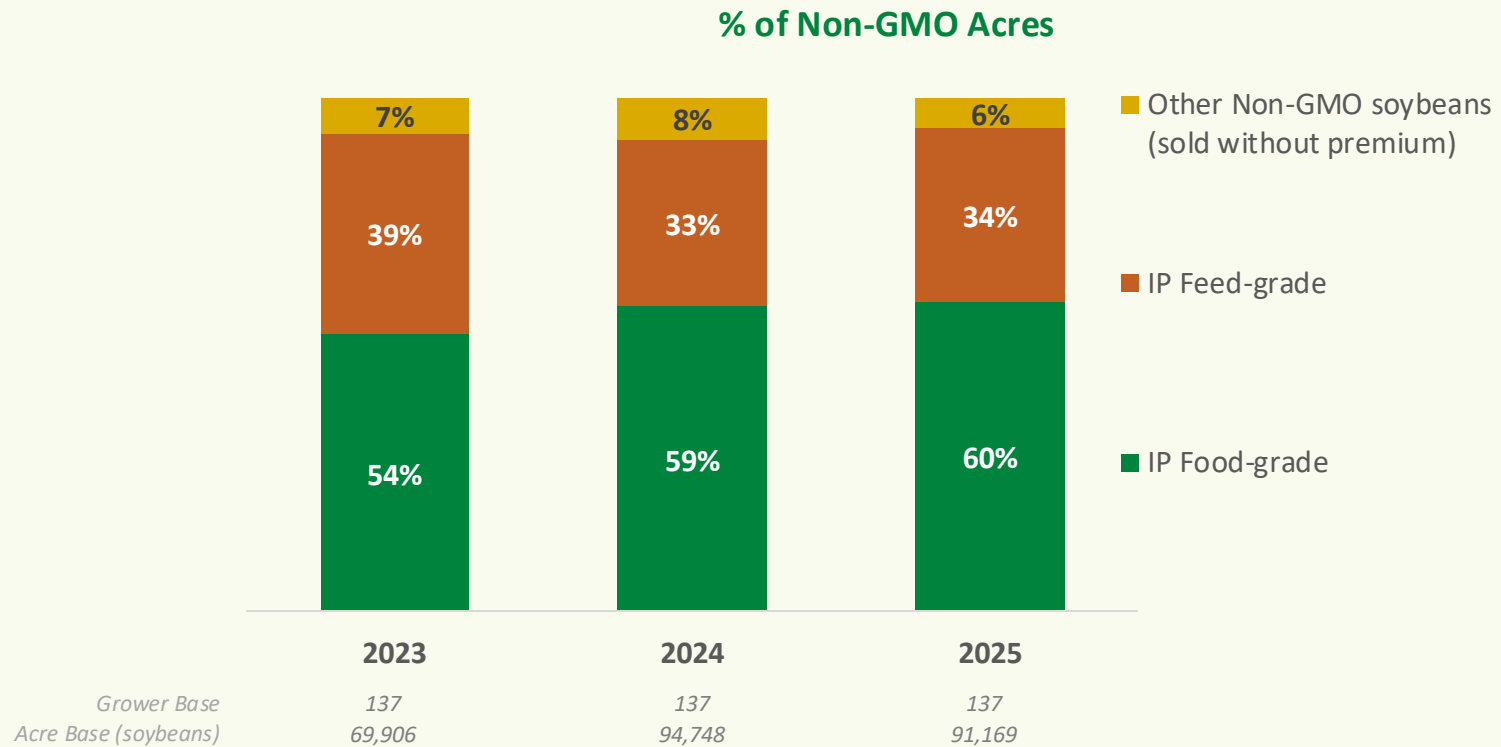
*All other soybeans include commercial soybeans for seed, organic, etc.

**Includes any food-grade, feed-grade and all other non-GMO acres, excluding organic.



Percent of Non-GMO Soybean Acres That Are Indicated Types

- IP feed-grade soybean acres decreased by 17% from 39% of non-GMO soybean acres in 2023 to 33% in 2024.
- IP food-grade soybeans as a percentage of all non-GMO soybeans increased by 10% from 2023 (54% of non-GMO acres) to 2024 (59% of non-GMO acres) and is expected to remain stable in 2025.

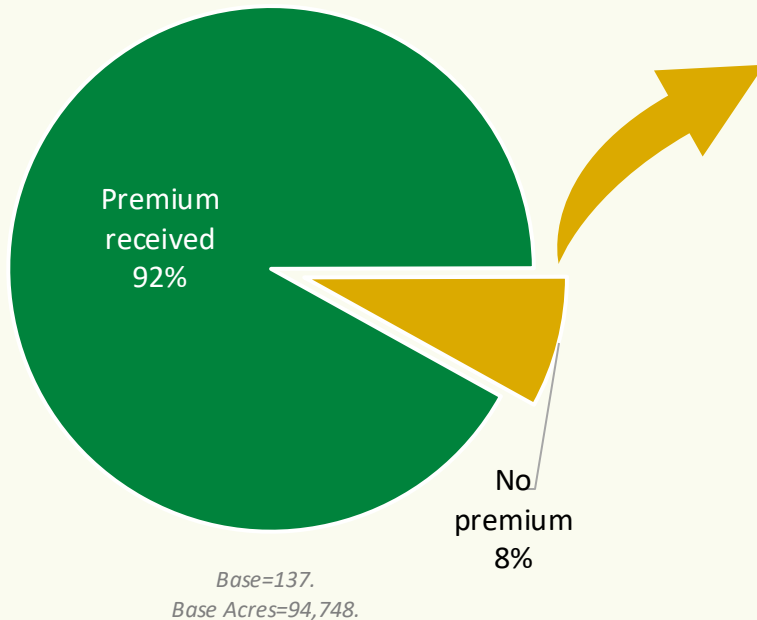


Source (2024 study): How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? How many of your 2023 soybean acres did you plant to the following types of soybeans? How many acres of the soybeans you intend to plant next year, in 2025 will be planted to the following types of soybeans?

Non-GMO Soybeans Sold Without A Premium

- About 14% of non-GMO growers do not expect a premium for their non-GMO soybeans in 2024. Among them, most all planted non-GMO soybean varieties for rotational purposes (65% in 2024) to reduce input costs (65% in 2024), or to minimize herbicide resistance (45% in 2024).
- Roughly 20% of non-GMO growers who do not expect to receive a premium reported producing over the contracted amount of non-GMO soybeans.

% of Non-GMO Soybeans Sold Without a Premium in 2024



Purpose of Selling Non-GMO Soybeans without a Premium*

Purpose	2023	2024
Reduce input costs	72%	65%
Reduce seed cost	50%	55%
Reduce inputs	39%	35%
Tech/licensing fee	11%	10%
Rotation	78%	65%
Minimize herbicide resistance	56%	45%
Produced over the contracted amount	22%	20%
No available local markets, couldn't sell them	22%	15%
Did not meet IP standards	6%	5%
	Base 18	20

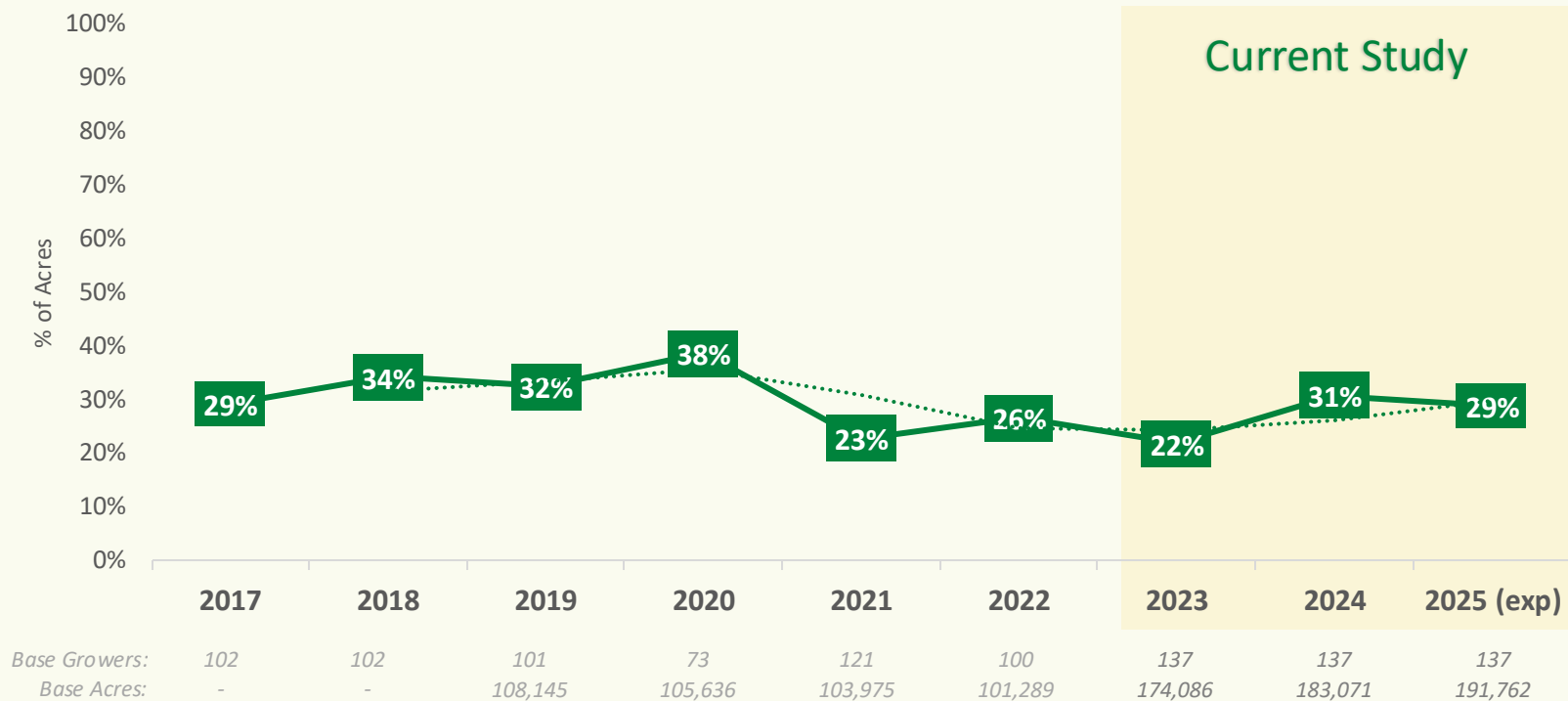
Source (2024 study): How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? What purpose do the non-GMO soybeans that are sold as commodity beans serve?

* Caution due to small bases.



Historical Trends in the Percent of Soybean Acres Planted to IP Non-GMO Food-grade

- Non-GMO growers increased food-grade soybean production from 22% of their soybeans in 2023 to 31% in 2024, indicating they perceive the 2024 soybean market to be more favorable for food-grade soybeans since 2021.
- Non-GMO growers expect to plant roughly 7% fewer soybean acres to food-grade soybeans in 2025 as they did in 2024.

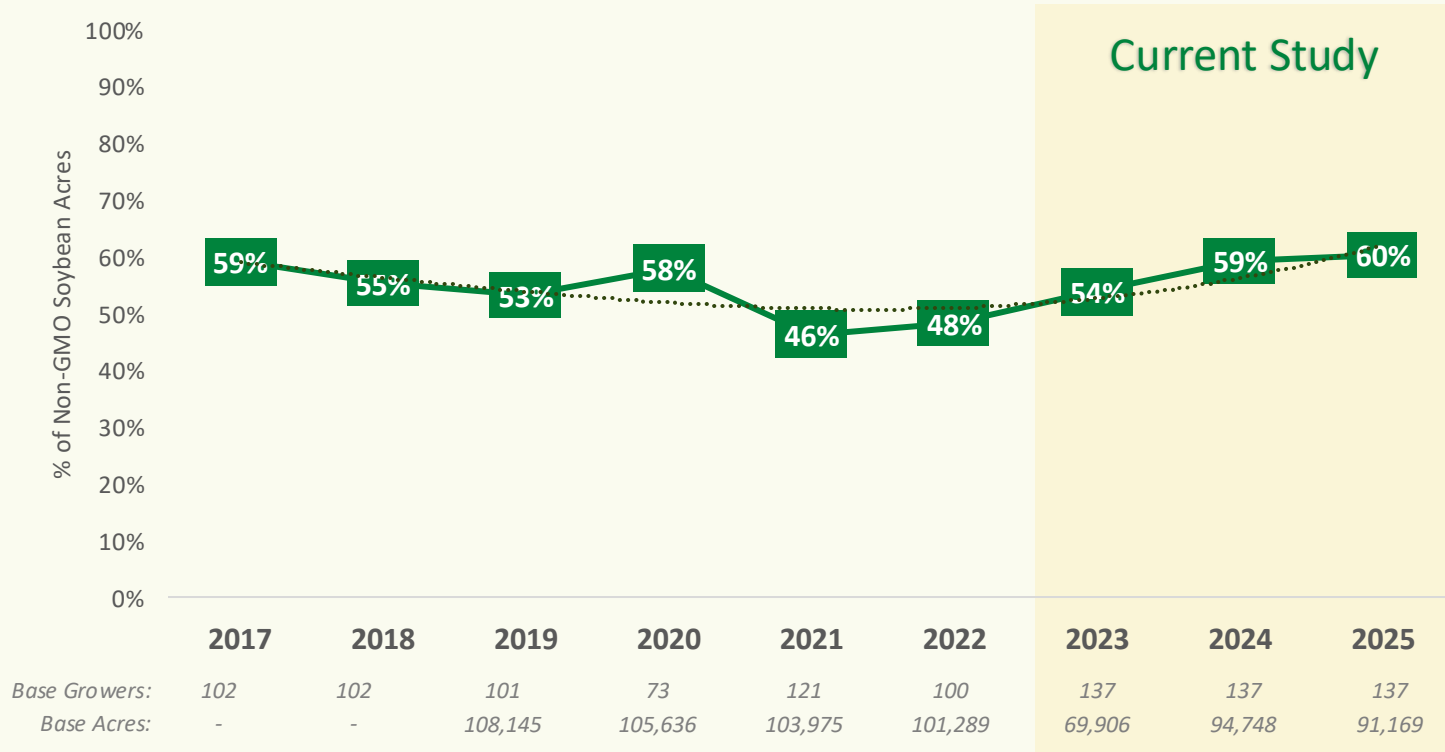


Source (2024 study): How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? How many of your 2023 soybean acres did you plant to the following types of soybeans? How many acres of the soybeans you intend to plant next year, in 2025 will be planted to the following types of soybeans?



Historical Trends in the Percent of Non-GMO Soybean Acres Accounted for by IP Food-grade Soybeans

- Food-grade soybeans as a portion of all non-GMO soybeans have been trending up since 2021. Between 2022 and 2023, non-GMO growers planted more of their non-GMO acres to food-grade soybeans than since 2020. Over the next year, non-GMO growers anticipate planting a slightly higher percentage of their non-GMO soybean acres to food-grade soybeans.

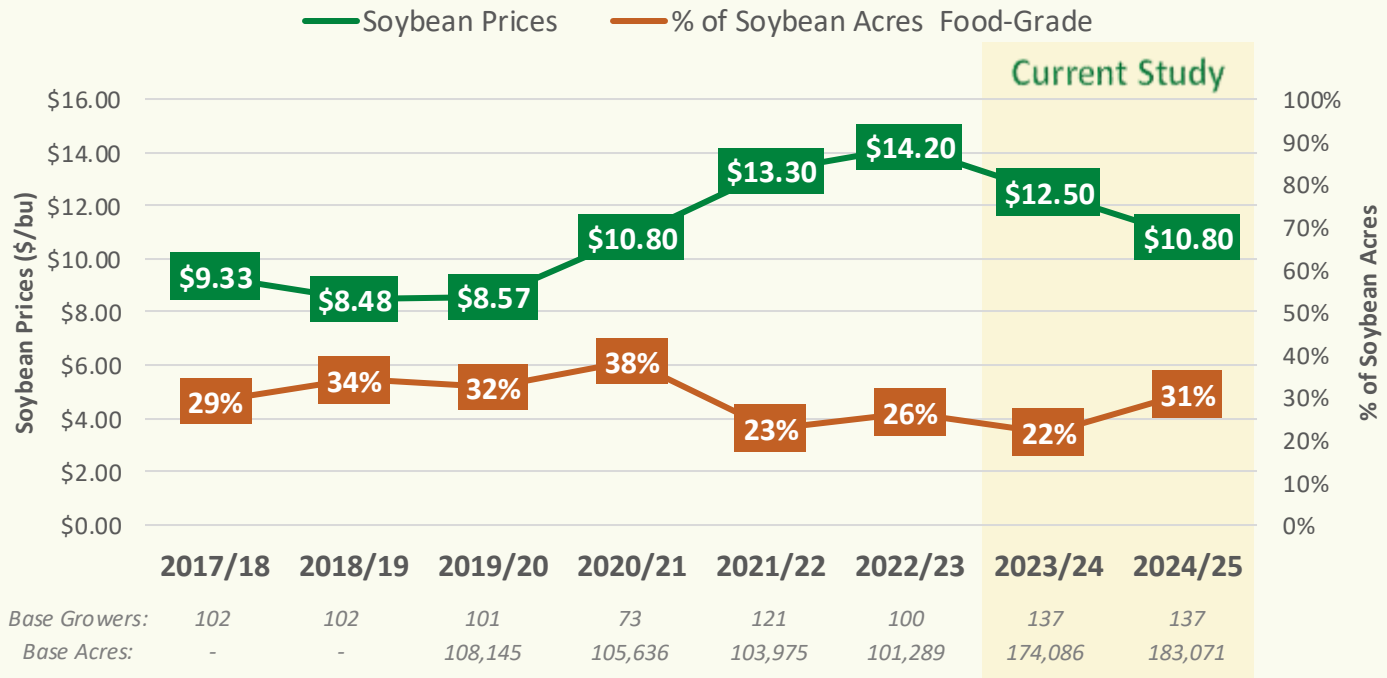


Source (2024 study): How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? How many of your 2023 soybean acres did you plant to the following types of soybeans? How many acres of the soybeans you intend to plant next year, in 2025 will be planted to the following types of soybeans?



Historical Trends in the Percent of Soybean Acres that are IP Non-GMO Food-grade and CBOT Soybean Prices

- There is a negative correlation between soybean prices and non-GMO food-grade soybean production. As commodity soybean prices increase, non-GMO food-grade soybean production decreases, and vice versa. Over the past two years, since the 2022/23 crop season, soybean prices declined by an average of 6% from \$14.20 in 2022/23 to \$10.80 in the current year (2024/25). During the same period, non-GMO food-grade production increased by 13%.
- Results suggest that changes in non-GMO food-grade production lag behind changes in soybean prices. From 2019/20 to the 2020/21 crop season, soybean prices rose and non-GMO food-grade production increased during the same time. However, as soybean prices continued to rise, non-GMO food-grade production began to fall. A similar trend occurs between the 2021/22 and 2022/23 crop seasons.



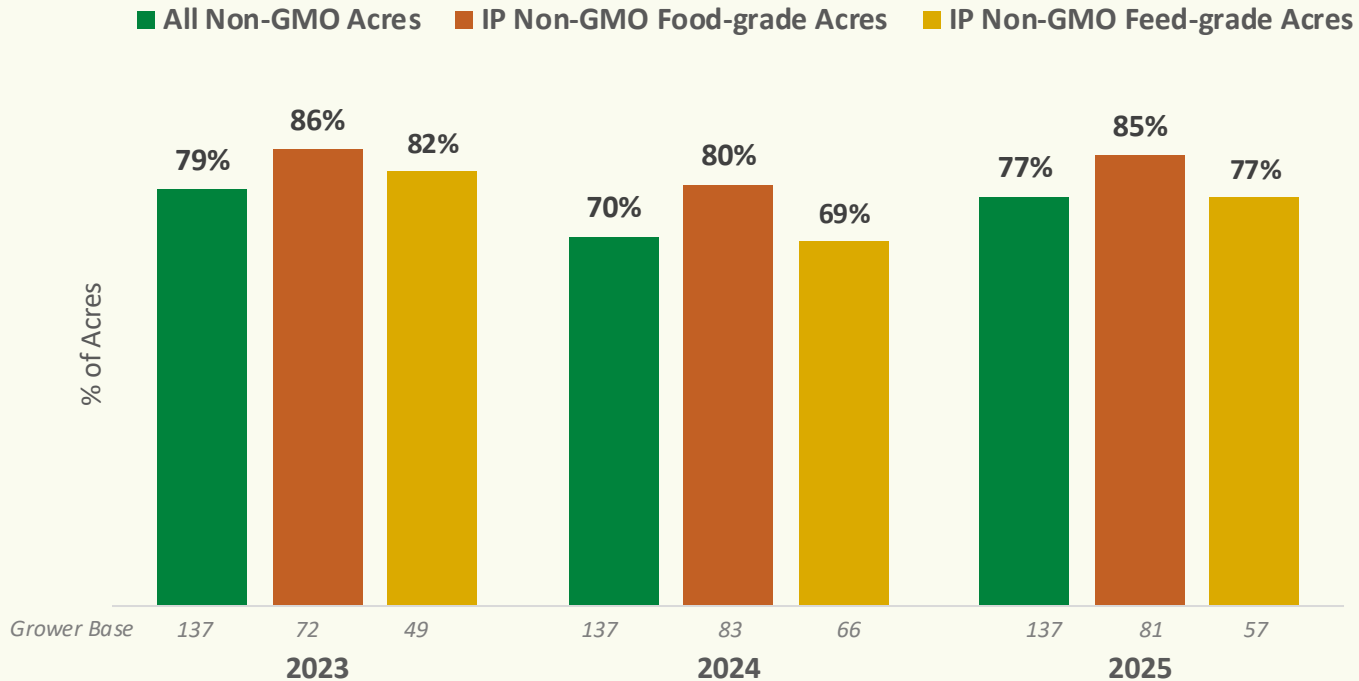
Source (2024 study): How many of your soybean acres this year, in 2024 were planted to the following types of soybeans? How many of your 2023 soybean acres did you plant to the following types of soybeans? How many acres of the soybeans you intend to plant next year, in 2025 will be planted to the following types of soybeans?

Source Soybean Prices: Source: USDA, Economic Research Service using USDA, National Agricultural Statistics Service, Agricultural Prices, August 2024.



Percent of Non-GMO Soybean Acres Produced Under Contract

- Non-GMO growers report about 79% of their non-GMO acres are contracted. The portion of non-GMO soybean acres contracted dropped from 79% in 2023 to 70% in 2024. The portion of both food-grade and feed-grade that is contracted dropped in 2024 compared to last season. Results suggest that growers anticipate contracting a higher proportion of their non-GMO acres in 2025 than in 2024.

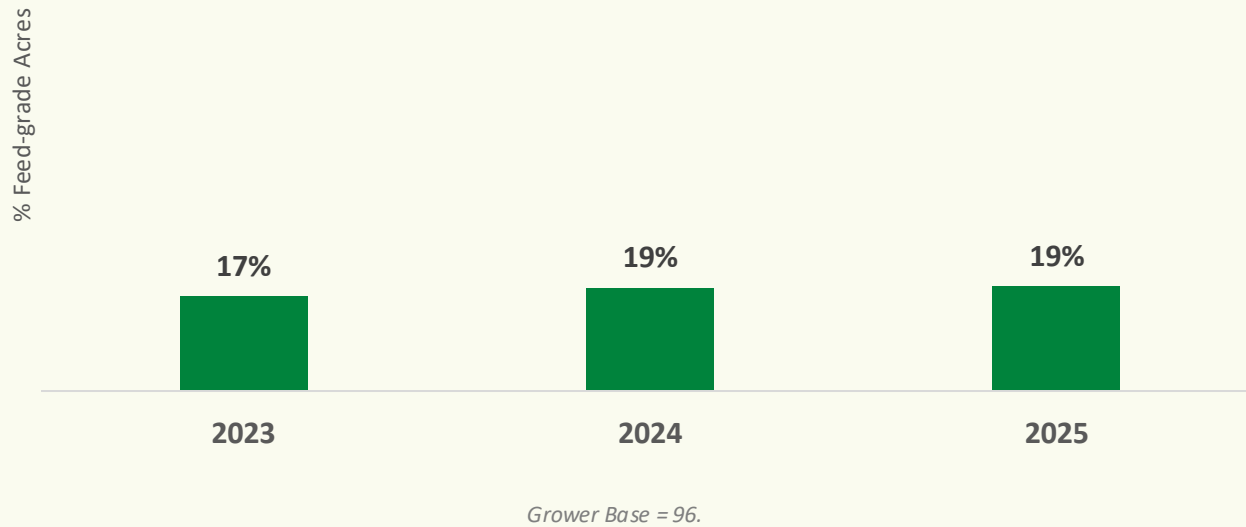


Source (2024 study): Of your total non-GMO soybeans that are sold at a premium, what percent (%) are produced under contract in 2024? Of your total non-GMO soybeans that are sold at a premium, what percent (%) are produced under contract in 2023? Of your total non-GMO soybeans that will be sold at a premium, what percent (%) will produced under contract in 2025?



Percent of Non-GMO Feed-grade Soybean Acres Used on Farm

- Non-GMO growers use about one-fifth of their non-GMO feed-grade soybeans on their farms.



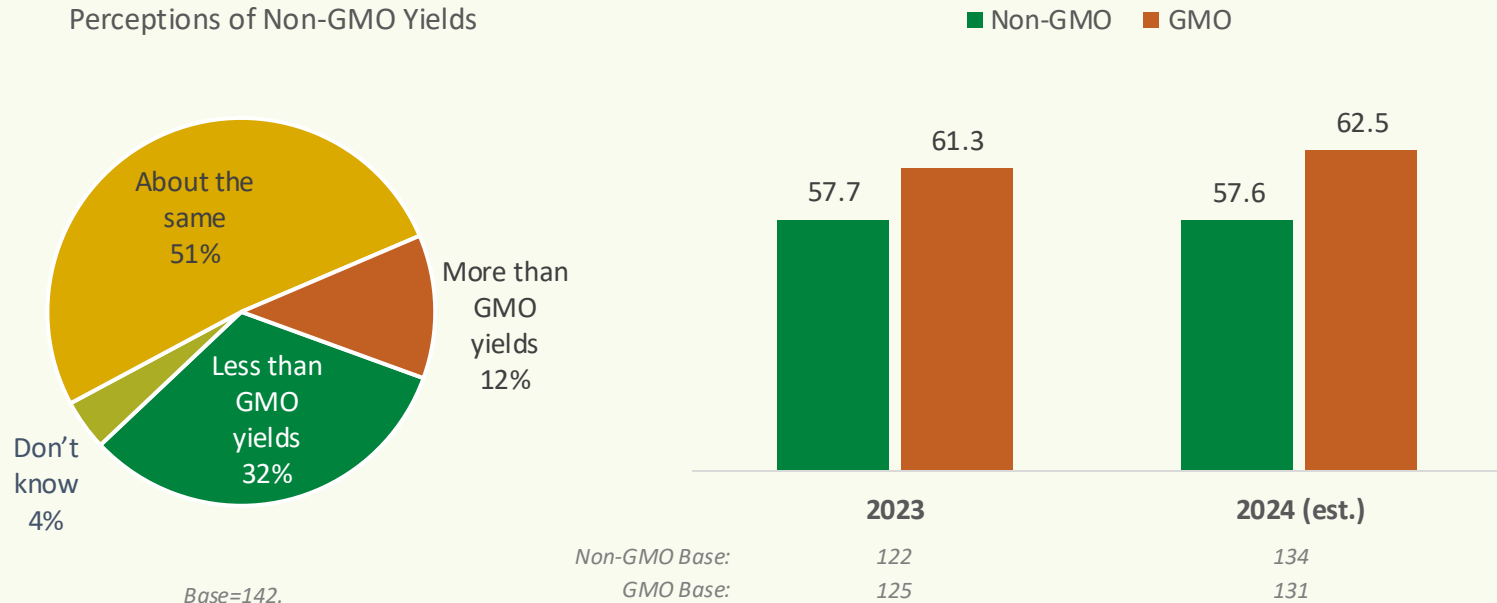
Source: What percent of your non-GMO feed-grade soybeans will be/were used on your farm?



Non-GMO Soybean Yields (Average Bushels/Acre)

- Results from this study suggest there is a perception among growers that GMO soybeans are better yielding than non-GMO soybeans. About half of non-GMO growers perceive yield from non-GMO and GMO soybeans to be the same (51%). However, among the 44% of growers who perceive a difference in yields, 73% report they get more bushels/acre from GMO soybeans than non-GMO soybeans.
- Growers perceive they get about 8.6 fewer bushels per acre from their non-GMO soybeans when asked how many bushels less they get from their non-GMO soybeans. The calculated net loss suggests growers get about two bushels less from non-GMO soybeans.¹ However, when queried about specific yield counts, growers report getting between four and five bushels less per acre from non-GMO soybeans in both 2023 and 2024, on average.

Perceptions of Non-GMO Yields



¹ Calculated based on 0 gain if "same" response, positive values if "more" response, negative values if "less" response.

Source (2024 study): How many total bushels per acre would you estimate you get from the following types of soybeans? [If more or less] How many [more/fewer bushels do you get from your non-GMO soybeans]

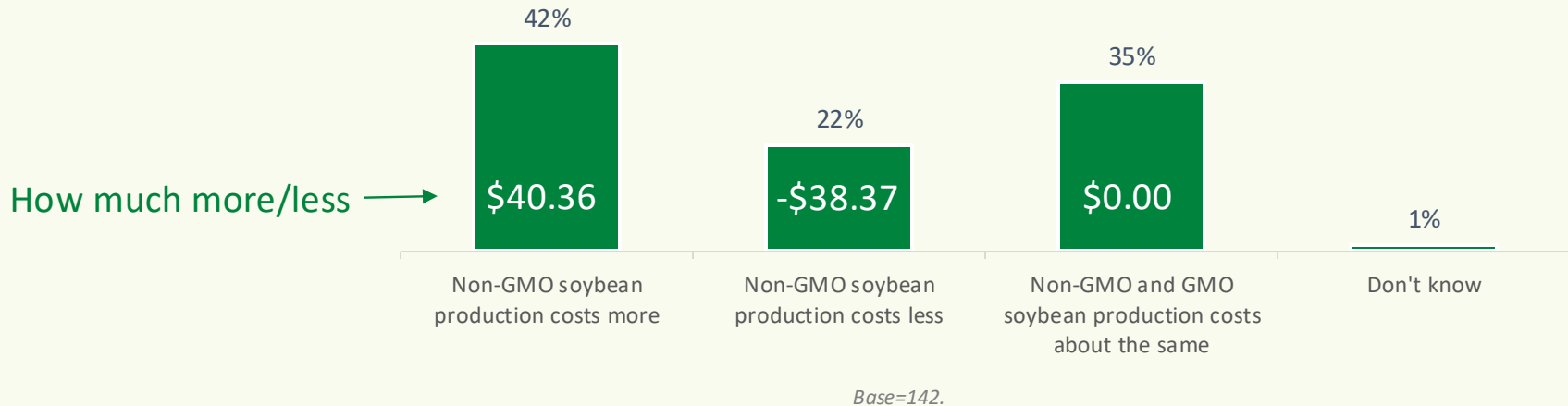
Excludes "0's". Maximum GMO=170, non-GMO=150.



Perceived Costs to Produce Non-GMO Soybeans

- Few non-GMO growers believe non-GMO soybeans cost less to produce than GMO soybeans (22%). On average, non-GMO producers estimate paying roughly \$40/acre more or \$38/acre less for non-GMO soybean production. Overall growers report paying a net \$8.80 per acre more for non-GMO soybean production.¹

Growers report paying a net of \$8.80/acre more for non-GMO soybean production.



¹ Average calculated based on 0's included for "same" response, negative values for "less" response, and positive values for "more" response.

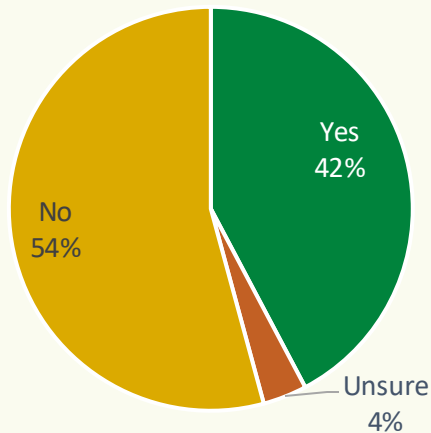
Source (2024 study): Is the cost to produce non-GMO soybeans more, less, or about the same as the cost to produce GMO soybeans? How much more/less per acre would you estimate it costs to produce non-GMO soybeans?



Differences in Production Practices between Non-GMO and GMO Soybeans

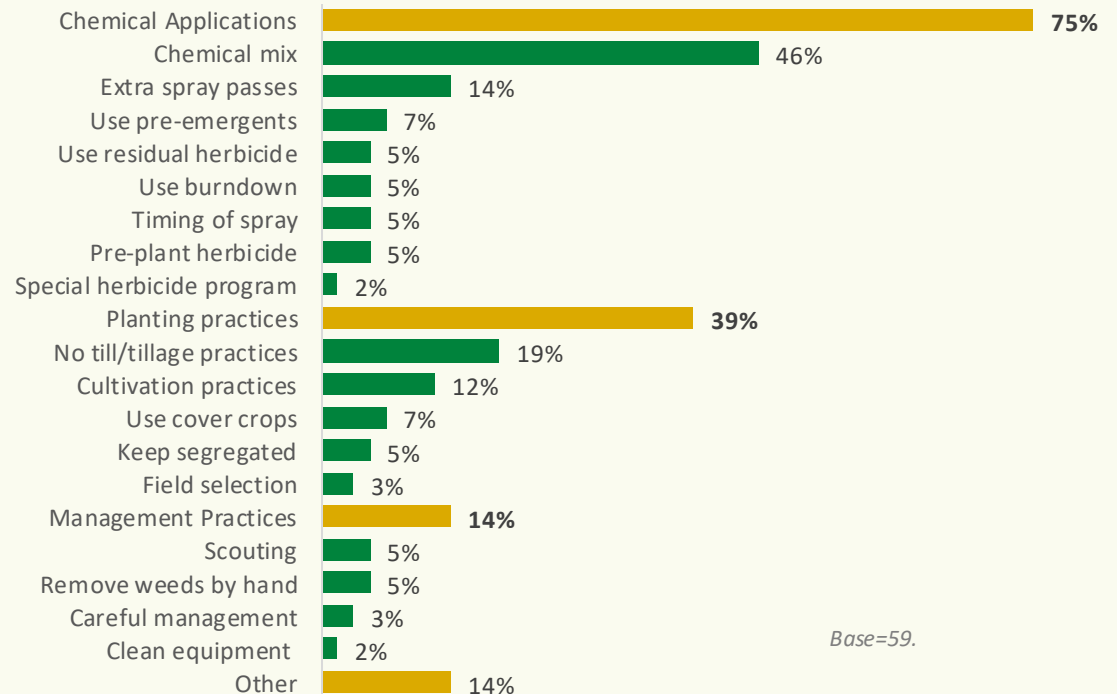
- Nearly half of growers report they engage in different production practices with non-GMO soybeans compared to GMO soybeans (42%). The biggest difference is in the chemical applications (75%). Most growers use a different chemistries for non-GMO soybeans (46%), including incorporating pre-emergent, burndown, residual, and pre-plant herbicides into their chemical program. One grower states that *herbicide programs are different. Use more pre-emergent herbicides in non-GMO. A lot more careful about limiting GM exposure of my crops so I plant non-GMO corn as well.* Planting practices between non-GMO and GMO soybeans differ for 39% of non-GMO growers, with tillage and cultivation being the primary differences as one grower notes, *do more tillage for the non-GMO, no-till some of the GM.*

Engage in Different Production Practices for Non-GMO Soybeans



Base=142.

Different Production Practices for Non-GMO Soybeans



Base=59.

Source: Do you engage in different production practices with GM versus non-GM soybeans? What do you do differently with non-GMO soybeans?



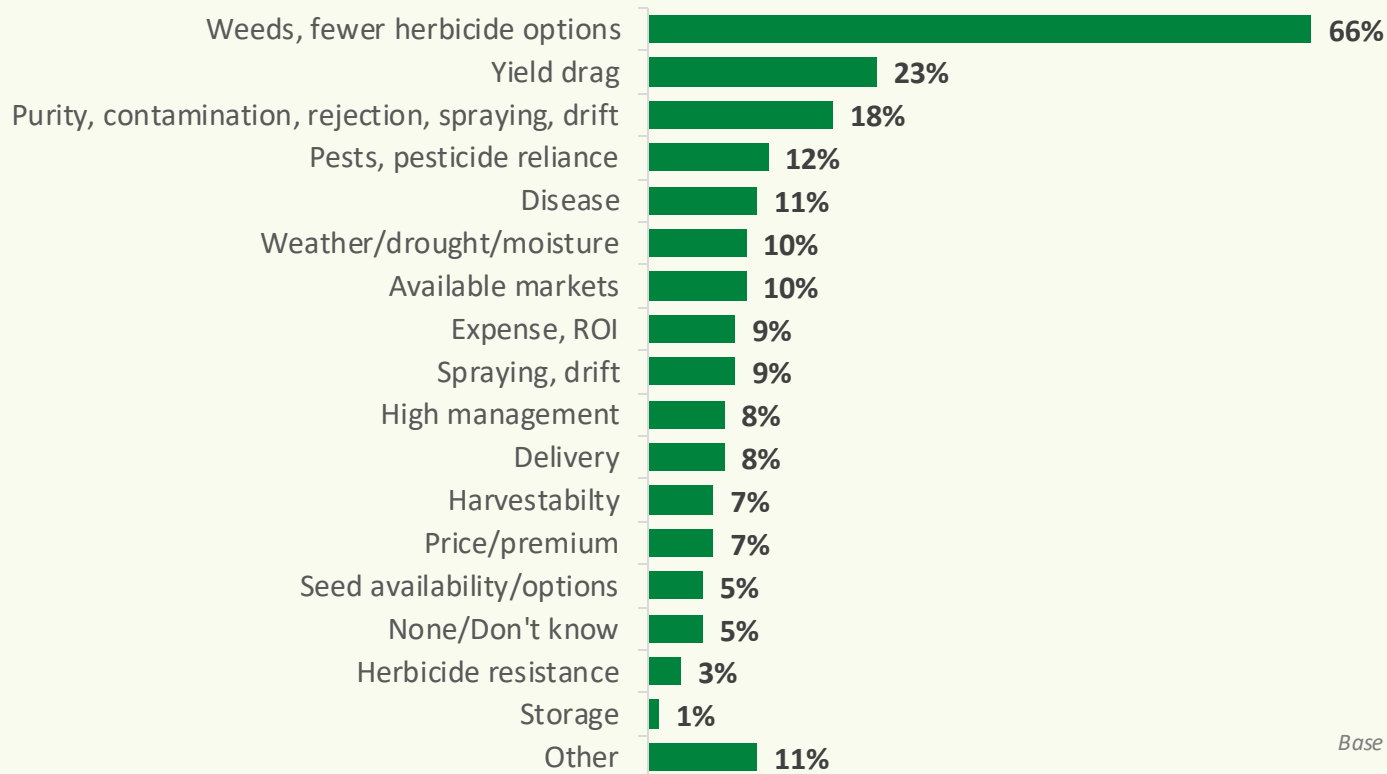
Growers' Risks and Rewards of Non-GMO Soybean Production

Non-GMO Food-grade Soybeans Quantification Study
September 2024



Risks Growers Associate with IP Non-GMO Food-grade Production

- Weed control is the primary risk growers associate with non-GMO food-grade soybean production (66% of growers). As one grower contends there are *more weeds, hard to keep them under control if you don't get early rains after planting to wash in preemergent spraying.*
- Yield drag is the second most mentioned risk (23% of growers) and contamination rounds out the top three risks (18% of growers), as one grower notes, *contamination from seed or other that reduces purity.*



Base growers=92.

Source: What risks, if any, do you associate with planting IP non-GMO food-grade soybeans vs. planting GMO soybeans? Please list all risks you associate with non-GMO production.



Risks Associated with IP Non-GMO Food-grade Production (Sampled Verbatim Responses)

Management Practices	31%
<i>Stay on top of things planting growing season always prepared.</i>	
<i>We usually follow BKMs for growing them and have been pretty successful in taking proactive steps against adverse events.</i>	
<i>Production practices and training of employees due care and being very particular on clean out, storage, and handling.</i>	
<i>We have an irrigation system that works well at mitigating the risk of drought.</i>	
<i>We actually still walk our beans.</i>	

Chemical Applications	32%
<i>Put together a robust herbicide program.</i>	
<i>Multiple pre-emerge herbicides.</i>	
<i>Respray when necessary.</i>	
<i>Using higher rates.</i>	
<i>We try to spray safer pesticides to make sure that the insects do not invade our soybeans.</i>	

Planting Practices	42%
<i>They cannot be put on ground with a history of weed problems. Must rotate them around so weed problems don't develop on clean ground.</i>	
<i>A different mindset. Reverting practices back to the 1980's with tillage.</i>	
<i>Non-GMO are always handled 1st and are placed in a low spot with fencing to help stop cross-contamination.</i>	
<i>Keep the fields separated by a mile or more.</i>	
<i>Plant after cover termination. Vary herbicide options. Hand weeding as needed.</i>	

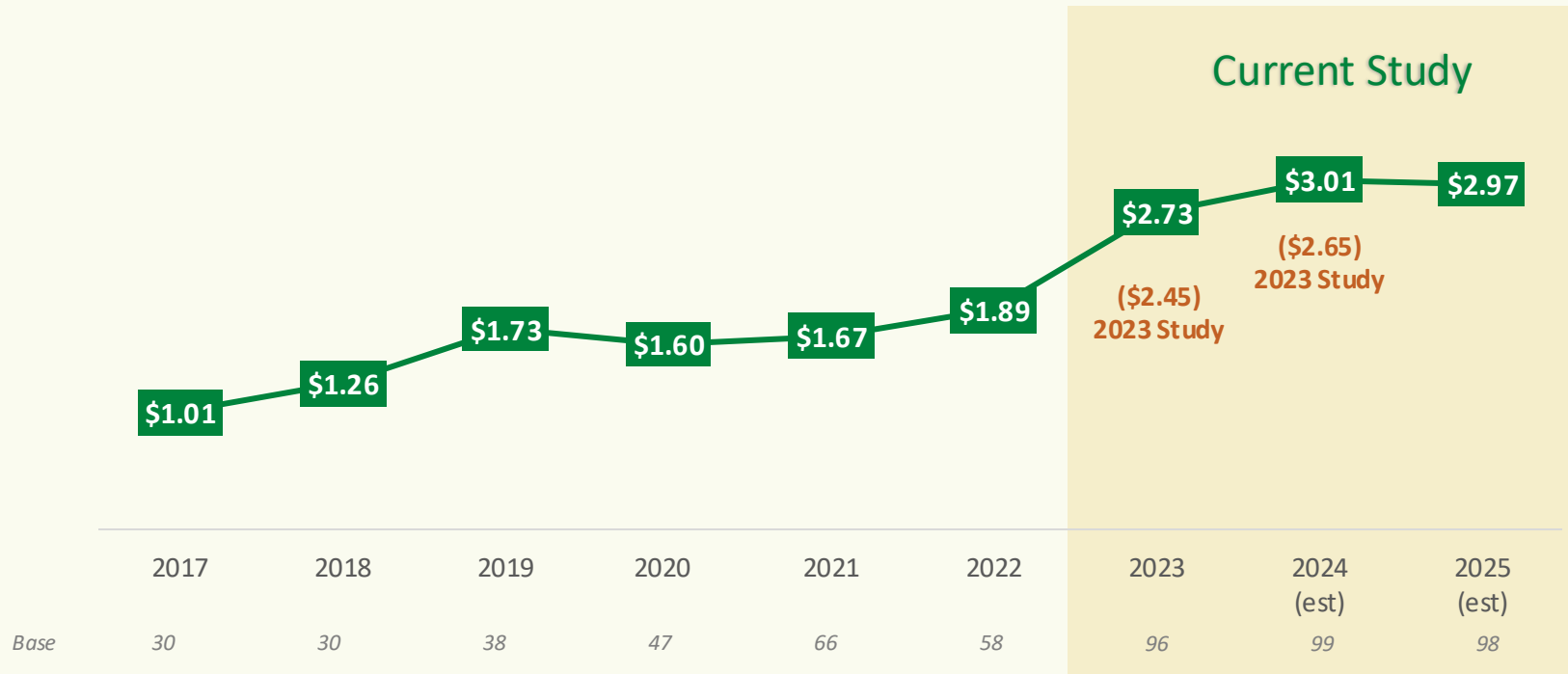
Marketing Practices	9%
<i>Field locations that have a lower weed seed bank, taking less water from other fields, prepricing of beans where possible. Attempting to address cash flow by spreading out contract delivery timing.</i>	
<i>Seed earlier, take out contracts.</i>	
<i>Pricing contracts and weed management</i>	

Source: What steps do you take to mitigate the risks associated with IP non-GMO food-grade soybean production for your operation?



Historical Trends in the Average Premium for IP Food-grade Non-GMO Soybeans

- Between the 2022 and 2023 crop seasons, food-grade soybean premiums increased by 45%, from \$1.89 to \$2.73. This year the increase is expected to wane to about 10% or \$3.01. Next year, in 2025, growers expect roughly the same premium as in 2024.
- In the previous study year (2023 study), growers estimated they would receive about a \$2.45 premium for their non-GMO food-grade soybeans in 2023, but in the current study, they report receiving \$2.73 in 2023. Similarly, in 2023, growers estimated they would receive an average premium of \$2.65 in 2024, but they currently expect \$3.01. However, growers do not expect the premium to increase in 2025.

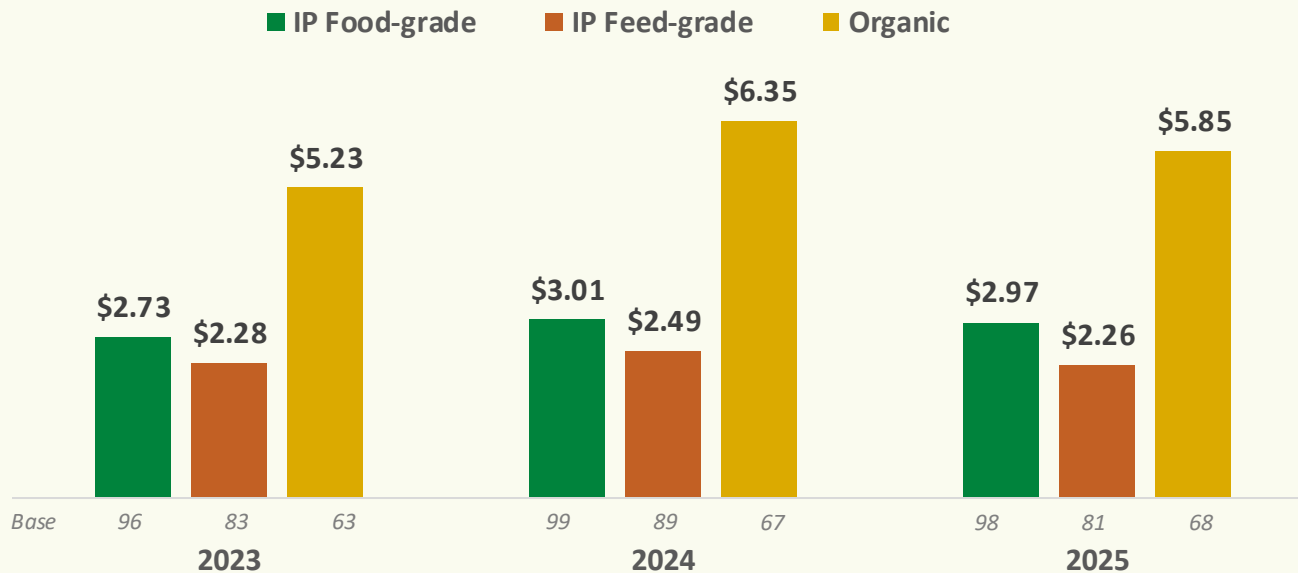


Source (2024 study): What premium do you expect to receive for the following types of non-GMO soybeans in 2024? The premium amount is the amount over what you would receive for GMO soybeans. Food-grade non-GMO soybeans that are identity preserved? Excludes "0's".



Average Premium for IP Non-GMO and Organic Soybeans

- On average, growers expect to receive roughly \$0.50 less for IP non-GMO feed-grade soybeans than food-grade soybeans in 2024.

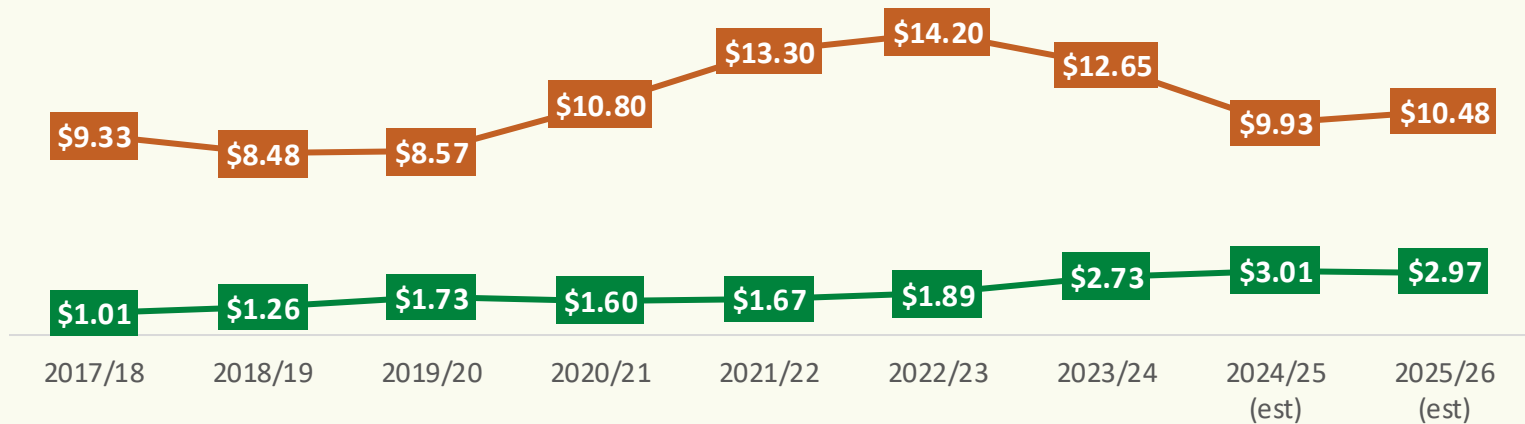


Source (2024 study): [Asked for 2023-2025 for each type of soybean] What premium do you expect to receive for the following types of non-GMO soybeans in 2024? The premium amount is the amount over what you would receive for GMO soybeans. Food-grade non-GMO soybeans that are identity preserved? Excludes "0's". Excludes "0's".



Historical Trends in the Average Premium for IP Food-grade Non-GMO Soybeans Compared to Soybean Prices

- A combination of lower soybean commodity prices and higher premiums has led to a more favorable market for non-GMO food-grade soybean production. In 2023/24, commodity soybean prices fell by 11% and premium prices rose by 45%. This trend continued this year when commodity prices fell roughly 22% while premium prices rose 10%. The outlook for next year is that commodity prices will increase only slightly, and premium prices will not change substantially. Thus, premium prices will have less impact on non-GMO food-grade production next year.



% Change In Commodity Soybean Price		-9%	1%	26%	23%	7%	-11%	-22%	6%
% Change In Premium		25%	37%	-7%	4%	13%	45%	10%	-1%
<i>Base</i>	30	30	38	47	66	58	96	99	98

Source (2024 study): [Asked for 2023-2025 for each type of soybean] What premium do you expect to receive for the following types of non-GMO soybeans in 2024? The premium amount is the amount over what you would receive for GMO soybeans. Food-grade non-GMO soybeans that are identity preserved? Excludes "0's".
 Source (Commodity prices): USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Crop Production, Grain Stocks, Fats and Oils: Oilseed Crushings, Production, Consumption and Stocks, and Agricultural Prices; and USDA, Foreign Agricultural Service, Global Agricultural Trade System.



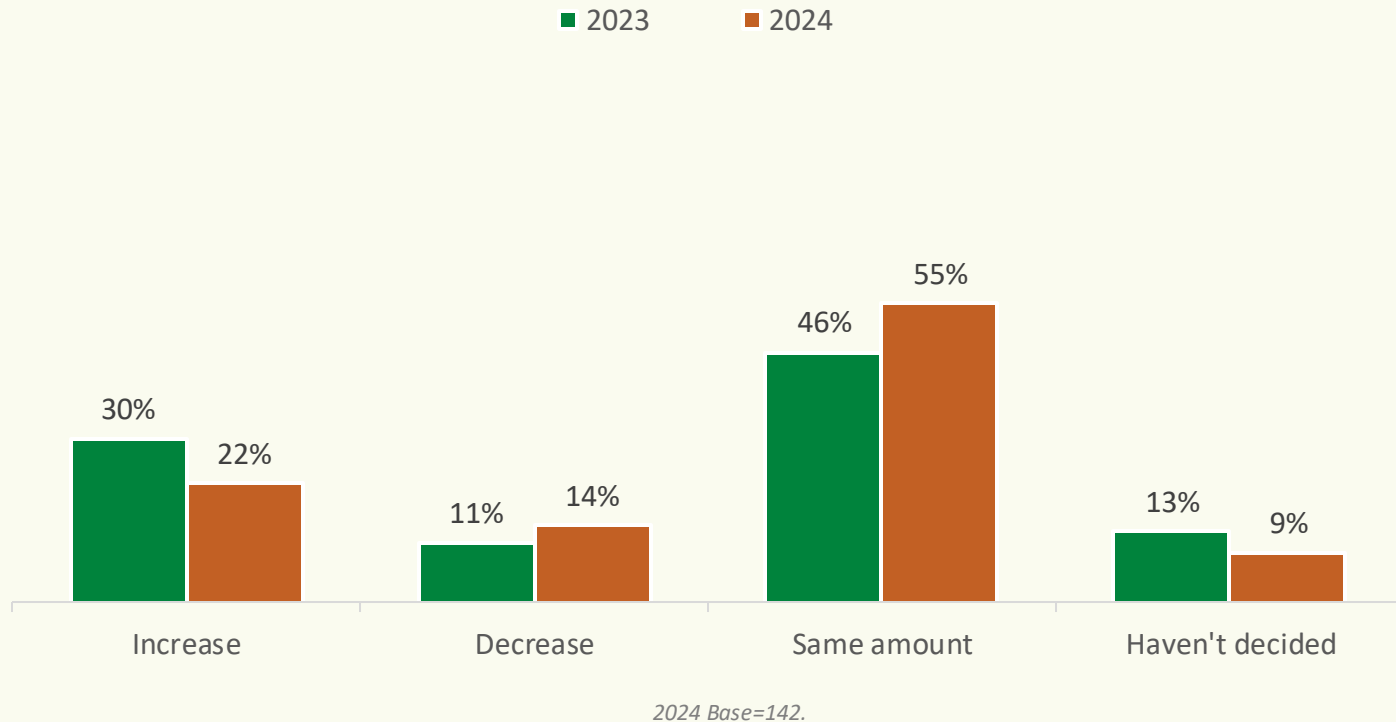
Growers' Future Considerations for Non-GMO Soybean Production

Non-GMO Food-grade Soybeans Quantification Study
September 2024



Change in Growers' Non-GMO Food-grade Soybean Production Over the Next Couple of Years

- A net of 7% of growers express they will increase their IP non-GMO food-grade soybean acres over the next couple of years. Overall, only 14% of growers contend they will decrease food-grade soybean production, compared to 55% who will maintain current production and 22% who intend to increase production.
- Compared to 2023, growers are less optimistic about future non-GMO food-grade soybean production.

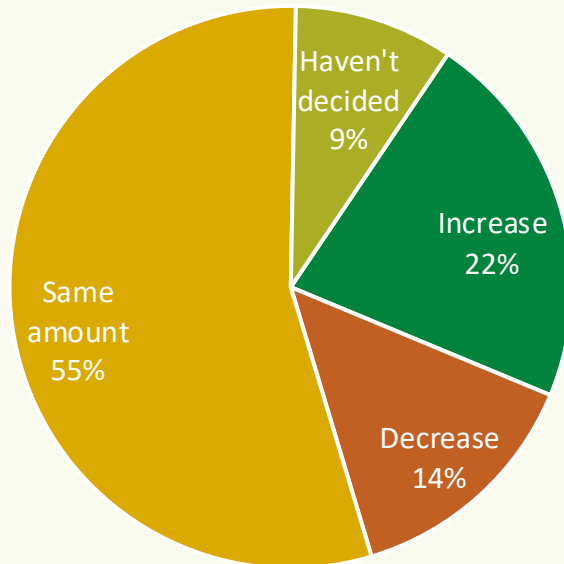


Source: Are you likely to increase, decrease or plant the same amount of IP non-GMO food-grade soybean acres in the next couple of years?



Reasons for Increasing/Decreasing Non-GMO Food-grade Soybean Production

- The primary reason 22% of non-GMO growers will increase food-grade soybean production is for the premium.
- The primary reason 14% of non-GMO growers say they will decrease food-grade soybean production is due to weed infestations.



Base=142.

Top Reasons for	Increase (base=21)*
Profit/premium	68%
Demand	13%
Quality/seed quality	10%
Commodity soybean price	6%
Top Reasons for	Decrease (base=19)*
Weeds	37%
Profit/premium	21%
Yield	16%
Input costs	11%

Source: Chart-Are you likely to increase, decrease or plant the same amount of IP non-GMO food-grade soybean acres in the next couple of years? Table-What are the primary reasons why you will [increase/decrease] IP food-grade soybean production ?

* Caution due to small bases.



Premium Needed to Incentivize Growers to Produce More Non-GMO Food-grade Soybeans

- Non-GMO growers contend they need a 5% premium increase over what they currently expect to receive to consider increasing food-grade soybean production, from the \$3.01 they expect to receive in 2024 to \$3.15.

Premiums	Average
2023 premium received	\$2.73
2024 (estimated)	\$3.01
2025 (estimated)	\$2.97
Minimum to consider planting more non-GMO food-grade soybeans	\$3.15

Base=116.

Source What is the minimum premium you need to receive to consider planting more non-GMO food-grade acres? The premium amount is the amount over what you would receive for GMO soybeans.



When Growers Make Decisions about Non-GMO Production

- Most growers decide on planting non-GMO soybeans between November and March for the upcoming season.

	2024	2025
January	7%	35%
February	2%	25%
March	4%	20%
April	2%	0%
May	0%	0%
June	2%	0%
July	1%	5%
August	4%	10%
September	14%	0%
October	14%	5%
November	32%	0%
December	18%	0%

Source When do you typically make decisions about 2025 non-GMO production on your farm?



Results from Non-GMO Purchasers

Non-GMO Food-grade Soybeans Quantification Study
September 2024



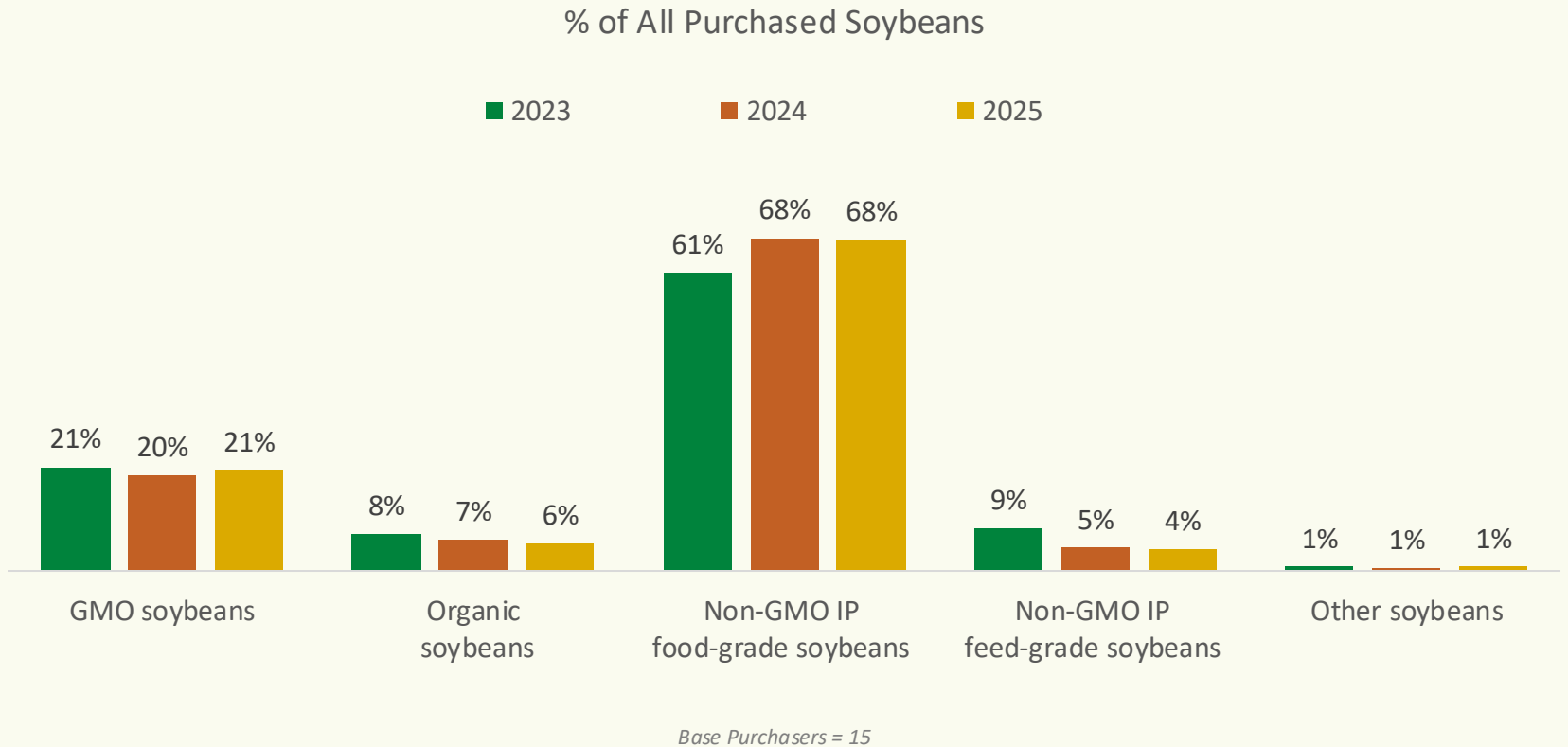
Soybean Acquisitions & Departures

**Non-GMO Food-grade Soybeans Quantification Study
September 2024**



% of Purchased Soybeans That Are Indicated Types

- Non-GMO food-grade soybeans account for most of the purchasers' soybean acquisitions (68% in 2024). Between 2023 and 2024, the portion of food-grade soybean purchases increased primarily at the expense of feed-grade soybeans.

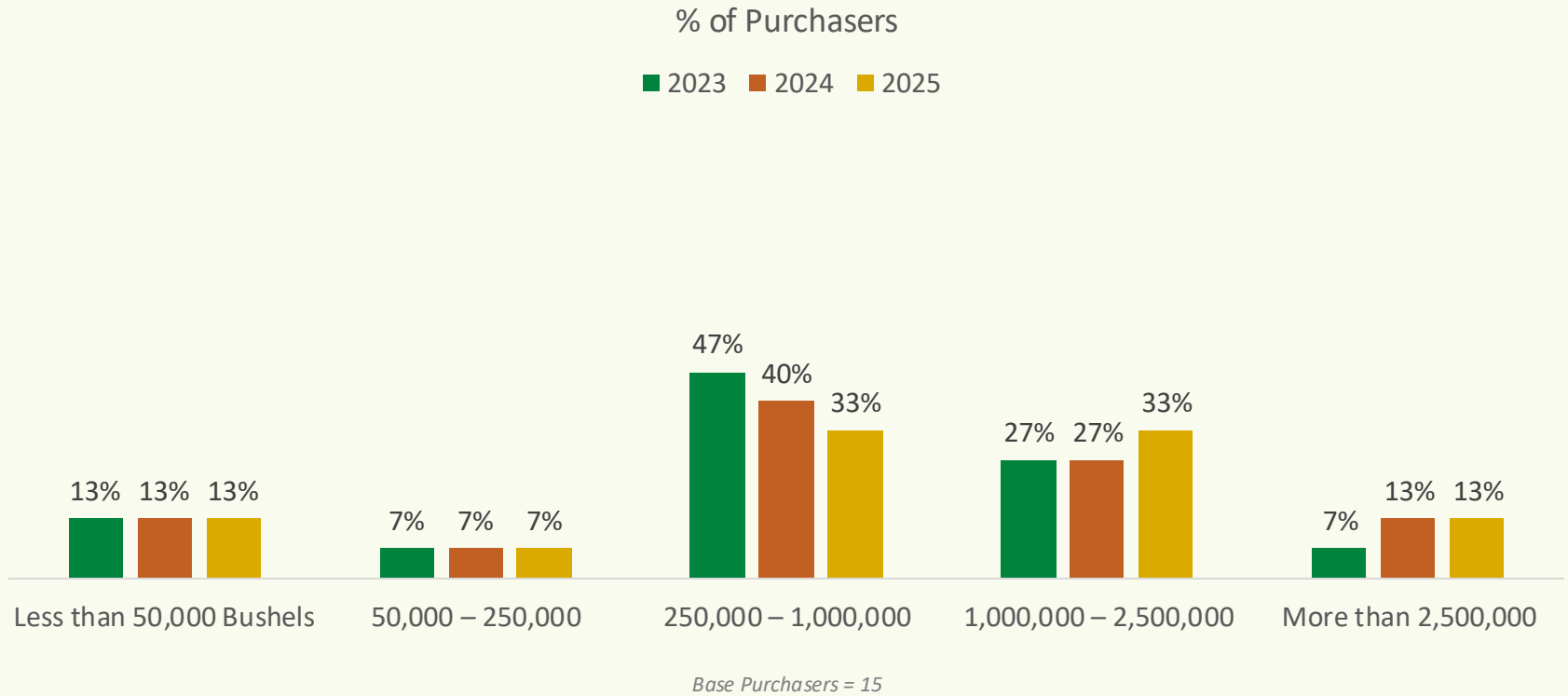


Source: Of the total soybeans purchased by your company, what percent (%) are of the following types? Base=15.



Number of Non-GMO Food-grade Bushels Purchased

- Most companies interviewed for this study purchased between 250 thousand bushels and 2.5 million bushels of food-grade soybeans.

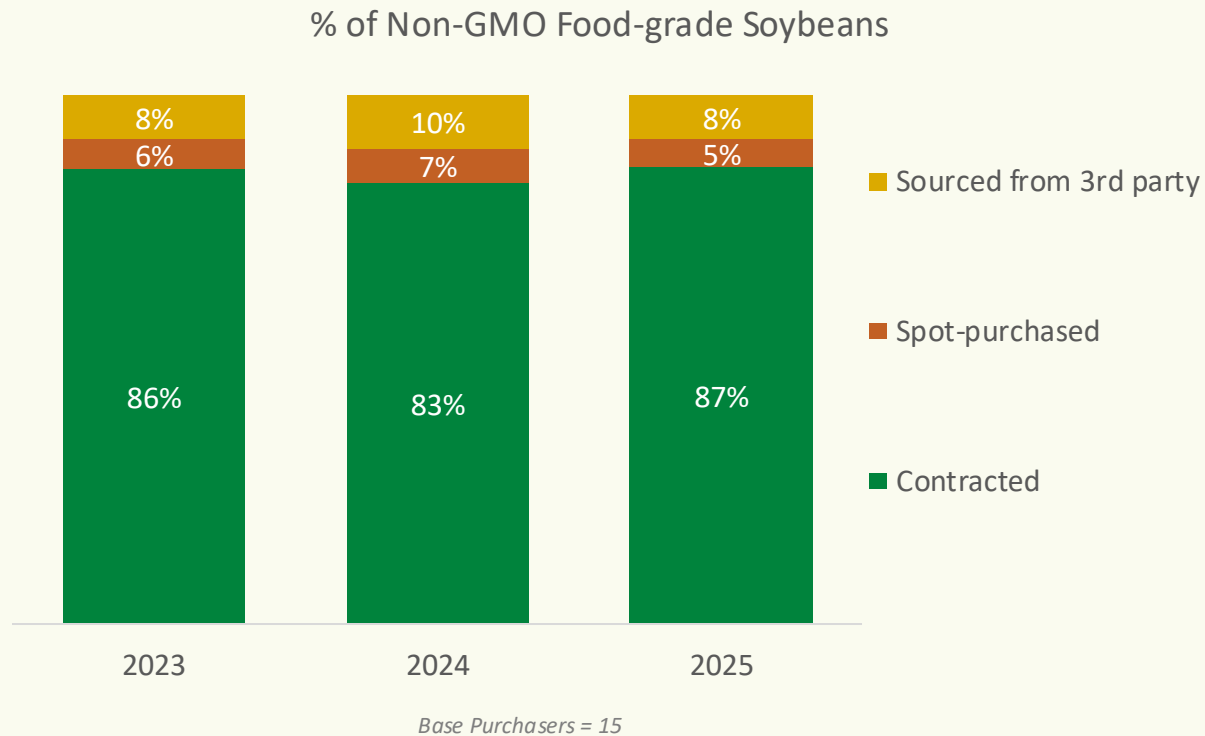


Source: Which of the following categories describes how many total bushels of NON-GMO FOOD-GRADE soybeans did/will your company acquire in the following years?



How Non-GMO Food-grade Soybeans are Acquired

- The portion contracted non-GMO food-grade soybeans fell in 2024 from 86% in the previous year to 83% in 2024. Contracted soybeans are expected to increase in 2025.

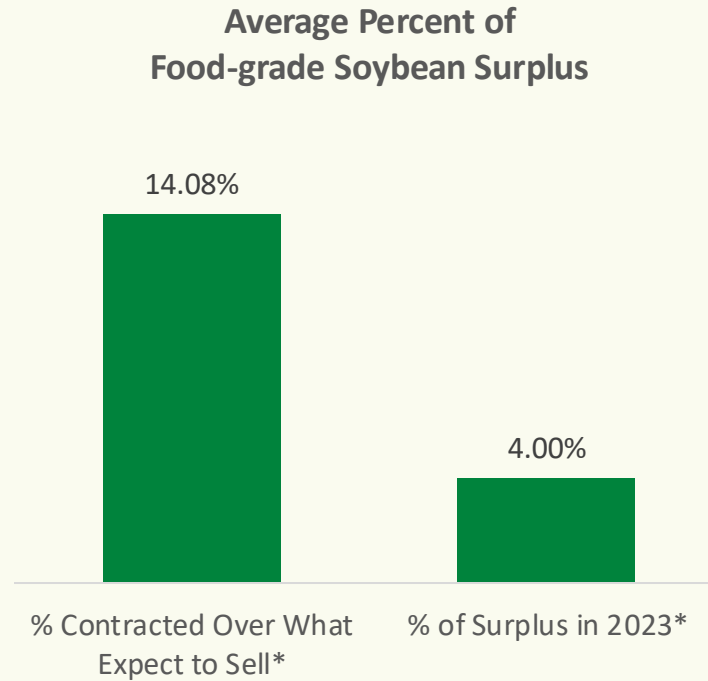


Source What percent (%) of the NON-GMO FOOD-GRADE soybeans acquired by your company will be/were acquired using the following methods Base=15.



Surplus Purchasing

- On average, purchasers contract about 14% more non-GMO food-grade soybeans than they expect to sell. At the end of the season in 2023, they still had about 4% overage.



Base Purchasers = 15

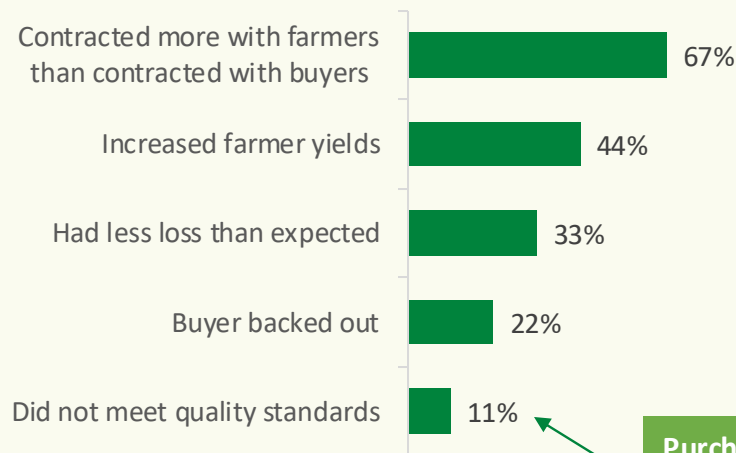
Source: How many more NON-GMO FOOD-GRADE soybeans do you contract in order to account for clean out/loss, etc.? Please indicate the percentage (%) of NON-GMO FOOD-GRADE soybeans that you contract over what you expect to sell. How much NON-GMO FOOD-GRADE soybean surplus, if any, did you have in 2023?

*Includes "0".

How Purchasers Handle Surplus

- Besides contracting for more than they intended to sell, increased yields and less-than-expected loss also contributed to a surplus of food-grade soybeans.
- Purchasers estimate about 12% of food-grade soybeans do not meet quality standards.
- Purchasers either carry food-grade soybean surplus into the subsequent crop year (45%) or they look for a different buyer (45%).

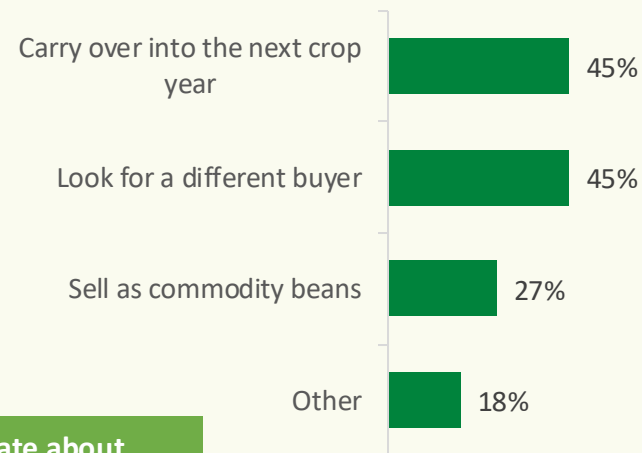
Reason for Surplus



Base Purchasers = 9

Purchasers estimate about 12% of food-grade soybeans do not meet quality standards.

How Surplus Was Handled



Base Purchasers = 11

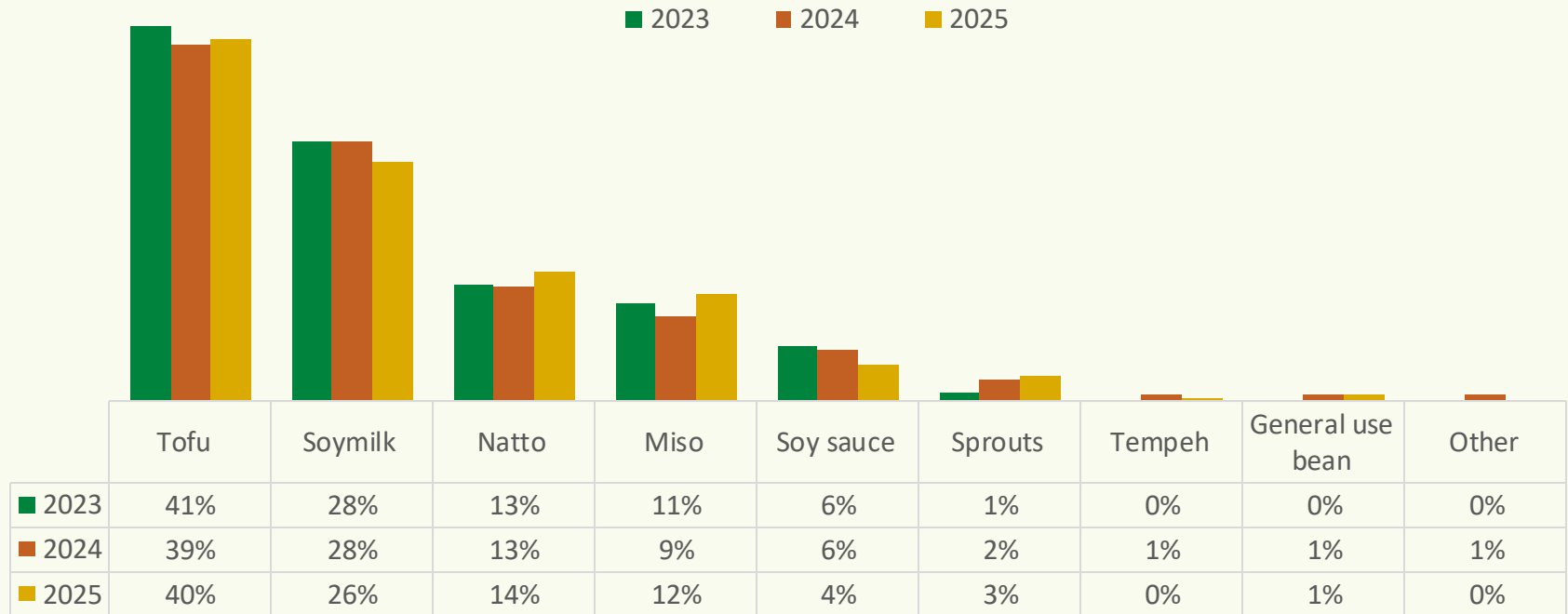
Source: What was the reason for the surplus of NON-GMO FOOD-GRADE soybeans? What did you do with the surplus beans?



Percent of Non-GMO Food-grade Soybeans Purchased for Indicated End-Purpose

- Similar to the 2023/24 crop year, about 65% of U.S.-produced food-grade soybeans will be used for either tofu (39%) or soymilk (28%). Natto and Miso account for another 24%. No significant changes to this hierarchy are expected in 2025.

% of Purchasers Food-grade Soybeans



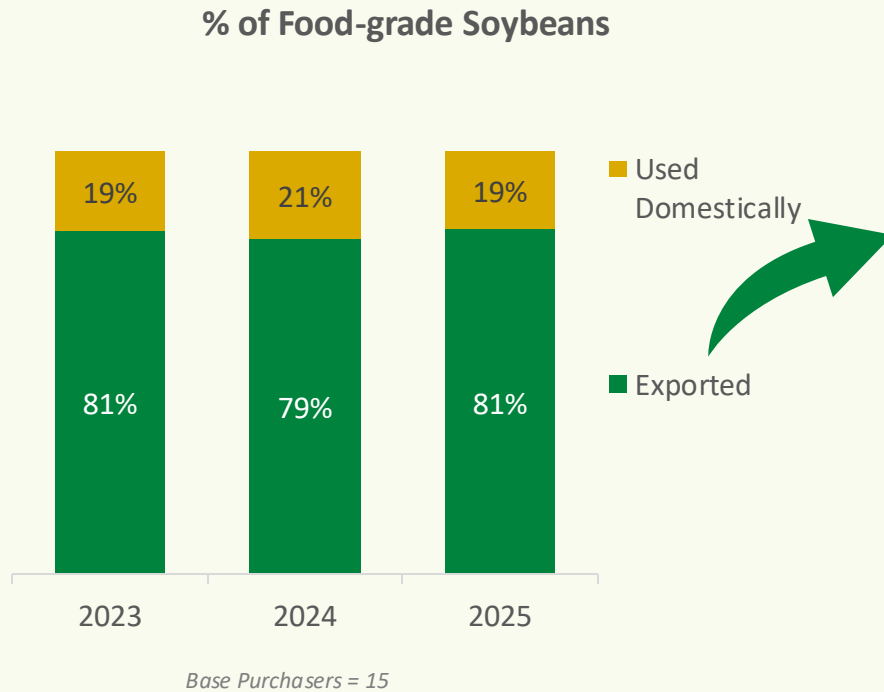
Base Purchasers = 15

Source: What percent (%) of the NON-GMO FOOD-GRADE soybeans purchased by your company are used for the following end purposes?



Percent of Food-grade Soybeans Exported to Countries Outside of the U.S.

- Roughly 80% of U.S.-produced food-grade soybeans are exported, mostly to Japan (63%). Taiwan and South Korea receive about 10% to 15% each and other countries receive less than 5% each.



% of Exported Food-Grade Soybeans to Indicated Receiving Countries

	2023	2024	2025
Japan	57%	63%	58%
Taiwan	15%	16%	15%
South Korea	12%	10%	10%
Thailand	4%	3%	3%
Malaysia/Singapore	1%	2%	4%
Others	3%	3%	8%

Source: Chart - What percent (%) of the IP NON-GMO FOOD-GRADE soybeans purchased in the U.S. by your company will be used domestically and what percent (%) will be sold for export to countries outside of the U.S.? Table - And what percent of the FOOD-GRADE IP NON-GMO soybeans were/will be exported to the following countries in the following years?



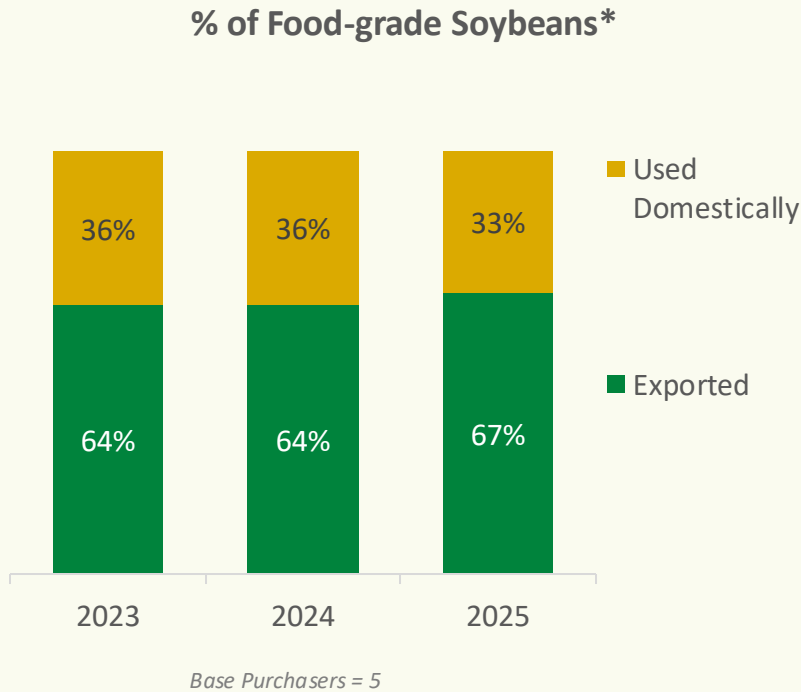
Non-GMO Feed-grade Soybeans

**Non-GMO Food-grade Soybeans Quantification Study
September 2024**



Percent of Feed-grade Soybeans Exported to Countries Outside of the U.S.

- Roughly 65% of U.S.-produced feed-grade soybeans are exported. Most purchasers market non-GMO feed-grade soybeans to soybean processors (80%).



Primary Market for Non-GMO Feed-grade Soybeans*

	2023	2024	2025
Livestock Feed	20%	20%	20%
Feed Mills	20%	0%	0%
Soybean Processors	80%	80%	80%
Don't know/not applicable	20%	20%	20%

Base Purchasers = 5

Source: Chart - What percent (%) of the NON-GMO FEED-GRADE soybeans purchased in the U.S. by your company will be used domestically and what percent will be sold for export to countries outside of the U.S.? Table - For the following years, what is/was the primary market for the NON-GMO FEED-GRADE soybeans purchased in the U.S. by your company that are used domestically?

*Caution due to extremely low bases.



Market Indicators For Growth of Non-GMO Food-grade Soybeans

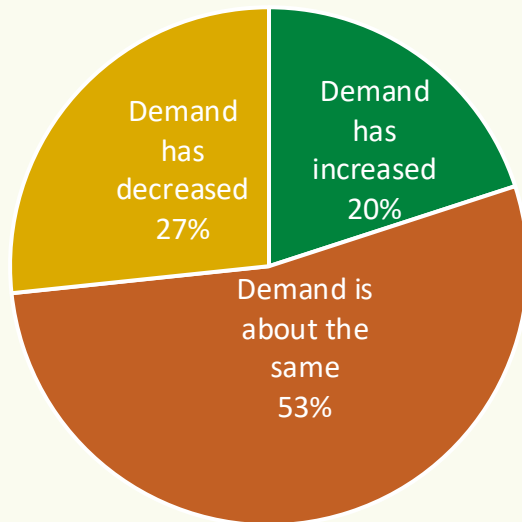
Non-GMO Food-grade Soybeans Quantification Study
September 2024



Purchasers' Perceptions of Upstream Demand for Non-GMO Food-grade Soybeans

- Most purchasers believe upstream demand for food-grade soybeans has been about the same over the past few years. The remaining purchasers are not in agreement on whether demand has increased or decreased. Purchasers question the quality of U.S.-produced food-grade soybeans as one of the reasons for less upstream demand, especially as it compares to Canada.

**Upstream Demand
% of Purchasers**



Base Purchasers = 15

Reasons for Increase

Soy milk and tofu.

Several soy-based food markets are growing steadily in Japan and other SE Asian countries like natto, tofu, etc.

Philippines Taiwan.

Reasons for Decrease

Increase in demand for tofu, soy milk and other products primarily consumed in the home that increased during the pandemic have returned to normal

High prices

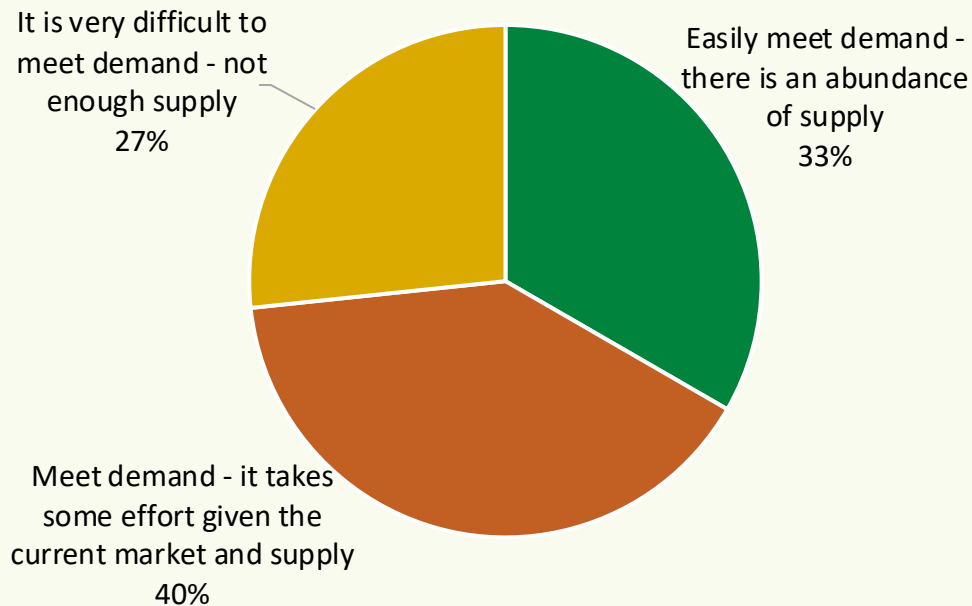
Source: So we can better understand trends in the food-grade soybean market, how would you describe upstream demand for NON-GMO FOOD-GRADE soybeans in the past few years?



Purchasers' Ability to Meet Demand for Non-GMO Food-grade Soybeans

- For most purchasers, demand for non-GMO food-grade soybeans is not easily met. Approximately 27% of purchasers contend there is not enough supply and another 40% of purchasers contend while they can meet demand, it takes some effort given the current market and supply.
- Purchasers contend they met about 94% of demand in 2023 and expect to meet about 95% of demand in 2024.

**Supply from Growers
% of Purchasers**



Base Purchasers = 15

% of Demand Met	
2023	94%
2024	95%

Base Purchasers = 15

How would you describe the supply of NON-GMO FOOD-GRADE soybeans from growers in the U.S.? What percent (%) of the demand for NON-GMO FOOD-GRADE soybeans were you able to meet in the following years?



When Purchasers Make Decisions about Buying Non-GMO Production

- Most purchase decisions for the 2024 growing season were made between September 2023 and January 2024. This is similar to when growers make non-GMO soybean production decisions. However, some purchasers made 2024 buying decisions as early as January 2023, suggesting that as the season progressed their decisions may have been revised.

	2023	2024
January	27%	27%
February	20%	20%
March	13%	20%
April	7%	13%
May	7%	20%
June	20%	20%
July	27%	13%
August	13%	27%
September	27%	20%
October	40%	27%
November	27%	33%
December	40%	27%

Base Purchasers = 15

Source When were/are decisions about the quantity of NON-GMO FOOD-GRADE soybeans that your company did/will purchase in 2024 made?



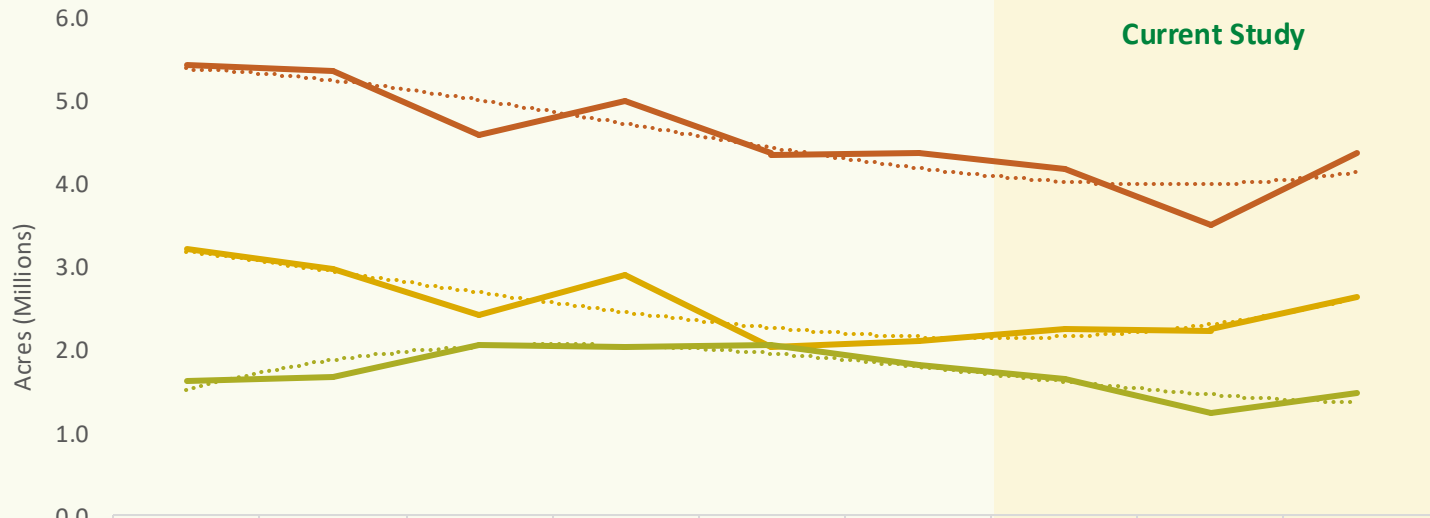
U.S. Non-GMO Soybean Production Estimates

Non-GMO Food-grade Soybeans Quantification Study
September 2024



Estimate of All Non-GMO Soybean Acres in the U.S.

- Non-GMO soybean production fell by about 17% from 4.2 million acres in 2023 to 3.5 million acres in the 2024/25 crop season. Most of the decline is accounted for by non-GMO feed-grade soybean acres, which fell by 24% over the past year. Non-GMO food-grade acres fell by less than 1%.
- In the 2025/26 crop season, non-GMO soybean acres are expected to increase from 3.5 million in 2024/25 to 4.4 million. Feed-grade soybean acres will increase by about 19% and food-grade soybean acres will increase by about 17%.



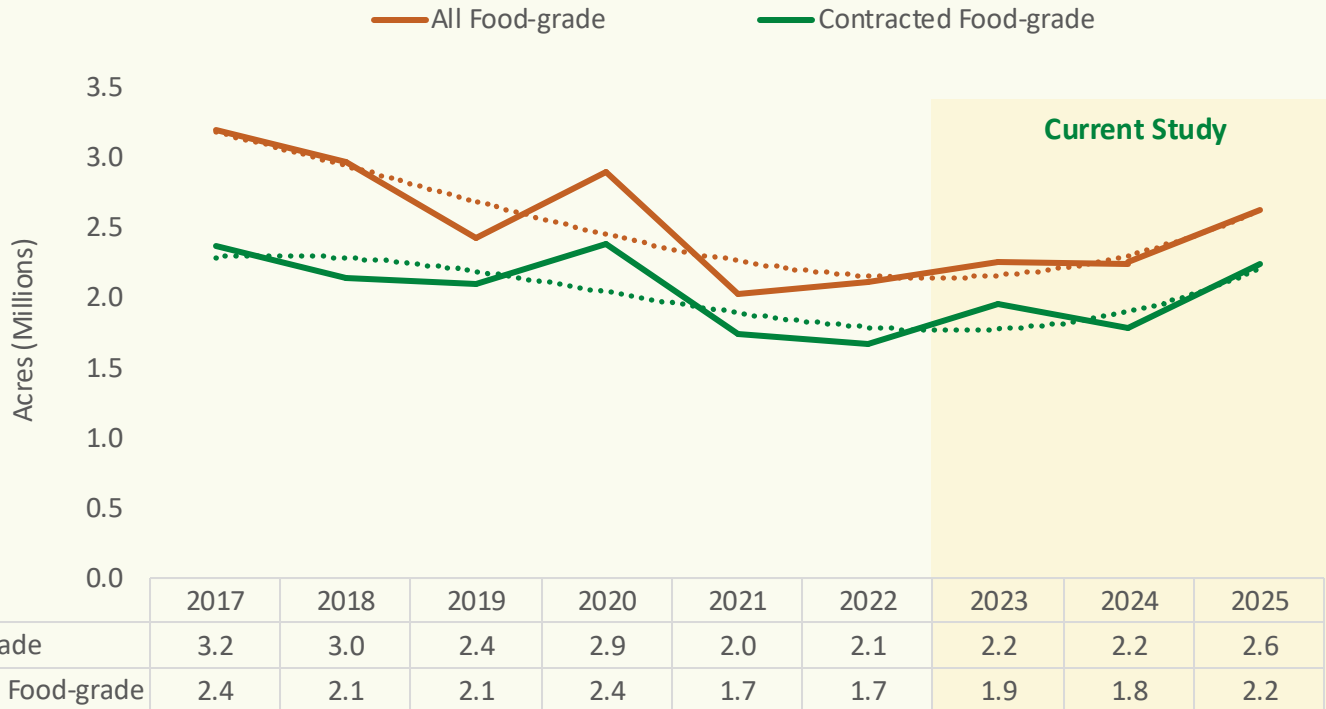
	2017	2018	2019	2020	2021	2022	2023	2024	2025
All Non-GMO soybean Acres	5.4	5.4	4.6	5.0	4.4	4.4	4.2	3.5	4.4
Non-GMO Food-grade Acres	3.2	3.0	2.4	2.9	2.0	2.1	2.2	2.2	2.6
Non-GMO Feed-grade Acres	1.6	1.7	2.1	2.0	2.1	1.8	1.6	1.2	1.5

2025 projections Source: Oil Crops Outlook: August 2024 - USDA, Economic Research Service using USDA, National Agricultural Statistics Service, Crop Production, and Grain Stocks; and U.S. Department of Commerce, Bureau of the Census, Foreign Trade Statistics. All non-GMO acres includes those planted but sold as commodity beans.



Estimate of Contracted Non-GMO Food-grade Soybean Acres in the U.S.

- Roughly 80% to 85% of growers' food-grade soybeans are produced under contract each year. In 2024, this amount was lower at about 79% produced under contract for a total of 1.8 million food-grade soybeans produced under contract in 2024. This is less than in 2023 (1.9 million contracted food-grade soybeans). Looking forward to 2025, growers expect to produce 2.2 million food-grade soybeans under contract.





Non-GMO Food-grade Soybean Export Estimates

Non-GMO Food-grade Soybeans Quantification Study
September 2024



U.S. Soybeans Exported to Other Countries

- In total, the U.S. will produce about 4.6 million bushels of soybeans in 2024 or 113 MMT, of which 40% or 1.9 million bushels (50.4 MMT) will be exported to other countries. Food-grade soybeans accounted for 0.7% of all exported soybeans in 2023 or 28.06 million bushels (0.76 MMT). This figure is down in 2024 to 0.5% of all exported soybeans or 23.28 bushels (0.63 MMT). However, given the expected increase in production, exports of food-grade soybeans are expected to increase next season.

All U.S. Soybean Production (millions) ¹	2023	2024
Bushels of All Soybeans Produced in U.S.	4,165	4,589
Metric Tons of All Soybeans Produced in U.S.	116.38	112.84
U.S. Soybeans Exported (millions) ²	2023	2024
Bushels of All U.S. Produced Soybeans Exported	1,700	1,850
Metric Tons of All U.S. Produced Soybeans Exported	46.27	50.35
U.S. Non-GMO Food-grade Soybeans Exported (millions) ^{3 4}	2023	2024
Bushels of U.S. Produced Non-GMO Food-grade Soybeans Exported	28.06	23.28
Metric Tons of Non-GMO Food-grade U.S. Produced Soybeans Exported	0.76	0.63

¹Source: USDA/NASS, September 2024.

² USDA/World Agricultural Supply and Demand Estimates (WASDE) September 2024.

³ Includes only contracted food-grade soybean acres.

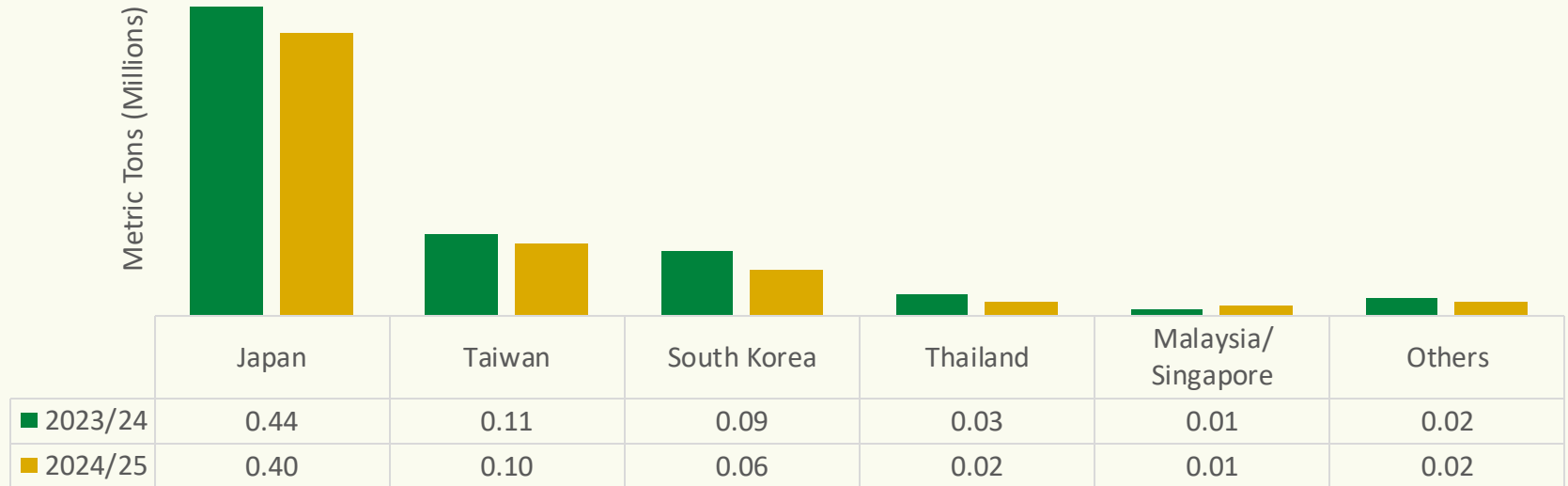
⁴ Assumes non-GMO growers' acres account for 5% of all soybean acres in 2023 and 6% in 2024.



Destination Countries for U.S. Non-GMO Food-grade Soybeans

- Japan remains the largest benefactor of U.S.-produced food-grade soybeans. In 2023, the U.S. imported 2.5 MMT of all soybeans to Japan, of which about 18% were food-grade soybeans.¹ In the current year, 2024, Japan is expected to export fewer food-grade soybeans, about 19% of the 2.14 MMT U.S. total U.S. soybeans.¹ Taiwan and South Korea are the second and third largest receiving countries, both of which are expected to receive fewer food-grade soybeans in 2024 than in 2023.
- According to the April 2024 Oilseeds And Products Annual Report, *“as the price of food-grade soybeans has elevated, Japanese wholesalers and food processors increased stocks of food-grade soybeans around the beginning of MY 2023/24. Due to the weak Japanese yen against other major currencies, the price competitiveness of North American food-grade soybeans has heavily weakened against domestic food-grade soybeans. Thus, North American food-grade IP soybeans will face challenging market conditions in near future.”*

MMT (Million Metric Tons) of Non-GMO Food-grade Soybeans Exported To Other Countries



¹Source: USDA Foreign Agricultural Service, Global Agricultural Information Network, September 2024. U.S. Census Bureau TradeData. USDA Foreign Agricultural Service Oilseeds and Products Annual Report, April 3, 2024, Report #JA2021-0017.

Year is calculated from September to August.



Conclusions & Implications

Non-GMO Food-grade Soybeans Quantification Study
September 2024

Summary of Findings

- Based on USDA data, **87.1 million acres** of soybeans were planted in the U.S. in 2024, of which 4%, or **3.5 million acres**, are non-GMO soybeans. Of the 3.5 million non-GMO acres, 92% or **3.2 million were sold for a premium**. Despite that planted soybean acres are up 4% in 2024 (83.6 million), non-GMO soybean acres are down 16% in 2024, compared to 2023.
- While the top three non-GMO producing states (i.e., IL, MN, and ND), all increased their non-GMO soybean acreage, it is offset by large declines in non-GMO acreage in Ohio (65% decrease), Wisconsin (43% decrease), and Missouri (37% decrease). State information shows that overall, **non-GMO acres fell by a net of 20% in the 2024/25 crop season among the top non-GMO soybean-producing states**.
- The decline in non-GMO acres in 2024 is mostly accounted for by **fewer non-GMO feed-grade soybean acres**, which account for roughly one-third of non-GMO planted acres (33%). Non-GMO feed-grade acres decreased by 25% from 1.6 million acres in 2023 to **1.2 million acres** in 2024. During the same time, non-GMO food-grade acres remained stable at **2.2 million acres**.
- Food-grade soybean acres account for roughly 59% of non-GMO acres planted in 2024. This study estimates contracted non-GMO food-grade soybean acres account for about 79% of total food-grade soybean acres or **1.8 million acres** in 2024. This figure is down only slightly from 1.9 million acres in 2023.
- Purchasers contract for about 15% over what they intend to sell to account for cleanout and loss. This means of the 1.8 million contracted food-grade acres, they expect to market about **1.5 million acres**. At the end of the crop season, they usually have about a 4% surplus, which they carry over into the next season or look for another buyer. They estimate about **12%** of food-grade soybeans they purchase **do not meet quality standards**. Growers report selling about 8% of their non-GMO soybeans on the commodities market in 2024, but few growers express it is due to not meeting IP standards.
- Purchasers estimate they will meet about 95% of the demand for food-grade soybeans in 2024, but express that it will not be an easy task (67%) given the supply and current market conditions, including competition from other countries.

Summary of Findings Continued

- The U.S. is expected to export **50.4 million metric tons (MMT)** of soybeans in 2024 or about 40% of its total soybean production. This figure is up from 46 MMT of soybeans exported in 2023. However, non-GMO food-grade soybeans account for fewer exported soybeans in 2024 than in 2023. In 2023, food-grade soybeans accounted for about 1.6% of exported soybeans or 0.76 MMT. In 2024, this figure is down to 1.3% of exported soybeans or **0.63 MMT**. Most U.S. non-GMO food-grade soybeans are destined for Japan, which is expected to import **400 thousand metric tons** of non-GMO food-grade soybeans in 2024 based on information from this study. This figure is down from .44 thousand metric tons in 2023, a decline of about 8%.
- Food-grade soybean **premiums** are expected to increase by 10% in 2024 from \$2.73 in 2023 to **\$3.01 in 2024**. During the same time, commodity soybean prices fell by 22% from \$12.65 in 2023 to \$9.93 in 2024, making non-GMO food-grade soybean production a more attractive option in 2024, despite lower non-GMO soybean production overall. Growers estimate it costs roughly \$8.00 to \$9.00 more per acre to produce non-GMO food-grade soybeans.
- The single largest percentage of U.S.-produced non-GMO food-grade soybeans are destined for the tofu market (39%). Another 28% will be used for soymilk. Natto accounts for 13% and miso accounts for 9%. This hierarchy is similar to that reported in 2023 and prior years.
- A net of 7% of growers contend they will increase their food-grade soybean production but they are expecting a 5% premium increase to do so. However, it is still early in the decision-making process. Most growers will decide on their non-GMO production for the 2025/26 season starting in September 2024 but will reevaluate up until March 2025. This is also true for purchasers.

- Overall, the U.S. markets about **1.5 million food-grade soybean acres** globally and domestically. This figure accounts for food-grade soybeans that are lost to the commodities market due to surplus, quality standards not met, etc. In 2024, producers and purchasers of non-GMO soybeans are in a precarious position of having favorable market conditions domestically, but unfavorable market conditions abroad. Consequently, food-grade soybean production has remained stable in 2024. One purchaser explains the balance as, *“Buyers’ retail side inflexibilities constricting US suppliers and export buyers. Price for tofu in the US retail is @ 4x that of retail pricing in Japan. US domestic volumes are increasing because the price of tofu supports global inflation and allows farmers to grow for profit rather than philanthropy.”*
- Commodity soybean prices are down in the U.S. and premiums for IP soybeans are increasing, making food-grade production more attractive domestically. In contrast, competition from countries like Canada, domestic markets abroad, higher interest rates, and a relatively strong U.S. dollar puts the U.S. at a disadvantage in the global market by making U.S. exports less competitive. As one purchaser explains, *“Global market pricing is lower for alternative countries interested in buying non-GMO.”*
- The outlook for non-GMO food-grade soybean production in the upcoming season is less optimistic than in 2023 and production. More stable commodity prices, expectations of stagnant premiums, and stiff competition from foreign markets will all contribute to the stagnant slow growth. In addition, some historical hurdles still exist. The quality of non-GMO food-grade soybeans was mentioned by several purchasers and delivery logistics is also a risk mentioned by both growers and purchasers. However, if commodity prices continue to fall and premium prices rise to about \$3.15/acre, growers are likely to increase non-GMO food-grade production in the 2025/26 crop season.