

## Non-GMO Food-grade Soybeans Quantification Study

## **Final Report**

September 2022





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## **Executive Summary**

### Non-GMO Food-grade Soybeans Quantification Study September 2022





#### **Background**

The primary purpose of this study is to provide USSEC with updated information about the number of non-GMO food-grade-soybean acres currently produced in the U.S., their end-use and trends in non-GMO planting. Inputs for this study comes from 121 non-GMO soybean producers (via phone interviews and online surveys), 17 companies that purchase non-GMO food-grade soybeans (via phone and online surveys), three state soybean boards and three industry experts (via phone interviews). Data was collected between July 2022 and September 2022. Additional input is provided by secondary sources including the United States Department of Agriculture (USDA) and its various agencies.

#### **Current U.S. Food-grade Soybean Production**

The USDA estimates there are currently about 4.4 million non-GMO acres in the U.S. As shown in the table below, this study estimates non-GMO acres currently include about 1.7 million contracted non-GMO food-grade soybean acres and 2.1 million non-GMO feed-grade soybean acres.

#### 2022 U.S. Soybeans Acres

Total Soybean Acres	87,455,000
Non-GMO Soybeans Acres	4,372,750
Non-GMO Food-grade Soybean Acres	1,924,010
Contracted Non-GMO Food-grade Soybean Acres	1.693.129
Non-GMO Feed-grade	2,098,920



#### **Trends in U.S. Food-grade Soybean Production**

- Results show a decline in U.S. non-GMO food-grade production that is related in part to high commodity prices. As commodity prices rise in 2020, there is a precipitous dip in non-GMO food-grade soybean production. In addition to commodity prices, comments from growers, purchasers and state boards also suggest disruptions in shipping and freight costs also contributed to slower non-GMO food-grade production. Commodity prices have little to no impact on non-GMO feed grade soybeans in 2022.
- Some of the top non-GMO soybean producing states that include Illinois, Indiana and North Dakota all reduced their non-GMO soybeans acres in 2022. In contrast Ohio, the fourth largest non-GMO production state, increased non-GMO soybean productions by 58%. This data is also reflected in comments from the QSSB's.



Estimated Soybean Acres (Millions) in the U.S.

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#### U.S. Food-grade Soybean Exports

- The U.S. will produce about 119 MMT of soybeans in 2022, of which about half (49%) or 59 MMT will be exported to other countries. Non-GMO food-grade soybeans will account for about 1.7% or just under 1 MMT of exported soybeans (0.95). This figure is expected to increase to 1.04 MMT in 2023. This mainly due to an expected increase in overall non-GMO soybean production in 2023.
- The largest benefactor of U.S. non-GMO food-grade soybean exports is Japan, which is expected to receive 657 thousand MT from the 2022 planting season. Taiwan will receive 101 thousand MT and South Korea will receive 91 thousand MT. South Korea is the one country showing a year over year decrease in U.S. food-grade soybeans.

All U.S. Soybean Production <sup>(</sup> (MMT)	2021	2022	2023
Bushels of All Soybeans Produced in U.S. <sup>1,3</sup>	4,435	4,378	4,417
Metric Tons of All Soybeans Produced in U.S. <sup>1,3</sup>	120.70	119.15	120.21
U.S. Soybeans Exported (MMT)	2021	2022	2023
Bushels of All U.S. Produced Soybeans Exported <sup>2</sup>	2,145	2,085	2,145
Metric Tons of All U.S. Produced Soybeans Exported <sup>2</sup>	52.89	58.65	52.90
U.S. Non-GMO Food-grade Soybeans Exported (MMT)	2021	2022	2023
Bushels of U.S. Produced Non-GMO Food-grade Soybeans Exported	37.72	35.04	38.15
Metric Tons of Non-GMO Food-grade U.S. Produced Soybeans Exported	1.03	0.95	1.04
U.S. Non-GMO Food-grade Soybeans Destination Countries (Thousand Metric Tons)	2021	2022	2023
Japan	674.66	656.96	704.44
Taiwan	108.82	101.07	121.07
South Korea	108.82	90.96	88.05

U.S. Produced Soybean Quantities Exported to Other Countries

<sup>1</sup>Source: USDA/NASS, September 2022.

<sup>2</sup> USDA/World Agricultural Supply and Demand Estimates (WASDE) September 2022.

<sup>3</sup>2023 Source only: 2023 projections based on USDA Long-Term Projections Report, OCE-2022-1, February 2022.



#### U.S. Produced Food-grade Soybeans End Use for 2022

In 2022, the U.S. produced 764 thousand food-grade soybean acres for tofu and another 432 thousand acres for soymilk. Tofu accounts for 0.9% of all soybean acres and 40% of food-grade soybeans. Note, estimates are based on 17 purchasers who participated in this study. Given the low sample size, the reader should exercise caution in drawing conclusions. However, further evidence from industry experts and QSSB's tends to support this conclusion.

	U.S. Soybean Acres (Millions)	% of All Soybean Acres	% of Food-grade Soybean Acres
All Soybeans	87,455,000	100.0%	-
Food-grade Soybeans	1,934,104	2.2%	100.0%
Tofu	721,307	0.9%	37.3%
Soymilk	408,437	0.5%	21.1%
Miso	325,385	0.4%	9.9%
Natto	191,135	0.2%	16.8%
Other (sprouts, general use and other uses)	79,640	0.2%	8.4%

#### 2022 Non-GMO Food-grade Soybean Acres Used for Indicated End-Purpose



#### U.S. Food-grade Soybean Production Outlook

- Results from this study suggest the slower non-GMO food-grade production in the U.S. is caused by one-side the supply side, as one purchaser states, "Market demand is there and still growing. The problem is supply." Most all purchasers see an increase in demand for food-grade soybeans but contend it has been very difficult to fulfill that demand with current U.S. non-GMO food-grade soybean production. One of the primary reasons is lack of grower interest. Higher soybean prices coupled with weed control issues, perceived yield deficits have all resulted in growers' lack of interest in planting non-GMO soybeans, as one purchaser explains, "We didn't want to purchase less, but our growers were less interested in producing non-GMO soybeans with the yield difference vs the new CBOT levels."
- This has had a domino effect as some companies are backing away from this market, leaving fewer local markets, as one grower explains, "We want to plant the same amount but our elevator is backing out of the non-GMO program." In addition to a 34% premium increase, nearly half of growers contend they would have to see more local markets to consider planting more non-GMO food-grade soybeans. In addition to lack of grower interest, there have also been disruptions in the supply chain freight and shipping, as one purchaser states what could prompt him to purchase more food-grade soybeans, "Logistics and supply chain working better, cheaper container freight."
- From growers' perspective, the current non-GMO food-grade premiums don't track parallel to soybeans prices. In 2021, when commodity prices increased by roughly 48% over the previous season, non-GMO food-grade soybeans increased by only 4%. In 2022, commodity prices increased by about 18% and non-GMO food-grade soybeans increased by about 13%. It is possible that non-GMO food-grade soybean production will increase as soybean commodity prices begin to descend. However, there will need to be a compelling argument to bring growers who left the market over the past couple of years back, as issues with weed control and yield drag still remain. As one growers explains, "Depends upon yield vs GMO soybeans. If they are about the same stay with current levels if the GMO yield more plant less non-GMO." Another grower concurs, "Weed pressure is Increasing and the GMO's bean out preforming the NON-GMO's."



## **Background & Methodology**

### Non-GMO Food-grade Soybeans Quantification Study September 2022





- The purpose of this study is to provide USSEC with updated information from growers, purchasers of non-GMO soybeans and state soybean boards (QSSB's) about the number of non-GMO food-grade-soybean acres planted in the U.S. in 2022. USSEC has tracked non-GMO production and specifically IP food-grade non-GMO production in the U.S. since 2015, with the purpose of demonstrating U.S. production capabilities in this market. This study extends previous information about the number of non-GMO food grade soybean planted to 2021, 2022 and 2023.
- Additionally, other trends and market factors in soybean production over the years have emerged that impact non-GMO food-grade production. These trends are driven by weed resistance to glyphosate and other market forces, such as commodity prices and increasing demand for plant-based proteins. To gain a complete picture of the non-GMO market, and specifically trends that impact non-GMO food-grade soybeans, it is imperative that this study is inclusive of planting trends for other types of GMO and non-GMO soybeans. Thus, this study seeks to identify and track non-GMO soybean acres in the U.S.
- > To achieve the objectives for this study, input from three different groups was used:
  - Growers that produce non-GMO/food-grade soybeans
  - Companies that purchase/export non-GMO/food-grade soybeans (purchasers)
  - QSSB's (qualified states' soybean boards) and industry experts.
- Information collected from each group achieves different objectives and is meant to be complimentary to the overall goal of this research. In aggregate, information collected from study participants is meant to provide USSEC with a complete description of IP non-GMO food-grade soybean production in the U.S as well an assessment of production trends that may impact non-GMO food-grade soybean production.

# USSEC Objectives for Key Groups



- •Quantify the total number of non-GMO IP food-grade soybean acres in the U.S. in the years from 2021 to 2023.
- Determine the portion of non-GMO soybean acres that are food-grade versus feed-grade.
- Identify changes in production of food-grade soybeans between 2021 and 2023.
- Compare GMO and non-GMO yields
- •Assess premiums for IP food-grade soybeans, IP feed grade soybeans, and organic soybeans.
- Determine to whom growers market non-GMO food-grade soybeans.
- Assess growers' future planting intentions as it pertains to non-GMO soybeans and market forces that may affect planting intentions.



Determine how food-grade soybeans are acquired (i.e., via contract, spot-purchase, 3<sup>rd</sup> party) and what portion is acquired using each method.

Estimate of the number of contracted food-grade soybean acres in the years from 2021 to 2023 in the U.S. that fall into end-use purpose categories such as soymilk, tofu, natto, miso and others.

Estimate the portion of food-grade soybeans that have value added properties. Determine the portion of U.S. non-GMO food-grade soybeans that are exported and the receiving countries.

Assess purchasers' outlook for non-GMO soybeans and market signals that influence their outlook.



- •Gather and verify state soybean production.
- •Identify other issues that may impact non-GMO and non-GMO food-grade soybean production.



- Both primary data from growers, purchasers and QSSB's and secondary information are used as input to calculate the estimated number of food-grade soybean acres and contracted food-grade soybean acres in the U.S. from 2021 to 2023
- 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 Trade Statistics. The following secondary information is assumed to be accurate and is used in this study as known quantities:

	2021	2022	2023
Total U.S. Soybean acres planted (millions) <sup>1</sup>	87.20	87.46	88.02 <sup>4</sup>
Total U.S. Soybean Bushels (millions)	4,435	4,378	4,417
U.S. Non-GM Soybean acres (millions) <sup>1</sup>	4.36	4.37	4.40
U.S. Non-GM Soybeans marketed without premium <sup>3</sup>	219,607	245,920	234,227
U.S. Non-GM Soybeans marketed for premium (millions) <sup>3</sup>	4.14	4.13	4.17
Average GM soybean yield (bushels/acre) <sup>1</sup>	51.4	50.5	51.8
Estimated metric tons of U.S. soybeans exported (millions) <sup>2</sup>	52.9	58.65	52.9 <sup>4</sup>
Estimated bushels of U.S. soybeans exported (millions) <sup>2</sup>	2,145	2,085	2,1454

<sup>1</sup>Source: USDA/NASS, September 2022.

<sup>2</sup> USDA/World Agricultural Supply and Demand Estimates (WASDE) September 2022.

<sup>3</sup> Source: Current study of grower information.

<sup>4</sup>2023 Source only: 2023 projections based on USDA Long-Term Projections Report, OCE-2022-1, February 2022.



- 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 2022.
- The margin of error varies based on sample groups and response proportions. The following margin of errors are based on equal response proportions (e.g., 50% yes and 50% no). A sample size of 121 producers of non-GMO soybeans has a margin of error of +/-8.9 percentage points at a 95% level of confidence and +/-7.5 percentage points at a 90% level of confidence. Among food-grade producers only, a sample size of 66 yields a margin of error of 12.1 percentage points at a 95% level of confidence and 10.2 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 sample size of 17 purchasers of food-grade soybeans has a margin of error of +/- 26.2 percentage points at a 95% level of confidence and 22.1 percentage points at a 90% level of confidence. Given the small sample size of purchasers, information from this key stakeholder will be considered directional only.
- A The sample list of purchasers include 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.



## **Results From Non-GMO Growers**

### Non-GMO Food-grade Soybeans Quantification Study September 2022





- In total 121 non-GMO soybean growers provided input for this study. Growers were taken from a purchased list in counties where non-GMO soybean acres are concentrated and identified non-GMO soybean producers in SMR&Ps AgInsights Farm Panel.
- SMR&P used telephone interviews and online surveys from July 2022 to September 2022 to collect information from growers. To participate in this study, growers were required to meet the following criteria:
  - Decision maker about soybeans planted on farm
  - Plant more than 100 soybean acres in 2022
  - Plant non-GMO soybeans in 2022
- > The survey covered planting behavior each year from 2021 to 2023 (expected), including the following:
  - Total soybeans planted
  - Non-GMO soybeans planted
  - Portion of IP non-GMO soybeans planted to food-grade, feed-grade and organic soybeans
  - Number of Non-GMO soybeans that are not IP planted
  - Food-grade and feed-grade non-GMO soybeans planted under contract
  - Premiums for IP food-grade, IP feed-grade non-GMO soybeans, organic soybeans and non-GMO soybeans that are not IP
  - GMO and non-GMO yields
  - Purchasers of growers' food-grade soybeans (2022 only)
  - Future plans to plant IP non-GMO food-grade soybeans

USSEC Non-GMO Growers Sampled by State

Participating growers in this study are concentrated primarily in Illinois, Indiana, Ohio and Iowa (70%). No geographical quotas were imposed on the final sample. Approximately 55% of non-GMO growers sampled for this study produce non-GMO food-grade soybeans that are identity preserved and 48% of non-GMO growers produce non-GMO feed-grade soybeans. Another 6% produced organic soybeans.

	Growers Who Produce Non-GMO Soybeans in 2022		Non-GMO Growers Who Produce Food-grade Soybeans in 2022		Non-GMO Growers Who Produce Feed-grade Soybeans in 2022	
	Count	Percent	Count	Percent	Count	Percent
Illinois	28	23%	18	27%	11	19%
Ohio	20	17%	10	15%	11	19%
Indiana	19	16%	8	12%	10	17%
Iowa	17	14%	7	11%	10	17%
Minnesota	8	7%	7	11%	2	3%
South Dakota	6	5%	3	5%	4	7%
Other	23	19%	13	20%	10	17%
Total	121	100%	66	100%	58	100%

#### **2022 Sampled Growers**

\*Other states include Alabama (1), Arkansas (1), Kansas (2), Kentucky (1) Michigan (3), Missouri (4), Nebraska (2), N. Carolina (2), North Dakota (2), Pennsylvania (1), Wisconsin (4).



## **Non-GMO Growers' Soybean Acres**

### Non-GMO Food-grade Soybeans Quantification Study September 2022



# USSEC Types of Soybeans Planted by Non-GMO Growers

Most non-GMO growers produce GMO soybeans and either non-GMO food or feed-grade soybeans, but few produce both non-GMO food-grade and non-GMO feed-grade soybeans (10% or less).

Type of Soybeans/Planting Year	2021	2022	2023
GMO soybeans	58%	64%	63%
Non-GMO food-grade soybeans	52%	55%	50%
Non-GMO feed-grade soybeans	43%	48%	40%
Both, non-GMO food-grade and non-GMO feed-grade soybeans	10%	8%	10%
Organic soybeans	3%	6%	7%
Other soybeans (e.g. high oleic, Calyxt, etc.)	19%	17%	19%
Base:	121	121	121

#### % of Non-GMO Growers Who Plant Indicated Types Of Soybeans

Source (2022 study): Please distribute all of your soybean acres according to the following?

## USSEC Distribution of Non-GMO Growers' Soybean Acres

The chart below shows that non-GMO soybeans accounts for roughly half of non-GMO soybean producers' soybean acres. The other half is accounted for mostly by GMO soybeans, with less than 10% accounted for by organic, specialty soybeans and seed.



#### % of Non-GMO Growers' Soybean Acres Planted to Indicated Types of Soybeans

\*All other soybeans include high oleic, commercial soybeans for seed, organic, etc. \*\*Includes any food-grade, feed-grade and all other non-GMO acres, excluding organic. Source (2022 study): Please distribute all of your soybean acres according to the following?

## USSEC Non-GMO Soybeans Produced Under Contract

Roughly 78% of all non-GMO soybeans are produced under contract in 2022 (including growers who do not contract for their non-GMO soybeans). Among growers who contract at least some portion of their non-GMO soybeans, this figure increases to 86%. Year over year, roughly 85% of non-GMO acres are contracted.

#### % of Non-GMO Soybeans Contracted

Among all non-GMO growers
Among non-GMO growers who contract some portion



#### Base=121.

Source (2022 study): Of your total non-GMO soybeans that are sold at a premium, what percent (%) are produced under contract in the following years?

# **ISSEC** Non-GMO Soybeans Contracted vs. Sold as Commodity Beans

About 10% of growers sell roughly 5% of non-GMO soybeans without a premium, as one grower explains, "Non-GMO contract is based on bushels so any production over the contracted bushels just get sold as commodity beans." Other reasons why growers produce non-GMO soybeans but do not sell them for a premium is the desire to reduce seed and input costs. It is unclear what portion of non-GMO seeds that are sold without a premium are identity preserved.



### Reason For Selling Non-GMO Soybeans Without Premium

Reasons	%	Count
Reduce seed cost	53%	8
Reduce inputs	40%	6
Rotation	33%	5
Minimize herbicide resistance	33%	5
Other	33%	5
Tech/licensing fee	27%	4
Reduce other costs (excluding seed)	13%	2
Total	100%	15

#### Base=121.

Source (2022 study): Please distribute all of your soybean acres according to the following. [Non-GMO sold as commodity beans] Of your total non-GMO soybeans that are sold at a premium, what percent (%) are produced under contract in the following years?



# Food-grade & Feed-grade Soybean Acres

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## USSEC Distribution of Non-GMO Soybean Acres Only

- Non-GMO soybean acres are distributed almost equally between food-grade or feed-grade soybean plantings. Together, food-grade and feed-grade non-GMO soybeans account for over 90% of all non-GMO soybean acres in 2022, which is relatively unchanged from 2021.
- One notable trend is feed-grade acres as a portion of non-GMO soybeans are expected to decrease next season, thus food-grade and other types of non-GMO acres are expected to increase as a proportion of the total.



% of Non-GMO Growers' Soybean Acres Planted to Indicated Types of Soybeans

Source (2022 study): Please distribute all of your soybean acres according to the following?

# USSEC Non-GMO Growers' Food-grade Acres by Year

Results below suggest non-GMO growers are reducing their non-GMO food-grade acres. Roughly about 22% of all non-GMO growers' soybean acres are accounted for by food-grade soybeans in 2022. This figure is down from an average of 36% between 2016 to 2020. Part of the decline in food-grade acres is a result of the general decline in non-GMO soybean acres in general, which decreased by an estimated 15% from 2020 to 2021.



#### % of All Soybean Acres that are Non-GMO Food-grade Among Non-GMO Growers

### **SEC** Non-GMO Growers' Food-grade Acres And Average Annual Soybean Price By Year

Results observed in the chart below show the impact commodity soybean prices have on non-GMO food-grade soybean acres. Between 2020 and 2021, commodity soybean prices increased by 48% from \$8.98 in 2020 to \$13.30 in 2021. Results show during the same time period the portion of food-grade soybean acres declined by roughly 39% from 38% in 2020 to 23% in 2021.



% of Soybean Acres that are Non-GMO Food-grade and CBOT Soybean Prices



Trends observed in the chart below show a recent decrease in food-grade soybeans. Prior to 2021, non-GMO food-grade acres accounted for roughly 58% of growers non-GMO acres, on average. Results observed in the current study show a decline in the portion of non-GMO acres accounted for by food-grade soybeans to about 44% in 2022, a decline of about 24%.



% of Non-GMO Soybean Acres Accounted for by Food-grade Soybeans Among Non-GMO Growers

## USSEC Non-GMO Growers' Feed-grade Acres by Year

Non-GMO feed-grade acres have been more consistent over the past few years, despite commodity price fluctuations. Prior to 2021, non-GMO feed grade acres account for roughly 26% of all soybean acres produced by non-GMO growers on average. This figure is dropped by 7% in 2022 to 24%.



#### % of All Soybean Acres that are Non-GMO Feed-grade Among Non-GMO Growers

### USSEC Food-grade and Feed-grade Acres Produced Under Contract

The chart below shows that most all non-GMO acres, both food-grade and feed-grade, are produced under contract, according to non-GMO growers. Food-grade soybean acres are more likely to be produced under contract than feed-grade soybeans acres, the latter of which may or may not be identity preserved.



#### % of Non-GMO Soybean Acres Produced Under Contract

Source (2022 study): Of your total [feed-grade / food-grade] non-GMO soybeans, what percent (%) applies to each of the following categories? % Produced under contract

# USSEC Non-GMO Feed-grade Acres Used On-Farm

> Non-GMO growers use only a small portion of their non-GMO feed soybeans on their own farms.

#### % of Non-GMO Feed-grade Acres Used on Farm



■ % of Feed-grade Acres

Source (2022 study): Of your total [feed-grade] non-GMO soybeans, what percent (%) applies to each of the following categories? % used on farm

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## **Marketing Non-GMO Soybeans**

### Non-GMO Food-grade Soybeans Quantification Study September 2022





Most growers assert GMO and non-GMO soybeans yield about the same bushels per acre (63%). Close to one-third of non-GMO soybean producers report getting on average 6.7 fewer bushels from their non-GMO soybeans than their GMO soybeans (30%). Few growers believe their non-GMO yields exceed their GMO yields (6%).



Base=115. Bu/Acre=35.

Source (2022 study): How would you best describe your yields from your non-GMO soybeans? How many fewer bushels per acre would you estimate you get from your non-GMO yields compared to your GMO yields?



Growers report getting about 60 bushels/acre from their GMO soybeans and about 58 bushels from their non-GMO soybeans. The differences in stated yields favoring GMO soybeans supports non-GMO growers' assertion that they get more bushels from GMO soybeans than non-GMO soybeans, even though results suggest the yield gap is narrower in 2022.



#### **Soybean Yields**

Source (20221 study): What were your yields (bushels per acre) for the following types of soybeans? For 2022 and 2023, please give your expected yields. \*2023 Non-GMO expected excludes 0's due to growers who do not intend to plant non-GMO in 2023 responding 0.

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Non-GMO soybean yields have increased year over year from 2019 to 2022 by an average of about 3% each year.

Average Non-GMO Soybean Yields



Source (2022 study): What were your yields (bushels per acre) for the following types of soybeans? \*2023 Non-GMO expected excludes 0's due to growers who do not intend to plant non-GMO in 2023 responding 0.

### USSEC Average Premiums Received For Food-grade Soybeans By Year

Based on growers reporting, non-GMO food-grade premiums increased year over year between 2020 to 2022. They also indicate they expect this trend to continue in 2023.



#### Premium Received for Non-GMO Food-Grade Soybeans

Source (2022 study): What premium (\$) did you or do you expect to receive for the following types of identity preserved (IP) non-GMO soybeans in the following years? By premium, I mean the amount above what you receive for your GMO soybeans.



As the chart below shows, commodity prices have increased at a faster pace than non-GMO food-grade soybean premiums.



Source (2022 study): What premium (\$) did you or do you expect to receive for the following types of identity preserved (IP) non-GMO soybeans in the following years? By premium, I mean the amount above what you receive for your GMO soybeans.

### USSEC Impact of Current Premiums on Future Foodgrade Soybean Acres

Non-GMO growers suggest they will reduce their food-grade acres if the premium does not increase over the next year. In total, a net of 11% of growers (i.e., % decrease minus % increase) will decrease their food-grade acres if the premium is the same, as one grower explains, *"Not enough premium to pay for the weed mess we end up with.* Organic gets huge premiums and we don't and we still get the weed mess. Might as well grow conventional unless the premium is big." This figure could potentially increase or decrease with 21% of growers being undecided how the premium will affect their future plantings. Growers contend it will require a 34% premium increase for them to consider planting more food-grade soybeans from their current average premium of \$1.89 to \$2.54, which is the average premium growers report is needed to consider planting more food-grade soybeans.




# USSEC Factors to Increase Food-grade Soybean Production

Available markets is the foremost mentioned driver of food-grade soybean production. This includes both domestic and international markets, as one grower notes why he sold non-GMO soybeans without a premium, "Couldn't sell them to processor."



#### % of Growers

## Base=120.

Source (2022 study): What market factors or other signals have to be present for you to increase production of non-GMO food-grade soybeans?

## USSEC How Seed Companies and Purchasers Can Help Increase Non-GMO Soybean Production

- Nearly all growers contend higher yielding varieties is the one thing seed companies can do to increase non-GMO production (77%). Whether perceived or actual, the yield gap between non-GMO and GMO soybeans is still a deterrent for some growers to consider planting non-GMO soybeans.
- The main thing purchasers can do is to offer a minimum price guarantee for non-GMO soybeans (78%) to incite growers to increase production of non-GMO soybeans.



### % of Growers

What Seed Companies Can Do

## What Purchasers Can Do



#### % of Growers

#### Base=115. Source (2022 study): What would you need from seed companies for you to consider increasing your non-GMO soybean production?

## USSEC Impact of Soybean Prices on Growers' Planting Intentions

Results in the chart below suggest current commodity prices will negatively impact IP non-GMO soybean acres. While most growers will not change their current IP non-GMO acreage, more growers who are changing are likely to decrease rather than increase IP non-GMO acreage. Results suggest the reduction in IP non-GMO acres will be offset by more GMO soybean production. Given the precipitous increase in soybean commodity prices, many non-GMO growers have already begun to plant fewer food-grade acres.



#### % of Growers Changing/Not Changing Soybean Acres Due to Recent Soybean Price Increases

Source (2022 study): What, if any, impact has the recent increase in soybean prices had on your decision to plant the following types of soybeans?

## USSEC Purchasers of Non-GMO Food-grade Soybeans

Roughly half of non-GMO growers sampled report they will sell their non-GMO food-grade soybeans to Cargill (49%). The remaining growers will sell to a variety of other companies, including local elevators.

% of Non-GMO Growers Who Market Non-GMO Food-grade Soybeans to Indicated Companies



\*Each mention in other category accounts for 2% or fewer growers.

Source (2022 study): And which companies did or will you market your non-GMO food grade soybeans to this year, in 2022?



## **Non-GMO Purchasers Information**

## Non-GMO Food-grade Soybeans Quantification Study September 2022





- In total, **17 processors, purchasers or traders of non-GMO food-grade soybeans** provided input for this study.
- The list of companies was compiled by USSEC. Participating companies were required to have contracted or spot- purchased non-GMO food-grade soybeans in 2022. Note, the sample list does not necessarily represent the population of companies whose activities include contracting for/purchasing non-GMO soybeans.
- To increase participation, USSEC sent an email invite to qualifying companies for which contact information was available. Additional calls to purchasers were made to increase response rates.
- The online survey covered purchasing behavior each year from 2021 to 2023 (expected), including the following:
  - Methods used to acquire soybeans in general (i.e., contracts or spot purchase) and more specifically methods used to acquire IP non-GMO food-grade soybeans
  - Bushels of soybeans purchased, or acres contracted, including GMO, non-GMO food-grade, non-GMO feed-grade, organic, specialty soybeans.
  - End-purpose of IP non-GMO food-grade soybeans
  - Quantity of IP non-GMO food-grade soybeans exported outside the U.S.
  - Countries to which IP non-GMO food-grade soybeans are exported
  - Impact of commodity prices on non-GMO soybean purchases

USSEC Companies Participating In This Study

Most companies participating in this study purchased 500,000 or more bushels of non-GMO food-grade soybeans. About 30% of purchasers acquired one million or more bushels.



#### **Bushels of Food-Grade Soybeans Purchased**

Source (2022) Which of the following categories describes how many total bushels of IP NON-GMO FOOD-GRADE SOYBEANS did/will your company acquire? \*4 companies remained anonymous.

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Participating Companies \*



## Purchasers' Soybean Acquisitions

Non-GMO Food-grade Soybeans Quantification Study September 2022





As indicated in the chart below, purchasers participating in this study report most of the soybeans they acquire are non-GMO food-grade soybeans (69% in 2022). Note, the figures in the chart below do not represent actual bushels and thus does not take into consideration the size of the purchaser.



#### % of All Purchased Soybeans That Are Indicated Types

Base =17

Source (2022) Of the total soybeans purchased by your company, what percent (%) are of the following types?

## USSEC How Non-GMO Purchasers Acquire Soybeans

Nearly all non-GMO soybeans are acquired via contract (91% in 2022), 6% of non-GMO soybeans are spot-purchased and 3% or fewer are acquired from a 3<sup>rd</sup> party. Most purchasers have their own sourcing and contract programs (76%) and the remaining purchasers supplement their own sourcing programs with 3<sup>rd</sup> party sources.



Source (2022 study): Of all the NON-GMO soybeans acquired by your company, what percent (%) will be/were acquired using the following methods?

## Impact of Soybean Futures on Purchasers' Non-GMO Soybean Purchases and Purchase Methods

For most purchasers of non-GMO soybeans, soybean futures had no impact on their decision to purchase non-GMO soybeans in 2022 (65%). However, for the 35% of purchasers whose decisions were impacted by soybean futures (i.e., those who report they would purchase either more or less non-GMO soybeans), most all report they purchased fewer non-GMO soybeans in 2022 (84% of the 35% or 29% of all purchasers), with the primary reason being lack of interest among growers.



Factors That Influenced Decision To Purchase Fewer Non-GMO Soybeans (Verbatim Comments)

- Growers were not as interested in Non-GMO contracts
- I could and want to purchase more, at the right premium. We will be purchasing less though because the CBOT rally causes growers to favor GMO soybeans vs non-GMO.
- Premium for high oleic competing for acres CBOT too high New Higher yields for GMO s spread too far apart
- We didn't want to purchase less, but our growers were less interested in producing Non-GMO soybeans with the yield difference vs the new CBOT levels.
- We wanted to purchase more, but growers were not as interested in non -GMO contracts due to high CBOT prices.

Source (2022): Left chart - What impact did recent soybean futures prices have on your decision to purchase NON-GMO soybeans this year, in 2022? What factors did you consider that influenced your decision to [purchase more/purchase less]this year?



## **Food-Grade Soybean Purchases**

## Non-GMO Food-grade Soybeans Quantification Study September 2022





Purchasers report that about half of the non-GMO food-grade soybeans they acquire are high/ultra high protein. This is a self reported percentage based on purchasers' perceptions of high/ultra high protein. Since there is no written definition of high/ultra high protein, no definition was offered to the respondents.



#### % of Non-GMO Food-grade Soybeans Purchased That Are Indicated Types

Base =17

Source (2022): What percent (%) of the FOOD-GRADE IP NON-GMO soybeans acquired by your company will be/were the following value-added varieties?

# USSEC End-Purpose for Non-GMO Food-grade Soybeans (Unweighted)

Most U.S. produced non-GMO food-grade soybeans are destined to be used for tofu (37%) and soymilk (21%). Results, although directional, show an upward trend for natto.



#### % of Non-GMO Food-grade Soybeans Used for Indicated End Purposes

Bases=17.

Source (2022 study): What percent (%) of the FOOD-GRADE IP NON-GMO soybeans purchased by your company are used for the following end-purposes?



Nearly all food-grade soybeans are expected to be sold to international buyers (88% of non-GMO food-grade soybeans in 2022), The top international market is Japan, to where 65% of U.S. non-GMO food-grade soybeans will be exported in 2022. Taiwan and South Korea are the second largest markets receiving roughly 10% each of U.S. produced food-grade soybeans.



#### % of Purchased Food-grade Soybeans

Base=17.

Source (2022 study): 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.? And to which countries will the exported IP NON-GMO FOOD-GRADE soybeans go. Please enter the portion that will go to each country.



Most food-grade soybeans that are used domestically are sold to food companies (67% of food-grade soybeans in 2022). The remaining food-grade soybeans are sold to soybean processors.

100% 80% Food companies 67% 69% 70% 60% Soybean Processors 40% 20% 33% 31% 30% 0% 2022 2021 2023

% of Purchased Food-grade Soybeans Used Domestically

Bases=17.

Source (2022 study): Of the IP NON-GMO FOOD-GRADE soybeans purchased for domestic use, what percent (%) will be sold to the following?



# Supply and Demand Market Factors for Non-GMO Food-grade Soybeans

## Non-GMO Food-grade Soybeans Quantification Study September 2022



# USSEC Demand and Supply for Non-GMO Food-grade Soybeans

Purchasers agree that demand for non-GMO food-grade soybeans has increased (71% of purchasers) and is outpacing supply, as one exporter explains, "All markets are showing growth due to increased demand for retail products and poor supply." Another retailer concurs, "We've seen an increase in demand, but I think it's due to displacement from other companies also having trouble sourcing."



Source (2022 study): So we may better understand trends in the food-grade soybean market, how would you describe upstream demand for IP NON-GMO FOOD-GRADE soybeans in the past few years? You mentioned demand for NON-GMO FOOD-GRADE SOYBEANS has increased. What markets are showing growth?

## USSEC

## Market Signals from Producers to Consider Contracting More Food-grade Soybeans

Some of the primary market signals purchasers would like to see to consider for contracting more food-grade soybeans in the U.S. include better weed control for non-GMO soybeans, better yielding varieties (on par with GMO), higher premiums, lower CBOT soybean prices and shipping/freight issues resolved.

#### **Verbatim Comments**

- We are looking to increase producers. We have to find an equilibrium on premiums.
- Better yields, better weed control.
- Better non GMO weed control options. Enhanced soy breeding to narrow yield gap between GMO and non -GMO soy. Better delivery time frames-reduce delays due to freight issues. Competitive pricing with all the new local crush plants coming online within the next year.
- Higher **premium**.
- Need CBOT price decrease. More competitive non-GMO seed compared to GMO seed
- Other specialty crops have to have enough volume. Shipping dynamics have to improve
- **Freight** has to become reliable so that we can ship in a timely manner. Seed and herbicide companies must recognize the market space and quit pushing growers away from non-GMO.
- Production/supply cannot currently keep up with demand, so any additional production can be contracted and sold.
- Profitability and location.
- Yield, price.
- Lower prices.
- Willingness/desire to grow IP non-GMO which right now is not so high.
- Higher premiums higher yields.
- Producers will need higher **premiums** to consider growing food-grade soybeans. Interest, **freight**, **market prices**, **weed control** and **yield** loss vs GMO & the plenish markets have made it challenging to continue growing.
- **Premium** level need to commit to growing non-GMO.
- **Premiums** need to increase to continue to contract growers into an IP NGMO food grade soybean program. Higher **yields** are a very close second the NGMO soybean varieties aren't keeping pace with the newer GMO varieties.

Source (2022 study): What market signals or other factors have to be present from producers for you to consider contracting more IP NON-GMO FOOD-GRADE soybeans?

## USSEC

## Market Signals from Upstream Purchasers to Consider Contracting More Food-grade Soybeans

The primary market signals purchasers would like to see from upstream purchasers to consider for contracting more food-grade soybeans in the U.S. include higher premiums, better freight costs and delivery periods.

### **Verbatim Comments**

- Increased premiums to cover increased costs throughout the supply chain.
- Willingness to pay higher premiums.
- Purchasers need to understand the non- GMO MARKET has changed and demand is more competitive, which will lead to higher grower **premiums** and delivered price to their destination.
- Higher premium.
- **Premium** increase. CBOT price decrease.
- Realistic delivery windows.
- We have not met demand for 4 years USSEC needs to work on growers as much as end users or this market space will leave the USA for S.A.
- Ability to accept/absorb price increases dictated by producers.
- Willing to accept freight clauses, delivery periods, margins
- Variety, price.
- Higher prices.
- Market demand is there and still growing. The problem is supply.
- Higher premiums.
- Better freight supply/costs.
- Meet the higher costs it will take to contract and produce soybeans.
- Understanding the premium are increasing at A very fast pace.
- We believe the demand is already there and will increase, as the supply seems to be dropping.

Source (2022 study): What market signals or other factors have to be present from upstream purchasers for you to consider contracting more IP NON-GMO FOOD-GRADE soybeans?

## Other Market Signals to Consider Contracting More Food-grade Soybeans

A few market signals that will prompt purchasers to consider contracting for more food-grade soybeans that are consistently mentioned are higher premiums, better logistics/freight, better yield.

#### **Verbatim Comments**

- We need higher yielding high protein clear hilum soybeans to meet our market demands.
- We are always looking to expand our IP NGMO food grade soybean program, without the ability to pay higher premiums and good yielding varieties it will continue to be difficult.
- The ability to make money in this market segment.
- New varieties.
- Margins, risk.
- Logistics and supply chain working better, cheaper container freight.
- Larger grower base.
- Higher premiums.
- Freight issues.
- Consistent and affordable container availability.
- Young grower's interest for non-GMO soybean program.

Source (2022 study): What other market signals or factors, if any, have to be present for you to consider contracting more IP NON-GMO FOOD-GRADE soybeans?

# USSEC When Non-GMO Food-grade Soybean Purchase Decisions Are Made

Most purchasers report making decisions about contracting for food-grade soybeans in in October to December, following harvest in the prior season and prior to planting for the same season. By late December, most decisions about contracting non-GMO food-grade soybeans have been made.



Source (2022 study): When do you typically make decisions about the quantity of NON-GMO IP FOOD-GRADE soybeans your company will contract?

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## **Feed-Grade Soybean Purchases**

## Non-GMO Food-grade Soybeans Quantification Study September 2022



# USSEC Feed-Grade Soybean Purchases and Use

Few purchasers of non-GMO soybeans purchased non-GMO feed grade soybeans (28%) and less than half are identity preserved (44%).



Base =17

Source (2022 study): What percent, if any, of the NON-GMO FEED-GRADE soybeans purchased in the U.S. by your company are identity preserved? Of the total FEED-GRADE IP NON-GMO soybeans purchased in the U.S. by your company in the following years, what percent (%) will be used domestically and what percent will be sold for export to countries outside of the U.S.?



## State Soybean Boards & Industry Expert Interviews





# USSEC Sampled State Soybean Boards (QSSB)

- Personal interviews over the phone were used to gather information from states' soybean boards (QSSB's). Three QSSB's were contacted, Michigan, Ohio and Illinois. Interviews were conducted with persons within each organization familiar with soybean production in the state. Interviews were guided by a discussion guide that addressed three primary topics: current soybean issues, soybean production and future trends for non-GMO and specifically food-grade soybeans, with a particular focus on high value soybeans and especially IP non-GMO food-grade soybeans. In addition, three Industry Expert interviews were conducted with knowledgeable soybean industry experts from Cargill, University of Minnesota and Inari Agriculture..
  - Current Soybean Issues Discussed
    - Primary issues and opportunities most important to QSSB's
    - Role of a QSSB's in advancing soybean production in state
    - Issues important to the value chains
    - Identity preservation non-GMO production in state and production trends
      - Factors that limit/encourage non-GMO/food-grade soybean production
      - Effect of high commodity prices on Non-GMO production
  - Soybean Production Topics Discussed
    - Demand for IP non-GMO food-grade soybean
      - Demand trends
      - Food grade versus Feed grade Non-GMO
      - Indicators to identify demand trends
      - Demand sources
    - Export of IP non-GMO food-grade soybeans
  - Future trends in IP non-GMO food-grade soybeans discussed
    - Barriers
    - Growth potential
    - New soybean characteristics

# USSEC QSSB Interviews: Issues and Opportunities

### > What are the primary issues and opportunities that are most important to your QSSB?

Illinois	Michigan	Ohio
Overall top priorities are to Represent farmers , sustainable quality, market development, increase awareness and increase market share of meal and oil for livestock	<ol> <li>Michigan soybean farmers have abundant new and existing market options.</li> <li>Michigan soybean farmers are profitable and environmentally sustainable.</li> <li>Michigan soybean farmers make well informed decisions.</li> <li>Consumers support Michigan soybean farmers</li> <li>Breed development is also a high priority for value-added soy.</li> </ol>	Priorities are: 1 Research – Plant Yield Disease New Use 2 OSU Research Center 3 Commercialization Of Consumer Uses 4 Increase Demand For Exports 5 Renewable Fuels 6 Livestock & Poultry (Egg) Feed 7 Education (Grow Next Gen) Ag Science 8 Farmer Outreach

# **USSEC** QSSB Interviews: Issues and Opportunities

What do you see as the future role of a QSSB in advancing soybean production in your state in the future?

Illinois	Michigan	Ohio
Same things: IL close to river so Exports important Container loading available #1 producer of Non GMO	Control of limiting factors through production research, such as pests, nutrient management, and other agronomic factors. Along with funding the development and advancement of food grade and all specialty soy. Educate specialty soybeans first	Same as the priorities.
	purchasers in Michigan about the availability, quality, and benefits of specialty soybeans first purchasers in Michigan. Educate the specialty soybean value chain about the opportunities for market development.	

# USSEC QSSB Interviews: Prioritization of Value-Added Soybeans

How high a priority is it for your board to increase value added soybean acres? Is your board focused on growing specialty soy/value added soy acres in your state?

Illinois	Michigan	Ohio
Increase technology Logistics Transportation New markets	High & Yes	Yes – Several ways We worked with USSEC and target USSEC projects High percentage of non-GMO and food grade in Ohio We are partners with USSEC for Japan and Korea exports for non-GMO

### What traits/varieties is your board focused on growing?

Illinois	Michigan	Ohio
High Oleic + Low Linoleic Increased Oil Content	Natto High Oleic + Low Linoleic Higher protein soybeans Others: high sugar, general non-GMO	High Oleic + Low Linoleic Higher protein soybeans

# USSEC QSSB Interviews: Importance of Non-GMO

### How important is non-GMO soybean production in your state?

Illinois	Michigan	Ohio
We support whatever the growers are doing Bulk and Conventional Soybeans market is strong Beans are planted. If price holds Non- GMO declines.	Our board of directors considers non- GMO soy a high priority area that is supported by our production research, market development efforts and farmer facing communication.	Very Important. Some non-GMO soybean is Organic Gunnar Lynum – Liaison with SE Asia - Ohio pays for travel to SE Asia for Strategic Market Development

## What would you guess is the percent of all soybean production in your state that is non-GMO soybeans?

Illinois	Michigan	Ohio
Not Much	10%	12%

# USSEC QSSB Interviews: Importance of Non-GMO

### > Has this figure increased, stayed stable or decreased in the past 5 years?

Illinois	Michigan	Ohio
Decreased - Due to commodity prices	Decreased - Due to weed control issues some growers have switched to GMO varieties to help control weed species. Growers are also able to be profitable within the general commodity soy market so are not as driven to find premium opportunities.	Stable - Maybe a stable or slight increase in first 4 years, but the last years loss was so significant we need to say decreased overall

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## USSEC QSSB Interviews: Types of Non-GMO Soybeans Produced

If you could portion out non-GMO production in your state, what percent would go to the following types of soybeans?

	Illinois	Michigan	Ohio
Organic soybeans		25%	1%
Food-grade IP Non-GMO soybeans (excluding organic)	60%	60%	50%
Feed-grade Non-GMO soybeans (excluding organic)	40%	14%	49%
Other Non-GMO soybeans that are not IP (i.e., sold as commodity soybeans)		1%	

### How do you see these proportions changing?

	Illinois	Michigan	Ohio
Organic soybeans	Stable	Stable	Stable
Food-grade IP Non-GMO soybeans (excluding organic)	Decreasing	Increasing	Stable
Feed-grade Non-GMO soybeans (excluding organic)	Decreasing	Stable	Stable

## USSEC QSSB Interviews: Indications about Future Non-GMO Production

Do you have any indication that demand for non-GMO food-grade soybeans is increasing or decreasing? What indications and what trend do they point to?

Illinois	Michigan	Ohio
Decreasing – Due to: Buyers and growers World Events Less Demand for Specialty	Increasing - Our processors indicate this trend	Major Contractors Buying more •Wellman •Schwartz •Bluegrass Farms (50 – 60K acres) •KAPI (Konamatsu Ag Products) •Delong

### > Do you anticipate any new food-grade characteristics in soybeans being made commercially available?

Illinois	Michigan	Ohio
Soy Oleic	High Oleic Non-GMO	Soy Oleic – High Oleic Non-GMO

# USSEC QSSB Interviews: Export and Domestic Use of Food Grade Soybeans

What percent of non-GMO food-grade soybeans would you estimate are exported vs. used domestically?

	Illinois	Michigan	Ohio
Exported	60%	90%	60%
Domestic Use	40%	10%	40%

### How are non-GMO food-grade soybeans being used domestically?

Illinois	Michigan	Ohio
Domestic Livestock Meal Oil and Renewable Fuels Sustainable Aviation fuel	Soy foods	Plenish or Soy Oleic impact affects premium Soy milk market Soy food

# **USSEC** QSSB Interviews: Barriers to Non-GMO

Do you estimate domestic non-GMO food-grade soybeans use will increase, stay the same, decrease? Why?

Illinois	Michigan	Ohio
Decrease - Due to demand	Increase - Growing popularity of plant based diets	Increase - If end users can get what they want at the price they want Demand is going up

### > What are the primary barriers limiting production of more non-GMO soybeans in your state?

Illinois	Michigan	Ohio
Market Access	Weed control options, delivery points and distance to them, on farm storage	Premium is too low

## USSEC QSSB Interviews: New Bio-Tech Traits

What are the primary barriers limiting production of more high value IP non-GMO soybeans in your state?

Current network has many markets so Storage over time and complications of Available containers for export – cos	linois	Michigan	Ohio
growers have options       storing multiple varieties       and availability         High prices for commodity soybeans       High prices for commodity soybeans         Farmers know how to grow food gran       Non -GMO	urrent network has many markets so rowers have options	Storage over time and complications of storing multiple varieties	Available containers for export – cost and availability High prices for commodity soybeans Farmers know how to grow food grade Non -GMO

### What new bio tech traits do you see being developed?

Illinois	Michigan	Ohio
Resistance New efficient yields	SCN (Soybean Cyst Nematode) resistance options (hopefully)	Corteva - Pioneer Enlist trait will be in Plenish


- Industry Experts generally agree with the direction outlined by the QSSB's interviewed. The consensus is that Non-GMO acres have declined substantially in the past few years. Food-grade soybeans have remained more stable, but still have been reduced.
- While the USDA report on GE soybean acres shows consistent percentages of GE (thus Non-GMO as well) Experts agree the fluctuations within individual states should probably be greater.
- Production of Non-GMO soybeans in 2022 will be down substantially due to the commodity prices being high.
- Consumer demand may actually be decreasing a bit due to inflation. With commodity prices high and the premiums adding to contractor costs, the increased cost of Non-GMO products may be a factor in reducing demand.
- These industry respondents feel the organic market for dairy will not grow substantially, thus decreasing the need for non-GMO soybeans for feed.
- Some processing programs for feed-grade soybeans are used to enhance protein content, but this is smaller than the food grade market.
- Yields in Non-GMO are now equal to GE varieties given the genetic improvements in Non-GMO varieties. But this trend is less recognized among a portion of growers. Experts agree the yield drag of Non-GMO is negligible at most 2-3 bushels.



- However, premiums for Non-GMO soybeans, even for food-grade, have not kept up with the price increases for commodity beans. Thus, growers are removing some acres from Non-GMO and converting back to commodity soybeans.
- Contracting for non-GMO acres is especially difficult given the risks associated with growing the crop. Similar to wheat premiums offered in the past, not only must they contract enough to meet expected purchases, but they must also add acres to account for weather related reductions in the yields (excessive rain, drought, hail etc.). Geographic dispersion is also necessary to avoid weather and disease related danger to the crops.
- Despite the premiums offered, growers continue to find the costs and "hassle" of Non-GMO production and IP segregation to be a deterrent to growing Non-GMO soybeans. Several very large growers known to the respondents were planting conventional (Non-GMO) varieties for the premiums. However, they moved away from this effort with the rise in CBOT commodity prices.
- Very large growers that have access to export markets for contracted Non-GMO soybeans are still able to utilize the premiums for these beans for some of their production. And the large contractors still contract for those acres. These respondents feel it is the "middle men" (those purchasing smaller quantities and selling to larger contractors) that are decreasing their purchases of Non-GMO.
- While these experts agree that most Non-GMO food grade soybeans are destined for export markets, the demand for domestic crush is still robust. One expert cites the example of a poultry facility in N.E. Arkansas that is marketing Non-GMO poultry but is having a hard time sourcing Non-GMO feed.



# U.S. Non-GMO Soybean Production Estimates

Non-GMO Food-grade Soybeans Quantification Study September 2022



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

- Historically, non-GMO food-grade soybean production in the U.S. tracks parallel to non-GMO soybean production in general. However, in 2021 and 2022, the decline in non-GMO food-grade soybeans is greater than the overall decline in non-GMO soybeans.
- For the current year, we estimate 1.9 million food-grade soybean acres were planted. This is down from the prior years and represents the fewest food-grade acres planted over the past five years.



Estimated Soybean Acres (Millions) in the U.S.



- Tracking non-GMO soybean acres by state is an indication for where food-grade soybeans acres are likely produced. USDA data shows that Illinois, North Dakota, Indiana, Ohio and Iowa produce most of the non-GMO soybeans in the U.S. (56%), even though a higher portion of soybean acres were planted to non-GMO soybeans in North Dakota, Wisconsin, Indiana, and Michigan (7%-8%).
- Over the past year, Ohio had the biggest increase in non-GMO soybean acres (58% increase) and is also the fourth largest producer of non-GMO soybeans. In contrast, the top three non-GMO soybean producing states decreased their non-GMO acres, including Indiana (20% decrease), Illinois (15% decrease) and N. Dakota (11% decrease).

Non-GMO Quantity Rank	State	2021 Non-GMO % of All Soybeans	2021 Non-GMO Acres	2022 Non-GMO % of All Soybeans	2022 Non-GMO Acres	% Change
4	ОНЮ	4%	194,000	6%	306,000	58% 🛧
12	MICHIGAN	7%	150,500	7%	157,500	5% 🛧
13	ARKANSAS	2%	61,000	2%	63,600	4% 🛧
10	KANSAS	4%	194,000	4%	202,000	4% 🛧
14	MISSISSIPPI	1%	22,300	1%	23,100	4% 🛧
8	NEBRASKA	4%	224,000	4%	230,000	3% 🛧
5	IOWA	3%	303,000	3%	303,000	0%
6	MINNESOTA	4%	308,000	4%	298,000	3% 🖊
11	WISCONSIN	9%	189,000	8%	172,800	9% 🖖
2	NORTH DAKOTA	7%	511,000	8%	456,000	11% 🖊
1	ILLINOIS	6%	636,000	5%	540,000	15% 🖊
3	INDIANA	9%	513,000	7%	409,500	20% 🖊
9	SOUTH DAKOTA	6%	330,000	4%	204,000	38% 🖊
7	MISSOURI	7%	399,000	4%	244,000	39% 🔶

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

Roughly 80% to 85% of growers' non-GMO food-grade soybeans are produced under contract each year. For 2022, growers reported 88% of the non-GMO food-grade acres were produced under contract. This translates to about 1.7 million acres in 2022.



#### Estimated Soybean Acres (Millions) in the U.S.



### **Non-GMO Food-grade Soybean Exports**

Non-GMO Food-grade Soybeans Quantification Study September 2022



# **USSEC** U.S. Soybeans Exported to Other Countries

The U.S. will produce about 4.4 billion bushels of soybeans in 2022 or 119 million metric tons (MMT), of which about half will be exported to other countries (46% in 2022). Among the roughly 46% of U.S. soybeans that are exported in 2022, non-GMO food-grade soybeans account for about 1.7% or roughly 35 million bushels. In 2022, the U.S. is expected to export just under 1 MMT of non-GMO food-grade soybeans to other countries. This figure is expected to decrease to 0.94 MMT (44.7 million bushels) in 2023.

All U.S. Soybean Production <sup>1</sup>	2021	2022	2023
Bushels of All Soybeans Produced in U.S.	4,435	4,378	4,417
Metric Tons of All Soybeans Produced in U.S.	120.70	119.15	120.21
U.S. Soybeans Exported <sup>2</sup>	2021	2022	2023
Bushels of All U.S. Produced Soybeans Exported	2,145	2,085	2,145 <sup>4</sup>
Metric Tons of All U.S. Produced Soybeans Exported	52.89	58.65	52.90 <sup>4</sup>
U.S. Non-GMO Food-grade Soybeans Exported <sup>234</sup>	2021	2022	2023
Bushels of U.S. Produced Non-GMO Food-grade Soybeans Exported	37.72	35.04	38.15
Metric Tons of Non-GMO Food-grade U.S. Produced Soybeans Exported	1.03	0.95	1.04

U.S. Produced Soybean Quantities Exported to Other Countries (Millions)

<sup>1</sup>Source: USDA/NASS, September 2022.

<sup>2</sup> USDA/World Agricultural Supply and Demand Estimates (WASDE) September 2022.

<sup>3</sup>2023 Source only: 2023 projections based on USDA Long-Term Projections Report, OCE-2022-1, February 2022.

<sup>4</sup> Includes only contracted food-grade soybean acres.

Strategic Marketing Research & Planning

#### **SEC** Destination Countries for U.S. Non-GMO Foodgrade Soybeans

According the USDA, Japan imported 2.39 MMT of soybeans in 2021 and 2.45 MMT in 2022 (est.) from the U.S. Information from Japan's Ministry of Agriculture and Fisheries (2020) and USDA information in 2022 indicates about 25% percent of Japan's soybean supply is food-grade. Applying this portion to 2021 and 2022 U.S. exports to Japan means food-grade acres to Japan accounted for roughly 596 thousand MT in 2021 and 612 thousand MT in 2022 based on USDA information or roughly 68% of Japan's soybean supply (excluding domestic production). Purchasers in this study report 89% of U.S. produced food-grade acres will be shipped to Japan in 2021 and 2022 (1.7% of all soybean exports). Thus, this study estimates the U.S. exported roughly 675 thousand MT of non-GMO food-grade soybeans to Japan in 2021, 657 thousand MT in 2022, and is expected to export 704 thousand in 2023.



Thousands MT of Non-GMO Food-grade Soybeans Exported To Other Countries

1Source: USDA Foreign Agricultural Service, Global Agricultural Information Network, Oilseeds and Products Annual: Japan, Report JA 2021-0043, March 30, 2021. 2Source: USDA Foreign Agricultural Service, Global Agricultural Information Network, Utilization of Food-Grade Soybeans in Japan: Japan, Report JA 2021-0040, March 24, 2021.

\* Based on average U.S. portion of all soybean exports to Japan from 2019 to 2021.



## **Conclusions & Implications**

#### Non-GMO Food-grade Soybeans Quantification Study September 2022





- Based on USDA data, there were 87.5 million acres of soybeans planted in the U.S. in 2022. Of these, 5% or 4.4 million acres, are non-GMO soybeans.
  - Over the past year, the top three producing non-GMO soybean producing states decreased their non-GMO acres, including Indiana (20% decrease), Illinois (15% decrease) and N. Dakota (11% decrease). In contrast, Ohio, the fourth largest non-GMO producer state, increased non-GMO soybean acreage by 58%.
- Food-grade soybean acres account for 44% of non-GMO acres or 1.9 million acres. This study estimates contracted non-GMO food-grade soybean acres account for about 88% of total food-grade soybean acres or 1.7 million acres non-GMO food-grade soybeans produced under contract in the U.S in 2022. Most of the remaining non-GMO acres are feed-grade (48% or 2.1 million acres). Organic and other specialty soybeans account for less than 10% of non-GMO acres.
- The single largest percent of U.S. produced non-GMO food-grade soybeans are destined for the tofu market (37%). Another 21% will be used for soymilk. Natto accounts for 17% and miso accounts for 10% of U.S. produced food-grade soybeans . All other uses such as sprouts account for less than 10% of U.S. produced non-GMO food-grade soybeans.
- The U.S. is expected to export 59 million metric tons (MMT) of soybeans in 2022 or about 49% of its total soybean production. This figure is up from 53 MMT of soybeans of exported in 2021.
  - Non-GMO food-grade soybeans account for about 1.7% of exported soybeans or 0.95 MMT, which is down from 1.03 MMT in 2021. However, this figure is expected to increase to 1.04 MMT in 2023.
  - Most U.S. non-GMO food-grade soybeans are destined for Japan, which is expected to import between 600 and 700 thousand MT of non-GMO food-grade soybeans in 2022 based on information from this study. Japan, Taiwan and Thailand are expected to increase imports of U.S. produced non-GMO food-grade soybeans in 2023. South Korea, on the other hand, is expected to import fewer food-grade soybeans in 2023.



- Results from this study suggest the slower non-GMO food-grade production in the U.S. is caused by one-side the supply side, as one purchaser states, "Market demand is there and still growing. The problem is supply." Most all purchasers see an increase in demand for food-grade soybeans but contend it has been very difficult to fulfill that demand with current U.S. non-GMO food-grade soybean production. One of the primary reasons is lack of grower interest. Higher soybean prices coupled with weed control issues, perceived yield deficits have all resulted in growers' lack of interest in planting non-GMO soybeans, as one purchaser explains, "We didn't want to purchase less, but our growers were less interested in producing non-GMO soybeans with the yield difference vs the new CBOT levels."
- This has had a domino effect as some companies are backing away from this market, leaving fewer local markets, as one grower explains, "We want to plant the same amount but our elevator is backing out of the non-GMO program." In addition to a 34% premium increase, nearly half of growers contend they would have to see more local markets to consider planting more non-GMO food-grade soybeans. In addition to lack of grower interest, there have also been disruptions in the supply chain freight and shipping, as one purchaser states what could prompt him to purchase more food-grade soybeans, "Logistics and supply chain working better, cheaper container freight."
- From growers' perspective, the current non-GMO food-grade premiums don't track parallel to soybeans prices. In 2021, when commodity prices increased by roughly 48% over the previous season, non-GMO food-grade soybeans increased by only 4%. In 2022, commodity prices increased by about 18% and non-GMO food-grade soybeans increased by about 13%. It is possible that non-GMO food-grade soybean production will increase as soybean commodity prices begin to descend. However, there will need to be a compelling argument to bring growers who left the market over the past couple of years back, as issues with weed control and yield drag still remain. As one growers explains, "Depends upon yield vs GMO soybeans. If they are about the same stay with current levels if the GMO yield more plant less non-GMO." Another grower concurs, "Weed pressure is Increasing and the GMO's bean out preforming the NON-GMO's."





