Survey of the Rye Value Chain in the Northeast

Full Report

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Introduction

Rye is a cereal grain and an important rotation crop in many sustainable and organic farming systems. It is one of the most frequently planted cover crops in the United States (Wallander et al., 2021). Producers would like to find a market for rye products to get a cash return for their crop, while retaining most of the agronomic and environmental benefits.

Farmers in the Northeastern states lack vital information needed to grow high-quality rye for food and beverage markets. At the same time, many millers, bakers, distillers, and maltsters in the region have expressed difficulty in obtaining rye grain of suitable quality and in sufficient quantities. Various state government initiatives to promote grain products have created a demand for rye grain grown in those states (see table 1). However, acreage planted to rye remains relatively small. Once a principal commodity in the United States, rye futures peaked in 1944 but subsequently declined in importance. Rye futures were dropped from the Chicago Board of Trade in 1970. The National Agricultural Statistical Service reported only acreage for Pennsylvania in their 2022 Small Grains report, with 190,000 acres planted but only 17,000 acres harvested in 2022 (USDA / NASS, 2022).

To learn more about the market opportunities, constraints, and barriers to the adoption of rye as a rotation cash crop, a team of researchers from the University of Vermont and the Glynwood Center conducted a survey of supply chain actors in the rye value chain. The purpose of the survey was to identify the main concerns of the different actors, gather market information, and understand what is needed to increase rye acreage in the Northeast region. The survey was

intended to gather preliminary information, and was not designed or conducted to be a comprehensive survey of a sample of the population. The survey was followed by a series of targeted focus groups with volunteers identified in the survey.

Methodology

The survey was conducted following a tailored design method (Dillman et al., 2014). The research team designed a survey instrument that was branched to reflect the various roles in the rye value chain. The instrument is included in Appendix A.

Actors identified in the value chain were growers, cleaners and aggregators, seed suppliers, food mills, feed mills, maltsters, and distillers. Questions were specifically designed for each group. The survey was conducted online through Qualtrics.

The researchers identified relevant and trusted organizations in the supply chain throughout the Northeast and North Central regions, as well as some national organizations. These included the Artisan Grain Collaborative, the Common Grain Alliance, the Craft Maltsters Guild, the Millers Peer Learning Group, the New York Distillers Guild, the Northeast Organic Farmers Association (NY), the Northern Grain Growers Collaborative, and the Ograin Project. The combined number of email addresses resulted in 16,022 contacts. Because the lists were controlled by the different organizations, we were unable to identify duplicates. The lists were also sent out at different dates depending on the schedules and availability of the different organizations. The population contacted does not reflect all possible stakeholders in the region. Parametric statistics are not appropriate and results are reported as general findings rather than analytically.

As the objective of this survey was preliminary fact-finding, the methodology was designed for the more practical purpose of gathering a wide range of experiences rather than statistical validity. As such, the project team acknowledges a respondent self-identification bias of interest in the successful outcome of the study.

Designers of the survey used best practices for an internet survey (Dillman et al., 2014). The survey instrument was designed to be completed in under 20 minutes, with 30 minutes expected to be the maximum for respondents who performed multiple roles—such as producer, cleaner, miller, or seed supplier—in the value chain.

Baker and brewer associations were deliberately not specifically contacted as the end point of the value chain.

The survey was initially sent out between February 14, 2023 and April 15, 2023. At least one reminder was sent by each collaborating organization. The survey was closed on June 12, 2023. Survey results were reviewed in the fall of 2023. Four primary and secondary processor focus groups (farmers, maltsters & distillers, millers & bakers, and feed & seed handlers) were convened in order to gather more detail and build additional context around rye production and processing. Invitations were emailed to specific actors from each group to join a virtual call with

a goal of four to six participants in each group. The project team interviewed three farmers, two maltsters, two distillers, two bakers, one miller, and one feed miller. Questions, shared with participants prior to each call, were designed to gather more detail about production and processing challenges, quality requirements, varietal attributes or preferences, grain supply, and market opportunities. Follow-up focus groups were conducted on September 8, 2023 and September 15, 2023.

Results

The investigators received the following responses from actors in the domestic cereal rye supply chain. Because a respondent can play multiple roles in the value chain, the total number of roles represented adds up to over 100%. The largest number of respondents were producers that grow cereal rye commercially, making up over a third of the respondents. Distillers and millers accounted for nearly a quarter of the responses.

Geographical Coverage

We gathered basic information on the state where the respondent operated, with a focus on the Northeast. However, some of the associations' lists were national or covered a region that partly included the Northeast and North Central or Southeastern SARE regions. Table 1 gives the number of responses received from each state.

Table 1: Responses by State

State	Number	%
Connecticut	3	2.9
Delaware	1	1.0
Maine	6	5.9
Maryland	3	2.9
Massachusetts	5	4.9
New Jersey	1	1.0
New York	31	30.4
Pennsylvania	2	2.0
Vermont	6	5.9
Other*	44	43.1
Total	102	100%

**Producers responding from outside the Northeast SARE Region were from the following states: (Alaska (1), California (1), Illinois (4), Michigan (2), Minnesota (7), North Carolina (3), Ohio (7), Oregon (1), Virginia (9), Wisconsin (9).*

We received responses from 19 states, including several states from outside the Northeast. The state with the most responses was New York with 31, followed by Virginia and Wisconsin. Cornell Cooperative Extension actively promoted the survey, and the Glynwood Center was

also active in follow up contacts. We received no responses from New Hampshire, Rhode Island, or West Virginia in the Northeast region.

Supply Chain Actors

The different roles performed by those taking the survey are summarized in Table 1. Because the people taking the survey can play multiple roles in the supply chain, the number of roles is greater than the number of responses.

Table 2: Respondent roles in the rye supply chain

Role	**% (N=146)**
Grow commercially	35.6
Clean/aggregate	11.6
Sell seed for planting	18.5
Sell for animal feed	7.5
Mill for human food products	22.6
Distiller	24.7
Maltsters	6.2
Not currently working with rye	13.0
Other	19.9

Over a third of respondents were growers. About a quarter were distillers. Even though bakers' associations were not included in the survey, the leading entry for "Other" was baking, with nine respondents giving that as a fill-in answer. Several respondents were vertically integrated from rye grain production to consumer-ready products. Six respondents grew rye that they made into distilled spirits, one of whom also malted. Three respondents grew rye for human consumption, implying that they directly market the rye.

After baking, the second most popular "other" response offered was the growing of rye as a cover crop. It was not clear from the responses in every case whether they grew their own rye for the purpose of replanting as a cover crop or were purchasing rye seed annually. Several producers clean and aggregate rye.

The survey also received 19 responses from people not currently working with rye. All nine responses asking for more specific information about what role they could potentially play were from producers who were interested in producing rye. Of these, the main reason given for not growing rye was the lack of markets or low prices.

Growers

Commercial rye growers were asked to rank the most important attributes in choosing which rye varieties to grow. The results are summarized in Table 3.

Table 3: Top Attributes/Concerns of Rye Growers

Attributes/Concerns	**% (N=52)**
Organic	44.2
Germination rate	36.5
Pathogens/toxins (DON, Ergot, etc.)	30.8
Flavor	26.9
Variety	23.1
Some other trait? (describe)	21.2
Disease resistance	15.4
Test weight	13.5
Cleanliness	11.5
Cold tolerance	11.5
Falling number	11.5

The attribute ranked highest by respondents was whether the rye was certified organic. Germination rate was the second most cited attribute, reflecting the importance of the seed market and the fact that many growers save their own seed for planting. Pathogens (including DON and ergot) ranked third, followed by flavor. Falling number, a measure of pre-harvest sprouting especially important for bakers, ranked tenth among growers, which may indicate that growing rye for the milling market is less common than other end uses. Focus group interviews confirmed that growers are often unclear about required specifications for baking-quality rye.

Just under a quarter of respondents indicated that rye variety was an important consideration for their buyers or for other end uses. While yield is often assumed to be an important priority for growers, responses did not indicate yield as a top concern. This may point to differences in end uses such as cover crop and roller crimping or for harvesting to maturity as seed or whole grain.

The concerns identified by fewer than 10% of respondents are omitted from the table. In descending order, these are moisture content, drought tolerance, local source (grown locally, within a region or state), protein content, purity, extraction rate, and starch content. Eleven responses named concerns that were not included.

Based on past experience with surveys on other small grains, yield was not included as an option because it was expected to overwhelm the other results. Three respondents named yield as a concern under the “some other trait” option. Two reported lodging, (when the stems of a crop have completely or partially fallen over, due to root damage or wind and rain damage) as a concern. Height and biomass were specifically named as well, but it wasn’t clear if this was related to lodging or straw production. Another response cited adaptivity and survivability in the producer’s specific growing environment. Finally, one response specifically named ergot resistance as a concern, which could be grouped under disease resistance.

When asked for more detailed information about the specific production challenges they faced, growers responded with several clear themes. Winter hardiness and ability to germinate in cold temperatures during late winter and early spring plantings was mentioned by several growers in

the Northeast region. Germination rates are seen as a common problem in general. Diseases and mycotoxins are a regional concern in the humid Northeast. Several growers mentioned ergot and deoxynivalenol (DON) as problems related to climate.

One producer who also is a distiller made this observation: *"We have had uneven germination, probably due to the conditions of our fields more than the seed. We found VNS rye to be bland in our whiskey compared with known varieties we have purchased. We don't have a good grain dryer onsite so we wait until the last minute to cut the rye, to keep moisture low, but in a wet year this has been a problem."*

Table 4: Commercial Rye Market Channels

Market Channels	**% (N=50)**
None	14.0
1	20.0
2-4	36.0
5 or more	30.0

Most producers sold rye to more than one customer, with nearly a third selling to five or more customers (Table 4).

Growers were also asked about the end uses of the rye they grew. Producers sold to multiple markets, including specific target markets. The results are summarized in Table 5.

Table 5: Producer End Uses for Rye

Rye End Uses	**% (N=52)**
Seed for planting	46.2
Distilling	38.5
Flour	34.6
Animal feed	23.1
Berries	21.2
Malting	15.4

By a wide margin, producers mainly grew rye for seed, with the distillation market the second most common reason, and milling grade for flour third. (These responses may reflect a sampling bias towards distillers and away from bakers.) Most farmers did their own cleaning. None of the producers sold rye to be flaked. One farmer baked bread. Farmers who retained rye and did not sell it mostly used it as seed for planting and as cover crop. Two producers grew it as animal feed for their own livestock.

While a slight majority of producers responding were able to sell all their rye, almost half (47.4%) did not sell all the rye that they produced. It was not clear from the volunteered responses how many retained some or all rye for on-farm use, including saving seed for the following crop, planting of cover crops, feeding to on-farm livestock, and producing value-added products such as bread and whiskey on-farm. One grower indicated that they carry over some production from the previous crop to fill the summer gap before harvest of the current season's crop.

The lack of a ready and accessible market was a common complaint, cited by about a third of the producers who were unable to sell all of their rye crop. Larger-scale producers indicated that they overestimated the size of the potential market. Two cited high DON levels as a reason why they were unable to sell to their intended markets in a given year.

The grower focus group was held on September 8, 2023. Emails were sent to seven rye farmers from across regions, who had directly expressed a desire for assistance in developing the market for rye. Three growers attended the focus group. Low yield was cited as a challenge, particularly by comparison with corn. The farmers on the call echoed the survey results about low prices making rye more attractive as a cover crop than a commercial one. Another farmer described rye as having respectable yields without having to buy inputs when grown in rotation with other crops. Another farmer explained that on his farm rye is the only grain that can be planted in the late fall/early winter following the corn harvest, survive the winter, and still produce a crop the following year. He described planting rye after corn, combined with red clover, for soil building. Two farmers described a benefit of rye as an offset to purchasing additional inputs, not always a profitable crop on its own, but offering additional benefits to the soil and subsequent cash crops that make it a worthwhile crop to continue planting.

Most of the producers in the focus group sold rye for seed, rather than to other value-added markets. One was selling to a distiller, who paid better than seed prices. Most were interested in selling more to food-grade or to distillers. All farmers on the call indicated that there are many unknowns about rye quality specifications, especially for the food and beverage markets. Specifications for rye are not as widely or concretely known as they are for wheat or barley. The markets do not always know what they are looking for. One farmer stated 'if markets can tell us what quality they're looking for farmers will figure out how to grow it, they just don't know'. All producers agreed on the need for farmer technical assistance with one stating that because rye fell out of favor, "we don't have the know-how and Extension (agricultural extension services) is playing catch-up."

Distillers

After growers, the second largest group to respond was distillers. Distillers were specifically targeted as a high-value premium market for rye grain. The investigators achieved a high response rate from this group and sent survey reminders with the help of various regional distilling organizations. The top concerns of distillers are summarized in Table 6.

Table 6: Top Concerns of Rye Distillers

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Characteristic	% N=36
Flavor	58.3
Local source	52.8
Starch content	27.8
Variety	22.2
Cleanliness	22.2
Pathogens and mycotoxins	16.7
Organic	16.7
Moisture content	13.9
Protein content	13.9

Respondents identified flavor as the top concern, followed by finding local sources for rye. The two factors indicate that there may be an underexplored niche in breeding for terroir. Demand for local grain may reflect specific state programs that favor or provide incentives for local distilleries.

Starch content was the third highest concern for distillers. Other factors identified by over 10% of respondents included variety, cleanliness, pathogens and mycotoxins, organic, moisture content, and protein content. Distillers were also asked to describe any challenges they encounter related to the characteristics they seek in rye for distilling. Five indicated that they had supply constraints and found rye to be limited in availability. Producers in humid regions with short seasons cited problems with high moisture, mycotoxins, and immature grains that have low alcohol yields. One said that “farmers don't know what we're looking for [specs] and we end up buying whatever is available because of limited availability.” Two cited cost as a barrier.

Table 6 summarizes the sources of rye used by distillers.

Table 7: Sources of Rye for Distillers

Source	% N=36
Purchase direct from farmers	66.7
Grow my own	16.7
Purchase from cleaners/aggregators	13.9
Through a broker	8.3
Through a maltster	2.8

Most distillers dealt with short supply chains. Two-thirds of the distillers purchased rye directly from farmers. Six were vertically integrated growers. Only about a quarter obtained rye through an intermediary. Half obtained all their rye from a single source, and half from two or more sources. Most were able to source all the supply they needed, but two indicated that rye was

either not available or in short supply. Most purchased on the spot market or through informal agreements, with only eight distillers contracting with producers prior to planting.

A focus group of maltsters and distillers was held on September 15, 2023. Emails were sent to 10 potential participants and five attended the virtual focus group via Zoom. All of the maltsters and distillers in the focus group indicated that rye whiskey has been trending upwards, that the market is growing. Variety was a lesser concern but of interest. Distillers clearly expressed interest in varieties with unique flavor characteristics but they more often than not end up taking whatever rye they can get rather than seeking out specific varieties. One distiller explained that it is difficult to select for quality when they don't have enough quantity.

Food Mills

Millers were the third largest group in the value chain to respond, after producers and distillers, with 33 responses. The characteristics millers seek are expected to be a proxy for bakers, chefs, and other end users of the value chain for food-grade rye. Their top concerns identified by three or more respondents are summarized in Table 8.

Table 8: Top Concerns of Food-Grade Rye Millers

Characteristic	**% (N=33)**
Flavor	57.6
Organic	48.5
Pathogens / mycotoxins	36.4
Cleanliness	33.3
Local source	30.3
Variety	15.2
Moisture content	9.1
Test weight	9.1
Purity	9.1

Over half identified flavor as a desired characteristic. Nearly half the respondents identified themselves as certified organic and that organic certification is a specification their market requires. Pathogens, mycotoxins (such as deoxynivalenol [DON] and ergot), and cleanliness were cited as concerns by food millers. Lack of a gravity table to do cleaning was identified as a constraint to quality by one miller.

Five stone millers indicated that rye is relatively difficult to mill compared with wheat and other grains. Moisture content needs to be below 13% for effective milling, which can be a challenge in humid northeast states. High moisture and low test-weight can make the grain sticky and gum up the stones. To compensate, one miller said they mill the flour coarse.

Local sources were important for about 30% of the respondents. Variety, test weight, and purity were also identified as important by several respondents. Two said that sourcing rye with good attributes for baking is a problem. Varieties that are unspecified are unpredictable in their baking quality. One miller who was not able to source adequate supply indicated that they intend to grow rye themselves.

Sources of food-grade rye are included in Table 9.

Table 9: Sources of Rye for Food Millers

Sources	**% N=33**
Purchase direct from farmers	57.6%
Grow my own	33.3%
Purchase from cleaners/aggregators	15.2%
Through a broker	3.0%

Most of the millers taking the survey reported purchasing rye directly from farmers and about a third grow their own. Only a handful purchase through intermediaries. Millers responding obtained rye from a single source in 60% of the cases, with 40% getting rye from two or more sources. As with distillers, most food-grade millers purchase rye through informal agreements and the spot market. Only four said they enter into pre-season contracts with growers. One miller indicated that their parent company is a farm that supplies their rye. All but three food-grade millers responding were able to get all the rye they needed in the previous year. None of them offered an explanation.

On September 15, 2023, we convened a focus group that included a miller, a miller-baker and a PhD student in Crop and Soil Sciences studying cereal rye. One miller is interested in understanding what the ideal falling number ranges are for rye but has only had one customer concerned with that parameter. Both millers attested that they don't have a lot of choice in specific varieties, and that the majority of what is available for food grade rye is Hazlet or Danko, and they sometimes blend. Baker feedback on the flavor of both the Danko and the Hazlet varieties has been positive.

Millers also reported that storage is a barrier to throughput (the amount of grain a facility is able to handle and process), as there are often limitations on how many grain bins are available to store grains onsite.

The bakers' most important quality considerations are flavor, crumb texture, and bread moisture. They have found that quality can vary by variety and growing conditions. Both bakers stressed that rye is a forgiving grain with a wide range of uses. They place less emphasis on specific quality metrics from a lab because they are able to manipulate the dough to achieve desired results (e.g. hydration, fermentation times).

Both bakers explained that consumer apprehension exists and there are sometimes negative preconceived notions about what rye tastes like which can limit sales (such as the association

with the spice caraway, commonly used in american rye breads). Both described experiences in which consumers tasted rye breads and were surprised at how flavorful they were and that the more they tried the breads the more of it they wanted. The miller explained that knowledge, acceptance, and demand in the market remains low but is growing.

Seed

We received responses from 27 respondents who sold rye for seed. The rye seed sellers were asked to name their top three concerns (Table 10). By far, the biggest concern reported by seed sellers was germination rate, with over three-quarters identifying it as one of their top three concerns. Cleanliness was the next biggest, identified by about 40% of the respondents. Certified organic rye was cited as the third most important concern by one-third of respondents. Varieties, pathogens and mycotoxins, purity, moisture content, and test weight were each cited by over 10% of the respondents.

Table 10: Rye Seed Sellers' Concerns

Characteristics	**% (N=27)**
Germination rate	77.8
Cleanliness	40.7
Organic	33.3
Varieties	22.2
Pathogens and mycotoxins	22.2
Purity	18.5
Moisture content	14.8
Test weight	11.1

Getting clean seed from producers was cited by several respondents to be a particular challenge. Rye is susceptible to ergot, and ensuring that their rye is ergot-free is a priority for their customers. While yield was not offered as a priority, several rye seed vendors identified it as an important factor in their customers' decisions to purchase a specific variety.

The sources for seed are summarized in Table 11. Almost three-quarters of rye seed sellers grow their own. About half get seed from farmers. A handful purchase either from cleaners and aggregators or through a broker. Most respondents said that they purchased seed through informal agreements. One contracts for seed production a year in advance. About a third of the respondents purchased seed from between two and four sources, and two sourced seed from five or more sources. Almost all were able to get the quantity of rye they needed. One seed seller indicated that there was not sufficient local supply in his region and that freight rates from outside of the region were cost-prohibitive.

Table 11: Rye Seed Sources

Source	**% (N=27)**
Grow my own	74.1

Purchase direct from farmers	48.1
Purchase from cleaners/aggregators	18.5
Through a broker	14.8
Contracted in advance	3.7

Seed sellers require clean seed for customers and mentioned problems with mycotoxins such as ergot and vomitoxin, small berries that still had the hull, high levels of chaff after threshing, vetch, and ragweed smell. Low germination was also cited by another respondent selling it as seed. Three-quarters of cleaners and aggregators obtained rye directly from producers with the remaining number roughly evenly distributed between brokers and other cleaners and aggregators. Slightly over two-thirds obtained their rye through informal agreements, with the remainder evenly divided between pre-season contracts and spot purchases as needed. The vast majority (71%) of cleaner/aggregators sold to five or more customers. Their customers' end uses are reported in Table 13.

Feed Millers

We received 11 responses from feed millers. Their top concerns for two or more respondents are included in Table 14. Protein content was the top concern for feed, with two-thirds of the respondents identifying it in their top three. Almost half of the respondents identified the need for organic rye. Pathogens and mycotoxins such as ergot and DON were identified as a concern by over a third of the feed millers. Clean rye was also identified as a concern by feed millers. Write-in answers under "other" included low yield.

Table 12: Feed Millers' Concerns

Characteristic	**N=11**
Protein content	63.6%
Organic	45.5%
Pathogens and mycotoxins	36.4%
Cleanliness	18.2%

Most feed millers grow their own rye with 36% purchasing rye from off farm. Only three feed millers reported purchasing rye from more than two off-farm sources. All three of these millers contract with farmers and two of the three purchase additional rye on the spot market as needed. All but one was able to obtain all the rye needed in the previous year.

A targeted interview was conducted with a feed supplier who is also a grower who has been including up to 400 pounds of rye per ton of feed for poultry and hogs (typically included in rations for older animals noting that rye is less ideal as a starter feed). The supplier noted that customers do not usually care about the grain composition as long as the ration meets quality and dietary recommendations. Further research on the use of rye in feed rations is warranted.

Ergot, lodging, and grain moisture are the primary concerns cited.

Cleaners / Aggregators

The survey had 17 responses from cleaners and aggregators. This category was evenly split between those that handled only their own grain or that of one other producer, and those that handled grain from two or more producers. Most were able to obtain the rye they needed, but about a quarter did not. Limiting factors cited included limited acreage, local availability, and price.

Cleaners and aggregators of rye were asked to name the top three characteristics that concerned them the most. The results are in Table 12.

Table 13: Characteristics identified as important for cleaners and aggregators

Characteristic	**% (N=17)**
Cleanliness	35.3
Germination rate	35.3
Organic	35.3
Local source	29.4
Variety	29.4
Pathogens/toxins (DON, Ergot, etc.)	29.4

Germination rate, cleanliness, and organic verification were all named by about a third of the respondents. These were followed by variety, local sources, and pathogen / toxin levels. Flavor, moisture content, falling number, and purity were all cited by more than one respondent.

Table 14: Rye Markets for Cleaners and Aggregators

Market	**% (N=17)**
Flour	52.9
Berries	47.1
Seed for planting	47.1
Distilling	41.2
Malting	35.3
Animal feed	11.8
Flakes	11.8
Wholesale to cleaners/aggregators	11.8

Most cleaners and aggregators had their rye milled into flour off-site or by a third party processor. Two cleaner/aggregators reported capacity to mill flour as part of their operation.

Slightly fewer than half sold whole grain either as berries for food use or seed for planting. One cleaner/aggregator also kept seed for planting. Distilling and malting were the next most important markets.

Maltsters

With nine responses, maltsters comprised the smallest group. Concerns identified by two or more maltsters are listed in Table 15.

Table 15: Rye Maltster Concerns

Characteristics	% (N=9)
Flavor	55.6
Moisture content	44.4
Germination rate	44.4
Pathogens / mycotoxins	33.3
Species/Variety	22.2
Purity	22.2
Local source	22.2

Flavor was the top concern, named by over half the respondents. Moisture and germination rate were next, followed by pathogens and mycotoxins. One reported DON scores exceeding 1.0 ppm as a particular concern.

Two-thirds of all maltsters surveyed reported purchasing rye directly from farmers, with one-third growing their own. One maltster also purchases additional rye through a cleaner / aggregator. Four respondents obtained rye from one source and five purchased from two or more sources. Four maltsters said they sign pre-season contracts, three enter into informal agreements and two buy on the spot market. All but one obtained all the rye they needed. The one who did not cited DON as the reason.

Respondents Not in the Supply Chain

We also received 19 responses from people not in the supply chain, but only eight provided any data useful to the study. These eight were all producers who were interested in planting rye in their rotation. Two indicated that their preferred market was for seed, one was interested in food grade, and one was interested in distilling whiskey. Three indicated that market conditions were the reason for not producing rye—either low prices or no buyers in their area.

Discussion

The responses gathered from these surveys and focus groups showed some clear patterns that reflect areas that must be addressed for rye acreage and the value of rye products to increase in the Northeast region. Many of the respondents—40 out of 102—fulfill multiple roles in the

value chain. There were responses from producers who were fully integrated in the value chain. One producer stood out as working with all the different segments of the value chain.

There were clear differences in the needs of growers and the needs of other supply chain actors that may need to be bridged for rye production and sales to increase.

Table 16 provides a cross-tabulation of all concerns for all groups. The table shows some patterns of overlap in the interests of different value chain actors, but also some ways in which the priorities are not shared. Yield, cost, and price were omitted as factors, but they still came up as volunteered answers for concern. The importance of these concerns was reinforced in the focus groups.

Table 16: Comparison of Group Concerns

	Commercial Rye Growers N=52	Rye Cleaners/ Aggregators N=17	Selling Rye for Seed N=27	Milling Rye for Animal Feed N=11	Milling Rye for Human Food N=33	Distilling Rye N=36	Malting Rye N=9
Variety	23.1%	29.4%	22.2%	9.1%	15.2%	22.2%	22.2%
Disease resistance	15.4%	5.9%	7.4%	0.0%	0.0%	2.8%	0.0%
Pathogens/ toxins (DON, Ergot, etc.)	30.8%	23.5%	22.2%	36.4%	36.4%	16.7%	33.3%
Drought tolerance	5.8%	5.9%	0.0%	0.0%	3.0%	0.0%	0.0%
Cold tolerance	11.5%	5.9%	7.4%	0.0%	0.0%	2.8%	0.0%
Moisture content	7.7%	17.6%	14.8%	0.0%	9.1%	13.9%	44.4%
Protein content	5.8%	5.9%	0.0%	63.6%	6.1%	13.9%	0.0%
Starch content	1.9%	5.9%	0.0%	9.1%	0.0%	27.8%	0.0%
Falling number	11.5%	11.8%	0.0%	0.0%	6.1%	2.8%	0.0%
Germination rate	36.5%	35.3%	77.8%	0.0%	0.0%	0.0%	44.4%
Test weight	13.5%	5.9%	11.1%	9.1%	9.1%	5.6%	11.1%
Extraction rate	3.8%	5.9%	0.0%	9.1%	3.0%	8.3%	11.1%
Purity	5.8%	11.8%	18.5%	0.0%	9.1%	5.6%	22.2%
Flavor	26.9%	17.6%	7.4%	9.1%	57.6%	58.3%	55.6%
Cleanliness	11.5%	35.3%	40.7%	18.2%	33.3%	22.2%	11.1%
Organic	44.2%	35.3%	33.3%	45.5%	48.5%	16.7%	0.0%
Local source	5.8%	29.4%	7.4%	9.1%	30.3%	52.8%	22.2%

Figure 1 below, presents a weighted average of the top concerns shared by the different segments of the value chain. Flavor and organic verification scored over a third of the responses overall, but with wide disparities between actors in the value chain.

Millers, maltsters, and distillers shared the top priority of flavor, with over half of each group naming it as by far their greatest concern. However, flavor was a low priority for growers, seed sellers, and feed millers. Growers and seed sellers may need better guidance as to what varieties are suitable for value added markets. Producers listed organic as their top concern, which also scored high for millers of both food and feed, as well as for seed sellers. Organic was less of a priority for maltsters and distillers. Germination was the top concern of seed sellers and the second highest for growers.

Figure 1: Top Concerns by Value Chain Role

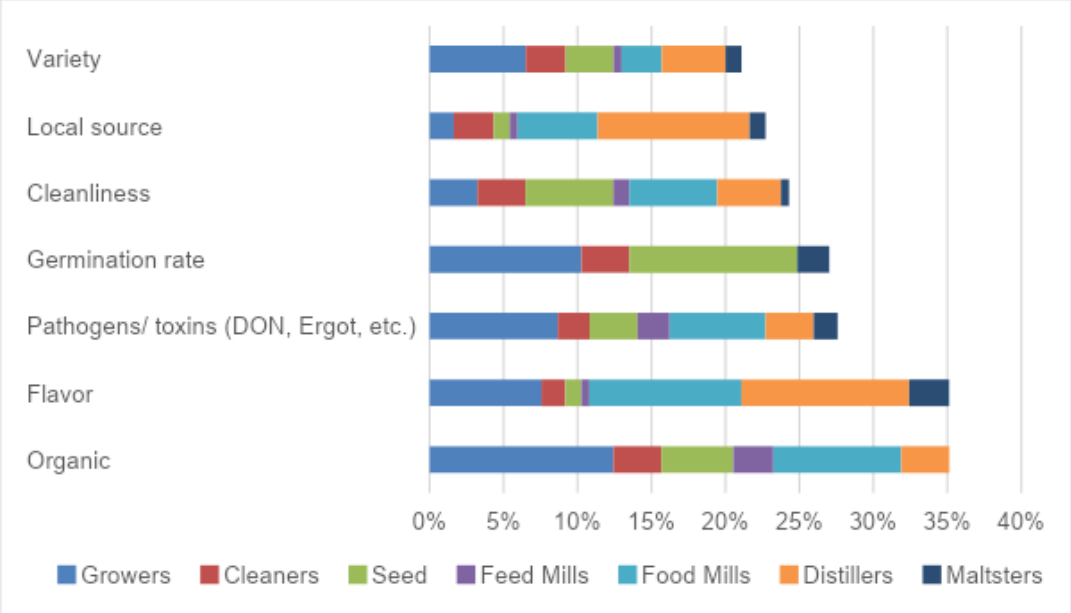
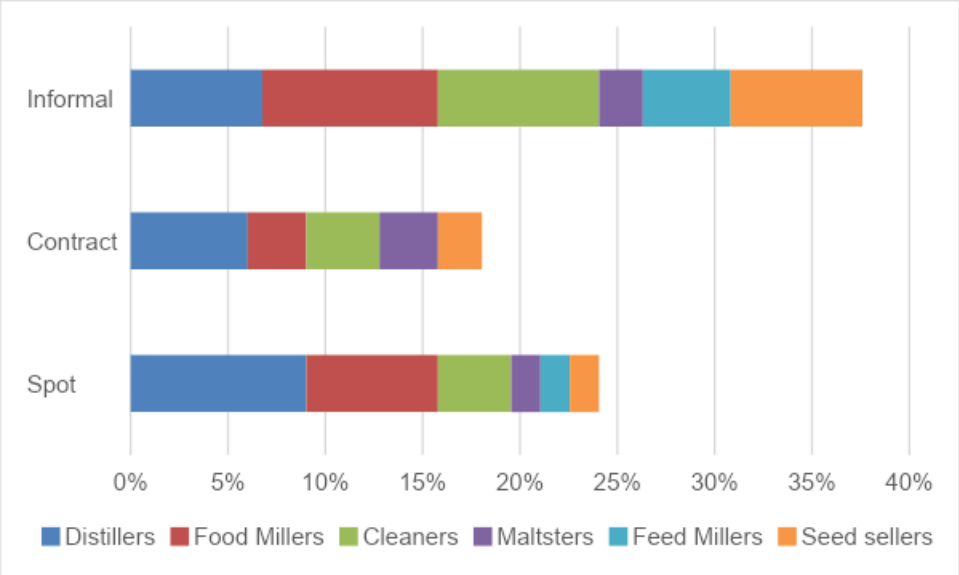


Figure 2 shows the weighted averages of marketing channels through which value chain actors sourced their rye. The figure omits vertically integrated producers who grow their own, which is about 20%.

Figure 2: Marketing Channels for Rye



Most actors in the value chain purchase rye through informal or “handshake” agreements. Interestingly, none of the feed mills contract before the season. Distillers, on the other hand, are more likely to have a contract.

Figure 3 shows the percentages of growers who were able to sell all their 2022 crop by the survey dates between February and June 2023. Nearly half (47%) still had an unsold inventory that they were carrying from the previous season.

Figure 3: Growers Able to Sell All Their rye from the 2022 Harvest

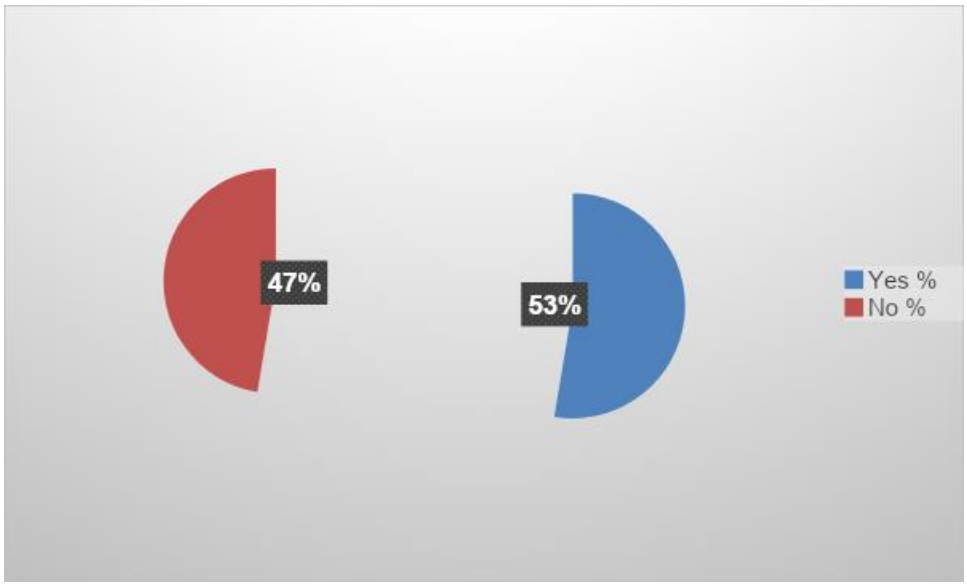
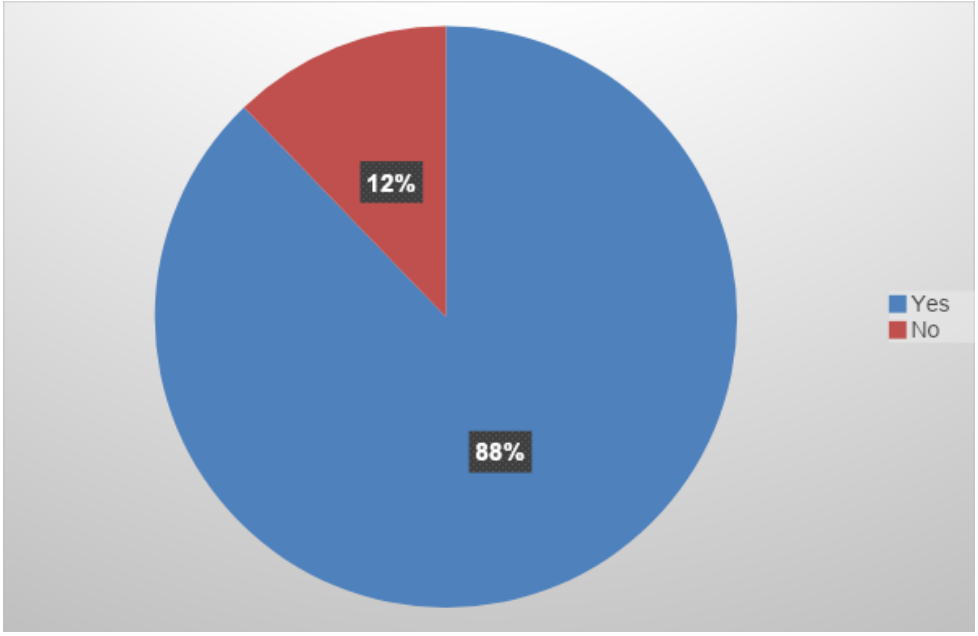


Figure 4 shows the unweighted percentage of cleaners, seed sellers, feed millers, and food millers, distillers, and maltsters able to source all the rye that they need.

Figure 4: Buyers Able to Source All Their Rye Needs from the 2022 Harvest



In contrast to growers, 88% of all buyers were able to get all the rye they needed from the 2022 crop season. At the time of the survey, rye in the Northeast was clearly a buyer's market.

Conclusions

- Clear opportunities exist to expand production of rye for seed and for value-added markets; however, a better understanding of functional attributes of different varieties is critical, including those of hybrid and open-pollinated varieties.
- Rye is recognized as a valuable crop to have in rotation on organic farms as it provides many benefits to the soil and can reduce the need for chemical inputs.
- Winter hardiness and the ability to germinate in cold temperatures during late winter and early spring plantings was mentioned by several growers. This may apply only to open pollinated varieties.
- There are opportunities for technical assistance at various points in the supply chain that would increase knowledge and decrease the risk of planting and processing rye for producers.
- Various state and federal incentive programs are adding additional support to the development of the rye market. See Appendix B. for a list of resources.
- Rye clearly presents market opportunities for farmers in the Northeast.

Appendix A.

State and Federal Programs and Resources

USDA NRCS, state departments of Agriculture, and university extension are the best resources for additional information about state and federal cover crop incentive programs.

Cover Crops

- The Northeast Cover Crops Council
- USDA-NIFA. Cover Crops Incentives Explorer Tool.
- USDA-AMS Transition to Organic Partnership Program (TOPP)
- Cornell CALs. Incentive programs doubled cover crop use by farmers.

USDA Partnership for Climate-Smart Commodities.

A climate smart commodity is defined as an agricultural commodity that is produced using farming, ranching or forestry practices that reduce greenhouse gas emissions or sequester carbon.

Climate smart production practices include

- Cover crops
- Low-till or no-till
- Nutrient Management

Other links

- List of Agricultural Funding for Cover Crops. ambrook.

Craft Beverages

New York and Michigan are unique in having developed state incentive programs for manufacturing craft beverages using state-grown ingredients. Most states have local marketing campaigns, but lack ingredient requirements and verification. Nonetheless, producers and sellers may find local sourcing to be a value-add for marketing.

- New York
  - Class D Farm Distillery License
    - 75,000 gallon limit.
    - 75% New York State Ingredients.
    - May sell its liquor and any other NYS labeled products (beer, cider, wine, mead, liquor) at the licensed premises and to-go.
    - A farm distillery need not be located on a farm.
  - Farm Brewery License
    - 75,000 barrel limit.
    - 60% New York State hops and
    - 60% New York State ingredients.

        - May sell its own and any other New York State labeled products (beer, cider, wine, mead, liquor) at the licensed premises and to-go.
        - A farm brewery need not be located on a farm.

- Michigan
    - Licenses
    - Qualified Small Distiller
        - 60,000 gallon limit.
        - 40% of the base spirit distilled from *qualified grain* grown and harvested in the state.
        - May sell: On-premise w/tasting room license, off-premise tasting room license, through Authorized Distribution Agents (ADA's). Self distribution.
        - Tax incentive; from 65% to 32.5%

Local Food Incentive Programs

- New York
    - Nourish New York. NYDSAM. Reroutes surplus agricultural products to populations who need them most through NY's network of food banks.
    - New York Food for New York Families. USDA-LFPA. Funding to implement projects that purchase New York grown food products and distribute them to underserved communities.
    - 30% New York State Initiative. Increased State reimbursement for the purchase of NYS food products for school lunch programs.
- Farm to Institution New England
- Vermont
    - Local Foods Incentive Program
    - Working Lands Enterprise Initiative

Local Foods Marketing Campaigns

- Buy Local Campaigns - most states.
- New England Feeding New England
- BetterBev. A regional sustainability recognition programFocused on energy, pollution, and wastewater from beverage producers. It cites 'environmentally responsible sourcing' but doesn't specify what that means or if it refers to ingredients or packaging materials. (CT, NH, MA, RI, ME, and VT).
- 'Vermont-made'. This requires bakeries and craft beverage producers to meet two out of the following three criteria: at least 50% of the raw ingredients must come from Vermont, substantial transformation of the ingredients occurred in Vermont, or the headquarters of the company manufacturing the product is based in Vermont.

- Empire Rye is a business/trade association of New York Distillers producing rye whiskey under certain criteria and collaboratively marketing their products under the Empire Rye moniker, similar to the European Union's products made within a designation of origin (EU).
- Maine Made Products can be labeled made in Maine which requires that they are manufactured in Maine but it doesn't require the use of in-state ingredients. A spokesperson said they were seeking funds to support craft beverage products which would require at least 51% Maine-grown ingredients.
- New York State Grown and Certified .
    - Products grown and produced in New York State.
    - Third party food safety verification program.
    - Participation in an environmental management program. (AEM)
    - Product Formulation statement. (need % ie. 51% in pasta)

References

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. Wiley.

USDA / NASS. (2022). *Small Grains 2022 Summary*. US Department of Agriculture, National Agricultural Statistical Service. https://downloads.usda.library.cornell.edu/usda-esmis/files/5t34sj573/h128pr261/5138kq83p/smgr0922.pdf

Wallander, S., Smith, D., Bowman, M., & Claassen, R. (2021). *Cover crop trends, programs, and practices in the United States* (EIB 222). US Department of Agriculture Economic Research Service.

Empire State Development [ESD]. (2017). The case for building your craft beverage business in New York State—distilled. Albany: NYS Government, ESD. Retrieved from https://esd.ny.gov/industries/craft-beverage

New York State Governor's Office. (2013, October 9). Governor Cuomo welcomes 14 licensed farm breweries in New York State [Press Release]. Albany: NYS State Capitol Building. Retrieved from https://www.governor.ny.gov/news/governor-cuomo-welcomes-14-licensed-farm-breweries-new-york-state

Hinchey, Michelle. (2022). Hochul signs two bills to support N.Y. craft beverage businesses. Morning Ag Clips. Web. Retrieved from https://www.morningagclips.com/hochul-signs-two-bills-to-support-n-y-craft-beverage-businesses/

ThinkNY. (2019). How the NY Craft Act Changed NYS Craft Beer Forever. New York State Brewers Association. Retrieved from https://thinknydrinkny.com/how-the-craft-ny-act-changed-ny-craft-beer-forever/

Meeting the Demand for Small Grains in New York State (2015). White paper on current trends in the craft beverage and craft baking industries, Rebecca Platel, June Russell. Carey Institute for Global Good for New York State Empire State Development.

Putting Down Roots. Analyzing the economic and environmental benefits of continuous living cover for Minnesota's farmers, water and climate. 2023

MLive. Michigan Liquor tax could could be slashed for state distillers. 2022

Michigan Farm News. Craft beverage distilling Legislation expected to help MI farmers. 2022

Governor Gretchen Whitmer. Governor Whitmer signs a bill helping Michigan distilleries.

Stop here
use link to survey instrument

Appendix B. : Survey Instrument and Focus Group Questions

1. Survey Instrument text below and Link
2. Focus Group Questions

Growers

1. Why did you choose to grow rye on your farm?
2. Are you currently finding markets for all the rye that you grow? What is your primary market?
3. How does labor for rye production compare to other grains on your farm?
4. How does rye compare to other grains in terms of equipment needed for production, cleaning, and handling?
    1. What equipment would be beneficial to have for your farm (or would you recommend to other farmers) to sell rye that meets market needs?
5. How do rye markets compare to other grains in terms of prices, profitability, and demand?
6. What resources do you seek out when making management decisions about your rye crop?
7. How do you select varieties to plant? Which varieties do you prefer?
8. How do you market your rye crop?
    1. Spot market? Pre-season Contracts? Informal (handshake) agreements? Cooperative?
9. What are the most consistent management and quality challenges you face with your rye crop?
10. What feedback do your customers give you regarding rye quality?
11. What would you need to produce a more consistently high-quality rye crop?
12. Do you want to increase your rye production? Which markets are most promising or of interest?

Feed & Seed

1. What level of demand have you experienced when it comes to using rye in livestock rations?
2. What value does rye add to livestock production on your farm or to your buyers?
3. What kind of livestock producers include rye in their rations?

4. What attributes of rye do you consider important for livestock feed?
5. Are your buyers price sensitive?
    1. Will they include rye in their rations if it provides cost savings compared with other grains of similar nutritional value?
    2. Do they substitute rye for other grains if rye is relatively expensive compared with other grains of similar nutritional quality?
6. Are there specific varieties that are particularly well suited for livestock feed?
7. For seed, how many varieties do you carry?
8. What are your biggest challenges for seed quality?

Distillers & Maltsters

1. What are important considerations for you when it comes to sourcing from growers?
2. What challenges do you face to source high quality grain?
3. How do you work with grain lots with different specs?
4. What attributes of rye do you consider the most important?
5. Are there specific varieties you prefer to purchase or try to avoid?
6. Can you define what makes a high-quality rye product?
7. What does rye flavor mean to you? Are there specific notes you are looking for?
8. In your experience what equipment works best for cleaning, sorting, and storing rye?
9. Do you typically have enough grain supply to meet your production and sales targets or to fill your orders all the time, most of the time, some of the time, or never?

Millers & Bakers

1. How does rye demand compare to other grains you mill or bake with? What kind of feedback do you get from consumers on your rye products?
2. What are the primary limitations to increasing your rye production volume?
3. What attributes are most important to you when buying rye grain? Which lab tests have you found to be the most useful indicators of rye quality?
4. Have you found inconsistencies between lab results and baking performance, or lab tests that are not as helpful or indicative of quality as you would have thought?
5. What equipment have you found works best for cleaning, sorting, handling, and storing rye?
6. Is information about rye variety available to you as a miller/baker? Are there specific varieties you prefer to purchase or try to avoid?

Survey Instrument

THIS STUDY WAS CONDUCTED by the University of Vermont Extension with funding from the USDA's Northeast Sustainable Agriculture Research & Education (NESARE) program (LNE22-437), in

collaboration with the Glynwood Center for Regional Food and Farming and the Center for Rural Studies at the University of Vermont. *The following survey was conducted in 2023 with results published in 2024.*

Q1.1
Welcome to the Rye Market Study.

University of Vermont Extension was recently awarded an NESARE grant for a project called Capturing Value with Cereal Rye. Growing High Quality Rye for the Northeast.
We are seeking to develop market knowledge of opportunities and challenges in the domestic/regional cereal rye supply chain.

The study is being conducted/executed by the University of Vermont's Center for Rural Studies with guidance from project collaborators University of Vermont Extension, Glynwood Center for Regional Food and Farming.

This survey could take between 10 to 20 minutes to complete, depending on your answers. Your responses are completely anonymous. We do not ask for any information that could be used to identify you or your business. Results are only reported in the aggregate.

Please select one or more of the following categories that best represent your role(s) in the rye commodity chain.

- I grow rye commercially
- I clean and aggregate rye from other producers
- I sell rye seed
- I sell rye for animal feed
- I mill rye for human consumption
- I distill rye
- I malt rye
- I am commercially involved with rye in some other way (describe)

Q2.1 As a rye grower, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Pathogens/toxins (DON, Ergot, etc.)
- Drought tolerance
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local source
- Some other trait? (describe)

Q2.2 Please briefly describe any challenges you encounter related to the characteristics you seek for growing rye.

Q2.3 To about how many places did you sell rye last year ?

- None
- 1
- 2-4
- 5 or more

Q2.4 For what use(s) did you sell rye last year?

- Seed
- Animal feed
- Flour/Flakes
- Distilling
- Malting
- Wholesale to cleaners/aggregators
- Some other use? (describe)

Q2.5 Select the way(s) you used your rye last year.

- Seed
- Animal feed
- Flour/Flakes
- Distilling
- Malting
- Some other use? (describe)

Q3.1 As a rye cleaner/aggregator, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Pathogens/toxins (DON, Ergot, etc.)
- Drought tolerance[N1]
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local source
- Some other trait? (describe)

Q3.2 Please briefly describe any challenges you encounter related to the characteristics you seek in rye for cleaning/aggregating.

Q3.3 From about how many places did you purchase rye for cleaning/aggregating from last year?

- None- I handle only rye that I grow
- 1 source
- 2-4 sources
- 5 or more sources

Q3.4 Select the option(s) that best describe your typical way of purchasing rye for cleaning/aggregating.

- Spot purchase as needed
- Pre-season contracts
- Informal agreements
- Some other way? (describe[JR1])

Q3.5 In the past year, were you unable[N1] to source the amount of rye for cleaning/aggregating that you needed?

- Yes
- No

Q3.6 What factor caused you to not be able to source enough rye for cleaning/aggregating last year?

Q3.7 To about how many places did you sell rye last year?

- None
- 1
- 2-4
- 5 or more

Q3.8 For what types of uses did you sell rye last year?

- Seed
- Animal feed
- Flour/Flakes
- Distilling
- Malting
- Wholesale to cleaners[N2] /aggregators
- Some other use? (describe)

Q3.9 What did you use your rye for last year?

- Seed
- Animal feed

- Flour/Flakes
- Distilling
- Malting
- Some other use? (describe)

Q4.1 As someone selling rye for seed, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Drought tolerance
- Pathogens/toxins (DON, Ergot, etc.)
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local source
- Some other trait? (describe)

Q4.2 Please briefly describe any challenges you encounter related to the characteristics you seek in rye to sell for seed.

Q4.3
Select the way(s) you typically obtain rye to sell for seed.

- Grow my own
- Purchase direct from farmers
- Purchase from cleaners/aggregators
- Some other way? (describe)

Q4.4 From about how many places did you obtain rye to sell for seed last year?

- 1
- 2-4
- 5 or more
-

Q4.5 Select the option(s) that best describe your typical way of purchasing rye to sell for seed.

- Spot purchase as needed
- Pre-season contracts
- Informal agreements
- Some other way? (describe)

Q4.6 In the past year, were you unable to source the amount of rye to sell for seed that you needed?

- Yes
- No

Q4.7 What factor caused you to not be able to source enough rye to sell for seed last year?

Q5.1 As someone milling rye for animal feed, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Drought tolerance
- Pathogens/toxins (DON, Ergot, etc.)
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local source
- Some other trait? (describe)

Q5.2 Please briefly describe any challenges you encounter related to the characteristics you seek in rye for animal feed.

Q5.3
Select the way(s) you typically obtain rye for animal feed.

- Grow my own
- Purchase direct from farmers
- Purchase from cleaners/aggregators
- Some other way? (describe)

Q5.4 From about how many places did you obtain rye for animal feed from last year?

- 1 source
- 2-4 sources
- 5 or more sources

Q5.5 Select the option(s) that best describe your typical way of purchasing rye for animal feed.

- Spot purchase as needed
- Pre-season contracts
- Informal agreements
- Some other way? (describe)

Q5.6 In the past year, were you unable to source the amount of rye for animal feed that you needed?

- Yes
- No

Q5.7 What factor caused you to not be able to source enough rye for animal feed last year?

Q6.1 As someone milling rye for human food, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Drought tolerance
- Pathogens/toxins (DON, Ergot, etc.)
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local source
- Some other trait? (describe)

Q6.2 Please briefly describe any challenges you encounter related to the characteristics you seek in rye for milling for human food.

Q6.3
Select the way(s) you typically obtain rye for milling human food.

- Grow my own
- Purchase direct from farmers
- Purchase from aggregators
- Some other way? (describe)

Q6.4 From about how many sources did you obtain rye for milling human food from last year?

- 1 source
- 2-4 sources
- 5 or more sources

Q6.5 Select the option(s) that best describe your typical way of purchasing rye for milling human food.

- Spot purchase as needed
- Pre-season contracts
- Informal agreements

- Some other way? _____

Q6.6 In the past year, were you unable to source the amount of rye for milling human food that you needed?

- Yes
- No

Q6.7 What factor caused you to not be able to source enough rye for milling human food last year?

Q7.1 As a rye distiller, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Drought tolerance
- Pathogens/toxins (DON, Ergot, etc.)
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local Source
- Some other trait? (describe)

Q7.2 Please briefly describe any challenges you encounter related to the characteristics you seek in rye for distilling.

Q7.3
Select the way(s) you typically obtain rye for distilling.

- Grow my own
- Purchase direct from farmers
- Purchase from cleaners/aggregators
- Some other way? _____

Q7.4 From about how many sources did you obtain rye for distilling from last year?

- 1 source
- 2-4 sources
- 5 or more sources

Q7.5 Select the option(s) that best describe your typical way of purchasing rye for distilling.

- Spot purchase as needed
- Pre-season contracts

- Informal agreements
- Some other way? _____

Q7.6 In the past year, were you unable to source the amount of rye for distilling that you needed?

- Yes
- No

Q7.7 What factor caused you to not be able to source enough rye for distilling last year?

Q8.1 As a rye grain malter, please select the top three characteristics you are most concerned with.

- Species/Variety
- Disease resistance
- Drought tolerance
- Pathogens/toxins (DON, Ergot, etc.)
- Moisture content
- Protein content
- Starch content
- Falling number
- Germination rate
- Extraction rate
- Purity
- Organic
- Local source
- Some other trait? (describe)

Q8.2 Please briefly describe any challenges you encounter related to the characteristics you seek in rye for malting.

Q8.3
Select the way(s) you typically obtain rye for malting.

- Grow my own
- Purchase direct from farmers
- Purchase from cleaners/aggregators
- Some other way? (describe)

Q8.4 From about how many sources did you obtain rye for malting from last year?

- 1 source
- 2-4 sources
- 5 or more sources

Q8.5 Select the option(s) that best describe your typical way of purchasing rye for malting.

- Spot purchase as needed
- Pre-season contracts
- Informal agreements
- Some other way? (describe)

Q8.6 In the past year, were you unable to source the amount of rye for malting that you needed?

- Yes
- No

Q8.7 What factor caused you to not be able to source enough rye for malting last year?

Q9.1 Please tell us by volume, about how much of the following grains you handled last year. We remind you, your answers are anonymous and we only report the aggregate results.

By Volume (POUNDS?)- About how much of each grain did you handle last year?

- Rye
- Hard Wheat
- Soft Wheat
- Buckwheat
- Corn
- Oats
- Barley
- Some other grain

Q9.2 What State are you in?

Focus Group Questions

Growers

5. Why did you choose to grow rye on your farm?
6. Are you currently finding markets for all the rye that you grow? What is your primary market?
7. How does labor for rye production compare to other grains on your farm?
8. How does rye compare to other grains in terms of equipment needed for production, cleaning, and handling?
    2. What equipment would be beneficial to have for your farm (or would you recommend to other farmers) to sell rye that meets market needs?
9. How do rye markets compare to other grains in terms of prices, profitability, and demand?
10. What resources do you seek out when making management decisions about your rye crop?

11. How do you select varieties to plant? Which varieties do you prefer?
12. How do you market your rye crop?
    2. Spot market? Pre-season Contracts? Informal (handshake) agreements? Cooperative?
13. What are the most consistent management and quality challenges you face with your rye crop?
14. What feedback do your customers give you regarding rye quality?
15. What would you need to produce a more consistently high-quality rye crop?
16. Do you want to increase your rye production? Which markets are most promising or of interest?

Feed & Seed

6. What level of demand have you experienced when it comes to using rye in livestock rations?
7. What value does rye add to livestock production on your farm or to your buyers?
8. What kind of livestock producers include rye in their rations?
9. What attributes of rye do you consider important for livestock feed?
10. Are your buyers price sensitive?
    2. Will they include rye in their rations if it provides cost savings compared with other grains of similar nutritional value?
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9. Are there specific varieties that are particularly well suited for livestock feed?
10. For seed, how many varieties do you carry?
11. What are your biggest challenges for seed quality?

Distillers & Maltsters

10. What are important considerations for you when it comes to sourcing from growers?
11. What challenges do you face to source high quality grain?
12. How do you work with grain lots with different specs?
13. What attributes of rye do you consider the most important?
14. Are there specific varieties you prefer to purchase or try to avoid?
15. Can you define what makes a high-quality rye product?
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17. In your experience what equipment works best for cleaning, sorting, and storing rye?
18. Do you typically have enough grain supply to meet your production and sales targets or to fill your orders all the time, most of the time, some of the time, or never?

Millers & Bakers

7. How does rye demand compare to other grains you mill or bake with? What kind of feedback do you get from consumers on your rye products?
8. What are the primary limitations to increasing your rye production volume?
9. What attributes are most important to you when buying rye grain? Which lab tests have you found to be the most useful indicators of rye quality?

10. Have you found inconsistencies between lab results and baking performance, or lab tests that are not as helpful or indicative of quality as you would have thought?
11. What equipment have you found works best for cleaning, sorting, handling, and storing rye?
12. Is information about rye variety available to you as a miller/baker? Are there specific varieties you prefer to purchase or try to avoid?

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