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Supplying Craft Breweries With Locally Produced Ingredients

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Supplying Craft Breweries With Locally Produced Ingredients

PREPARED FOR:

THE NORTH CENTRAL INITIATIVE FOR SMALL FARM PROFITABILITY

A USDA—FUNDED PROJECT

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Table of Contents

Executive Summary	3
Introduction	5
1.0 State of Craft Brewing Industry/Trends in Consumer Demand	6
1.1 Consumer Knowledge of Craft Brewing Products	8
1.2 Breweries Need to Investigate New Markets	9
1.3 Future Malt Supply	10
2.0 Brewery Interest In Locally Grown/Produced Ingredients	11
3.0 Production Needs: 2000 Beer Production	13
3.1 Production Needs: Projected Change in Production for 2001	14
3.2 Production Needs: Malted Barley	15
3.3 Production Needs: Two Row Verses Six Row Barley	15
4.0 Base Malt Needs: Type Used	17
4.1 Base Malt Needs: Annual Whole Kernel Use	18
4.2 Base Malt Needs: Single Order Purchases	19
4.3 Base Malt Needs: Package Type	20
4.4 Base Malt Needs: Order Frequency	20
4.5 Base Malt Needs: Where Purchased	21
4.6 Base Malt Needs: Base Malt Supplier	22
4.7 Base Malt Needs: Percent That Have Changed Base Malt Supplier	23
5.0 Specialty Malt Needs: Type Used	24
5.1 Specialty Malt Needs: Annual Whole Kernel Use	25
5.2 Specialty Malt Needs: Single Order Purchases	26
5.3 Specialty Malt Needs: Package Type	27
5.4 Specialty Malt Needs: Order Frequency	27
5.5 Specialty Malt Needs: Types of Specialty Malt	28
5.6 Specialty Malt Needs: Where Purchased	28
5.7 Specialty Malt Needs: Specialty Malt Supplier	29
5.8 Specialty Malt Needs: Percent That Have Changed Specialty Malt Supplier	30
6.0 Attributes Important in A Brewery's Raw Material Purchasing Decisions	31
6.1 Importance of Physical Properties	31
6.2 Importance of Chemical Properties	32
6.3 Importance of Services Offered	33
6.4 Importance of Price	34
6.5 Importance of Attributes by Type of Brewery	35
7.0 Wheat Beer	36
7.1 Wheat: Form Purchased	36
7.2 Wheat: Amount of Wheat Used	37
7.3 Wheat: Single Order Purchases	39
7.4 Wheat: Package Type	39
7.5 Wheat: Where Purchased and Order Frequency	40
7.6 Wheat: Attributes Important in a Brewery's Purchase	41
7.7 Wheat: Future Consumer Demand For Wheat Beer	43
8.0 Other Ingredients to Supply the Brewery Industry	44
8.1 Future Use of Other Ingredients	45
9.0 Demographical Profile of Sample	46
10.0 Conclusions and Unanswered Questions	47
11.0 Survey Instrument	50
Appendix: Brewery Industry Links	57

Executive Summary

This report summarizes the initial findings of a survey of 52 craft breweries (brewpubs, microbreweries, and regional breweries) in the states of Colorado, Nebraska, Iowa, Missouri, Minnesota, and Wisconsin. The head brewer or owner/operator was surveyed to determine the craft brewing industries' level of interest in purchasing locally grown and produced grains and locally produced malt, as well as the procurement needs for the ingredients they purchase.

The craft brewing industry, which mushroomed in the early to mid 1990's, slowed to a crawl in the late 1990's, however, the industry began to rebound in 2000 as volume for craft brewers increased substantially. The breweries in this study were very optimistic about the future of craft brewery industry with all of the surveyed breweries believing that demand will grow in the foreseeable future.

The vast majority of the breweries (81%) feel the need to investigate new markets in order to survive in the craft brewing industry. The need for breweries to investigate new markets may be an opportunity for producers and craft breweries to partner and develop a market for beer that is produced with locally grown and produced ingredients and/or malt. Fifty-nine percent of the breweries were very or extremely interested in making the claim that their beer was made with grains produced or grown locally with 31% indicating that they were extremely interested. The survey also assessed the breweries' level of interest in making the claim that the malt used in their brewing process was produced locally. Again, the majority (59%) of breweries were very or extremely interested in making this claim.

In order to supply craft breweries with ingredients and malt, it is necessary to understand their procurement needs. The breweries overwhelmingly prefer to purchase malt made with two-row barley (94% mention) rather than six-row barley (2% mention). A brewery's malt needs can be broken down into the base and specialty malt that the brewery purchases to brew its beer. The breweries were surveyed on their use of four principle types of base malt: whole kernel, pre-ground, dry malt extract, and syrup malt extract. Whole kernel malt was the most prevalent type of base malt used with 84% of the brewpubs, 92% of the microbreweries, and all of the regional breweries using this product. Whole Kernel Malt was also the predominant specialty malt used with 81% of the brewpubs, 85% of the microbreweries, and all of the regional breweries using this product.

In order to supply the brewery industry, it is important to know the size of the malt market. Brewpubs use an average of 45,000 pounds of whole kernel base malt per year, while microbreweries use an average of 206,000 pounds annually. Regional breweries use over two million pounds of whole kernel base malt annually on average. In an example given of converting pounds of malt to acres of planted barley, 175 acres of barley could supply nearly three "typical" microbreweries with their annual supply of base malt.

In order to supply a brewery, it is important to understand the characteristics that surround a brewery's malt purchases. Some of these characteristics include: the typical malt order size; the type of packaging preferred by the breweries; their order frequency; where the breweries purchase their malt and how it is shipped to them. These characteristics were assessed for both base and specialty malt purchases and are described in detail in the report.

A significant number of brewpubs and microbreweries receive their base and specialty malt through a malt distributor. In addition, the smaller breweries typically order in smaller quantities (possibly paying a higher premium) and order less frequently (possibly to lower their distribution costs and meet minimum order sizes). By ordering on a less frequent basis these breweries *may, at times*, be forced to use a malt that is not as fresh as they would like to use. This dilemma may present an opportunity to supply these types of breweries.

In order to successfully compete in the brewing industry, a producer or producer owned maltster has to meet the needs of its customers (breweries). Four categories of procurement needs or attributes were assessed in the survey for their degree of importance in a brewery's purchasing decisions. The categories included physical properties, chemical properties, services offered, and price. Among all of the categories, "recourse for poor malt quality", "timeliness of delivery", "consistency of taste", and "malt freshness" were the top ranked attributes in their importance to all breweries. Each of these attributes had an average score of at least 9 (on a scale of 1-10) or a ranking of "extremely important" by all breweries.

Looking at the *microbrewery* segment, protein/nitrogen level and moisture content were had an average score of 9.0 or above (extremely important), while malt analysis was extremely important to *regional* breweries. It is interesting to note that price (mean score of 7.92) was ranked fifteenth in importance among *all* breweries and seventeenth (mean of 7.57) among *brewpubs*.

Although malted barley is the main grain used in the brewing of beer, there are many other ingredients that are part of the brewing process. The most common of these "other ingredients" is wheat. More than 90% of the surveyed breweries brew wheat beer. The vast majority of the breweries (65%) prefer to purchase their wheat malted, while 23% prefer to purchase wheat in a raw form. It was estimated that it would take more than 2,800 acres of wheat to supply all (malted and non-malted) of the wheat beer breweries in the six-state region including 700 acres to supply Colorado and Nebraska wheat breweries. Overall, 90% of the breweries agreed with the statement that consumer demand for wheat beer would continue to grow.

Other ingredients used to brew beer include oats, rye and corn. Thirty-seven percent of the breweries use some form of oats in their brewing process. Thirty-one percent use rye, flaked rye, or rye hulls, while 13% purchase varieties of corn. Four percent of the breweries manufacture a beer that is brewed with organic ingredients.

Introduction

A representative sample of 264 craft breweries (brewpubs, microbreweries, and regional breweries—see section 1.0 for more information on craft breweries) in the states of Colorado, Nebraska, Missouri, Iowa, Minnesota, and Wisconsin were sent a survey by mail in July 2001. Fifty-two surveys were returned from respondents and three were returned as closed businesses giving the survey an overall return rate of 20%. The return rate by state was: 15% in Colorado, 44% in Nebraska, 14% in Iowa, 25% in Minnesota, 22% in Wisconsin, and 25% in Missouri.

The brewery survey had four central purposes:

- (1) To determine the craft brewing industries' level of interest in purchasing locally grown and produced grains and locally produced malt in the six-state region* in order to reveal potential opportunities for producers to supply the breweries with ingredients
- (2) To understand the procurement needs of the breweries by determining how breweries purchase their base and specialty malts
- (3) To determine other ingredients that breweries use and if there is an opportunity for producers to supply the breweries with these ingredients
- (4) To determine the importance of selected physical, chemical, and service attributes in a brewery's decision to purchase its base and specialty malt

This report summarizes the initial findings of the study. The sample of 52 breweries has a *maximum* standard error range of $\pm 12.3\%$ at a 95% level of confidence, although some individual questions may have a lower error range. This means that the percentages reported for the entire sample of 52 breweries will not vary by *more* than 12.3% in 95 out of 100 cases.

The report begins with the results of several questions on trends in the brewing industry, consumer demand, and the breweries' need to investigate new consumer markets. The survey then shifts its focus to locally grown and produced ingredients and malt, as well as the production needs that should be met to supply this malt. The breweries' base malt, specialty malt and wheat needs are then addressed. The potential to supply ingredients other than barley and wheat, conclusions, and a copy of the survey instrument are presented in the final chapters of the report.

Many of the questions in the survey were based on a survey conducted by the Department of Agricultural and Applied Economics in the University of Wyoming College of Agriculture, the Wyoming Department of Agriculture and the Wyoming Business Council's Agriculture and Timber Marketing Division¹. These questions were modified and updated according to the research purposes of this survey (see above). The survey was further modified after a pretest with a microbrewery and a regional brewery. The results of these questions serve to update entrepreneurs on the craft brewing industry, which (as seen section 1.0) has changed dramatically since 1998.

* The six-state region includes Colorado, Nebraska, Missouri, Iowa, Minnesota, and Wisconsin.

¹ "Malt Preferences of the Craft brewing Industry," Department of Agricultural and Applied Economics, University of Wyoming, November 1998.

1.0 State of Craft Brewing Industry/Trends in Consumer Demand

The Institute of American Brewing Studies defines a craft brewer as a brewery that²:

- (1) Possesses a Federal Brewer's Notice
- (2) Brews at least 90 percent of beer sold using no more than 10 percent corn, rice or refined sugar adjunct, of any form (except in the case of some traditional Belgian-style strong ales, which can contain as much as 20 percent adjunct)
- (3) Does not use artificial colors, artificial flavors, or any processing aids that combine to become part of the final beer product
- (4) Is not more than one-third owned (or the economic equivalent) by another company of greater than \$50 million revenue that is not itself a craft brewer

Craft breweries generally consist of three types of businesses: brewpubs, microbreweries, and regional breweries. For the purposes of this survey a *brewpub* was defined as a restaurant-brewery with a majority (greater than 50%) of beer sold on site. The beer is brewed for sale and consumption in the adjacent restaurant and/or bar. A *microbrewery* is defined as a brewery that produces less than 15,000 barrels (17,600 hectoliters) of beer per year. Microbreweries typically sell to the public in one or more of the following methods: a three-tier system (brewer to wholesaler to retailer to consumer); a two-tier system (brewer acts as wholesaler and sells direct to a retailer who sells to a consumer); and directly to the consumer through carryout, onsite tap-room, or brewery restaurant sales. Finally, a *regional brewery* has the capacity to brew between 15,000 barrels (17,601 hectoliters) and 2 million barrels (2.35 million hectoliters) a year³.

The craft brewing industry boomed in the 1990's by posting annual volume sales increases ranging between 25% and 70% from 1992 through 1996. However, the industry became overcrowded in 1997 as its sales volume growth dropped to 5%. In 1998, there was no growth in the industry, but in 1999 the industry came back to post a 2% increase in sales⁴. Nationwide, more than 300 brewpubs and breweries closed during the late 1990's as industry growth slowed including four of the largest craft brewers: Boston Beer Company, Pete's Brewing Company, Redhook Ale Brewery Incorporated, and Pyramid Brewing Incorporated⁵. However, the industry began to rebound in 2000 as volume for craft brewers increased substantially, on the order of almost 250,000 barrels⁶. The table on the next page illustrates the state of the craft beer industry from 1990 to 1999.

² <http://www.allaboutbeer.com/news/industry/craft.html>.

³ As defined by the Institute of Brewing Studies

⁴ "IBS Reports Sales Increasing for Micros," *Modern Brewery Age*, May 8, 2000.

⁵ "Nation's Thirst for Specialty Beers Flat?," *Modern Brewery Age*, May 1, 2000.

⁶ "Craft Brewers Demise Much Exaggerated," *Modern Brewery Age*, May 21, 2001.

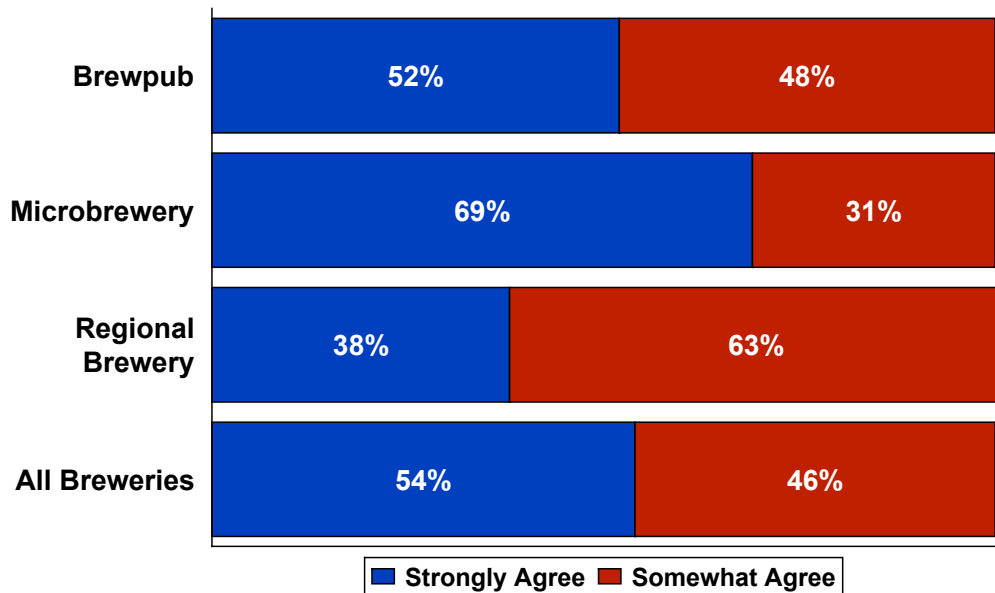
Growth of the Craft Brewery Industry

<u>Year</u>	<u># of Brewpubs & Microbreweries</u>	<u># of Barrels Produced/Yr</u>
1990	211	635,000
1991	248	854,000
1992	295	1,189,000
1993	382	1,670,000
1994	541	2,509,000
1995	804	4,254,000
1996	1,102	5,339,000
1997	1,320	5,583,000
1998	1,399	5,582,000
1999	1,447	5,694,000

Source: Modern Brewery Age May 8, 2000

To determine the current craft brewer’s perspective on industry growth, the question below was asked to each brewer.

Q. Consumer demand for craft brewing products will continue to grow for the foreseeable future (agreement with statement was assessed on scale of 1 to 10 with 1 as Strongly Agree and 10 as Strongly Disagree).

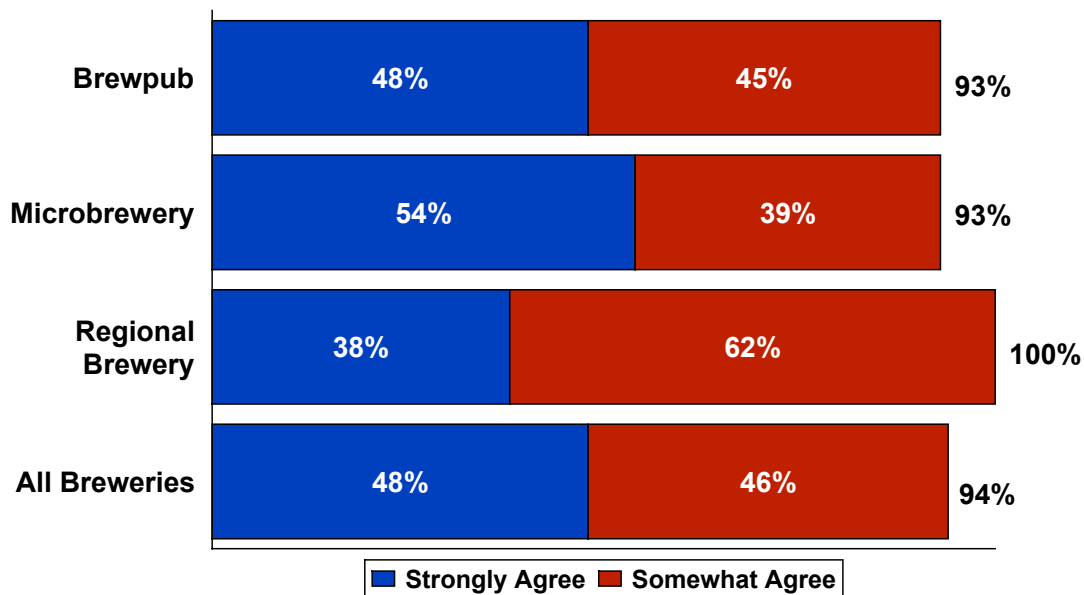


All of the breweries believe that consumer demand for craft brewing products will continue to grow in the foreseeable future. Sixty-nine percent of the microbreweries and 52% of the brewpubs strongly agreed with this statement, while 38% of the regional breweries strongly agreed.

1.1 Consumer Knowledge of Craft Brewing Products

For the industry to grow, consumer knowledge of craft brewing products will also need to grow. Professor Swaminathan of the University of California Davis Graduate School of Business states “specialty beer consumers prefer a beverage brewed by a small, craft firm according to traditional methods and may choose specialty brews more for fashion than taste⁷”. As seen below, about half of the craft breweries strongly believe that consumer knowledge will continue to grow.

Q. The degree of knowledge/sophistication of your clientele regarding craft brewing products will continue to grow in the foreseeable future (agreement with statement was assessed on scale of 1 to 10 with 1 as Strongly Agree and 10 as Strongly Disagree).



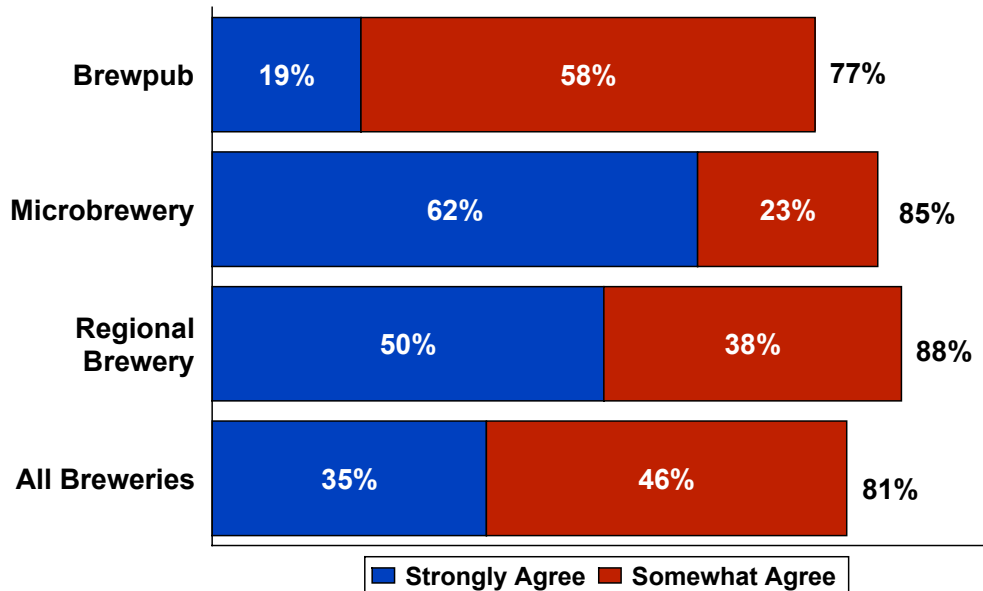
Nearly all of the breweries (94%) believe that consumer knowledge of craft brewing products will continue to grow in the foreseeable future. Fifty-four percent of the microbreweries and 48% of the brewpubs strongly agreed with this statement, while 38% of the regional breweries strongly agreed.

⁷ “Market Researchers Caution Craft Brewers,” Modern Brewer Age, February 28, 2000.

1.2 Breweries Need to Investigate New Markets

For the craft industry to grow, it will need to investigate new markets. As seen below, the vast majority of craft breweries are interested in investigating new markets.

Q. To survive in the craft brewing industry, I must investigate new markets (agreement with statement was assessed on scale of 1 to 10 with 1 as Strongly Agree and 10 as Strongly Disagree).



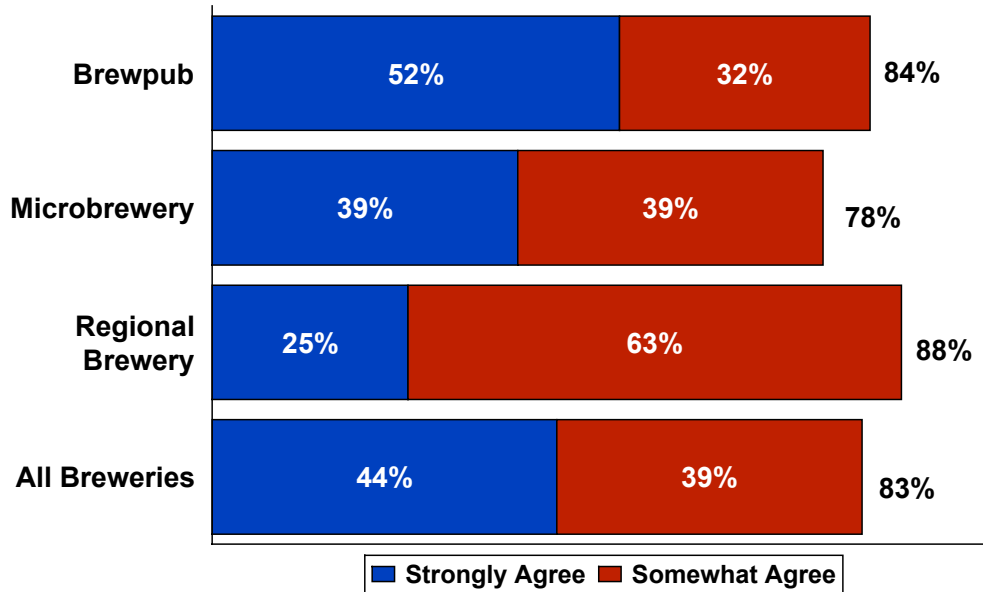
The vast majority of the breweries (81%) feel the need to investigate new markets in order to survive in the craft brewing industry. Sixty-two percent of the microbreweries strongly agreed with this statement, while only 19% of the brewpubs strongly agreed. Half of the regional breweries strongly agreed with the above statement.

The need for breweries to investigate new markets is an opportunity for producers and craft breweries to partner and develop a market for beer that is produced with locally grown and produced ingredients and/or malt. This opportunity will be studied in section two.

1.3 Future Malt Supply

Another factor that is critical to industry growth is the availability of malt. As seen below, the breweries were fairly confident in their future malt supply.

Q. I am confident that the supply of malt for the craft brewing industry is reliable (agreement with statement was assessed on scale of 1 to 10 with 1 as Strongly Agree and 10 as Strongly Disagree).

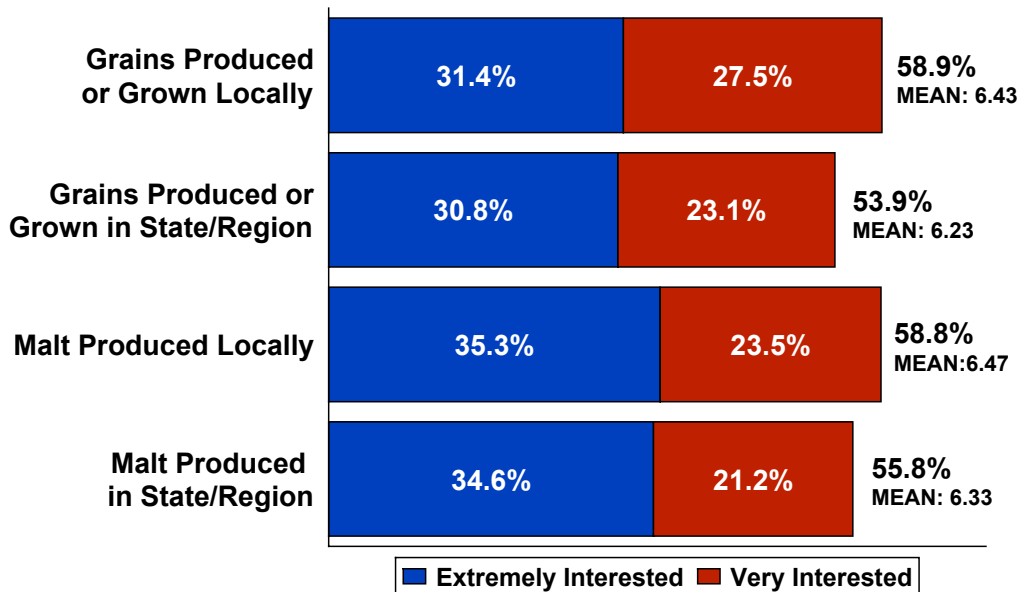


The vast majority of the breweries (83%) thought that their future malt supply was reliable. Fifty-two percent of the brewpubs strongly agreed with this statement, while 39% of the microbreweries strongly agreed. Only 25% of the regional breweries strongly agreed with the above statement.

2.0 Brewery Interest In Locally Grown/Produced Ingredients

As seen in section 1.2, the vast majority of breweries believe it is necessary for them to investigate new markets. Consumer interest in locally grown and produced products is currently at very positive levels. A consumer survey of 500 random households in the states of Nebraska, Iowa, Missouri, and Wisconsin showed that seven in ten respondents believe that it was very or extremely important that the brands or products they purchase support a local family farm and are locally grown or produced. Only 7.6% of the population depicted locally grown or produced products as “not important” in product or brand selection⁸. As seen below, most of the craft breweries surveyed were very supportive of the ability to label their products as made with locally grown or produced ingredients and malt.

Q. What would be your level of interest in the ability to make a claim (through your label or promotional material) that your beer was made with...? Please indicate your interest on a scale of 0 to 10 with 0 as No Interest and 10 as Extremely Interested.



Base: All Respondents(n=52)

The breweries were asked to rank their level of interest (on a scale of 0 to 10 with 0 as not at all interested and 10 as extremely interested) in the ability to make various claims through their label or promotional material. Fifty-nine percent of the breweries were very or extremely interested⁹ in making the claim that their beer was made with grains produced or grown locally with 31% indicating that they were extremely interested¹⁰. The breweries were also gauged on their interest in making the claim that their beer was made with grains produced or grown in their state or region. Fifty-four percent were very or extremely interested in making this claim with 31% saying they were extremely interested.

⁸ “Attracting Consumers with Locally Grown Products,” [University of Nebraska Food Processing Center](#), October 2001.

⁹ A rating of 6 or above

¹⁰ A rating of 9 or 10

The survey also assessed the breweries' level of interest in making the claim that the malt used in their brewing process was produced locally. The majority of breweries (59%) were very or extremely interested in making this claim with 35% indicating that they were extremely interested. Fifty-six percent were very or extremely interested in the ability to make the claim that their malt was produced in their state or region.

Level of Interest by Type of Brewery

The table below shows the breweries' level of interest in purchasing locally produced ingredients and malt by type of brewery. Overall, brewpubs and microbreweries had a higher degree of interest in purchasing locally grown ingredients and locally produced malt than regional breweries. In each of the questions, the average or mean response (on a scale of 1 to 10) fell in the range of 6.3 to 7.7 for the brewpubs and microbreweries, while it ranged between 4.1 and 4.5 for the regional breweries.

	Total Sample	Brewpub	Micro Brewery	Regional Brewery
<u>Grains Produced & Grown Locally</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Extremely Interested	31	32	50	0
Very Interested	28	29	17	38
Somewhat Interested	33	32	33	38
Not Interested	8	6	0	25
Mean (Average Response)	6.43	6.45	7.67	4.50

	Total Sample	Brewpub	Micro Brewery	Regional Brewery
<u>Grains Produced & Grown in State/Region</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Extremely Interested	31	32	46	0
Very Interested	23	26	8	38
Somewhat Interested	39	36	46	38
Not Interested	8	6	0	25
Mean (Average Response)	6.23	6.32	7.08	4.50

	Total Sample	Brewpub	Micro Brewery	Regional Brewery
<u>Malt Produced Locally</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Extremely Interested	35	36	58	0
Very Interested	24	26	8	38
Somewhat Interested	31	29	33	38
Not Interested	10	10	0	25
Mean (Average Response)	6.47	6.58	7.67	4.25

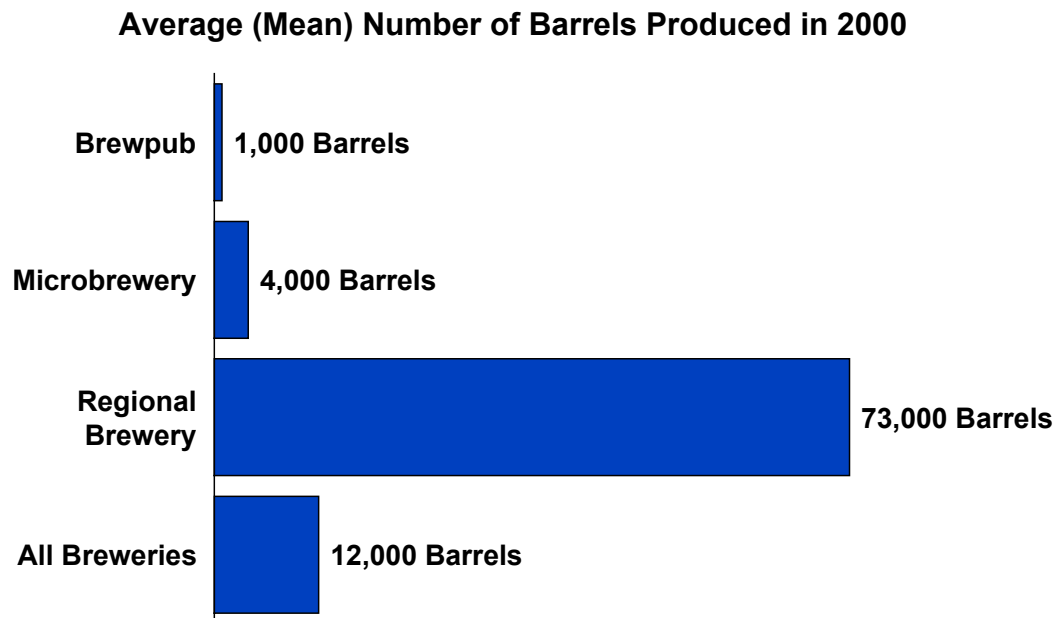
	Total Sample	Brewpub	Micro Brewery	Regional Brewery
<u>Malt Produced in Region/State</u>	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Extremely Interested	35	36	54	0
Very Interested	21	23	8	38
Somewhat Interested	35	32	39	38
Not Interested	10	10	0	25
Mean (Average Response)	6.33	6.45	7.38	4.13

Base (n=)	52	31	13	8
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3.0 Production Needs: 2000 Beer Production

To approach a craft brewery with the concept of purchasing locally grown and produced ingredients and malt, a producer needs to understand the brewery's production needs. The graph below shows the average quantity of beer produced by this sample of breweries.

Q. How much beer was produced (rather than sold) in your business in the year 2000?

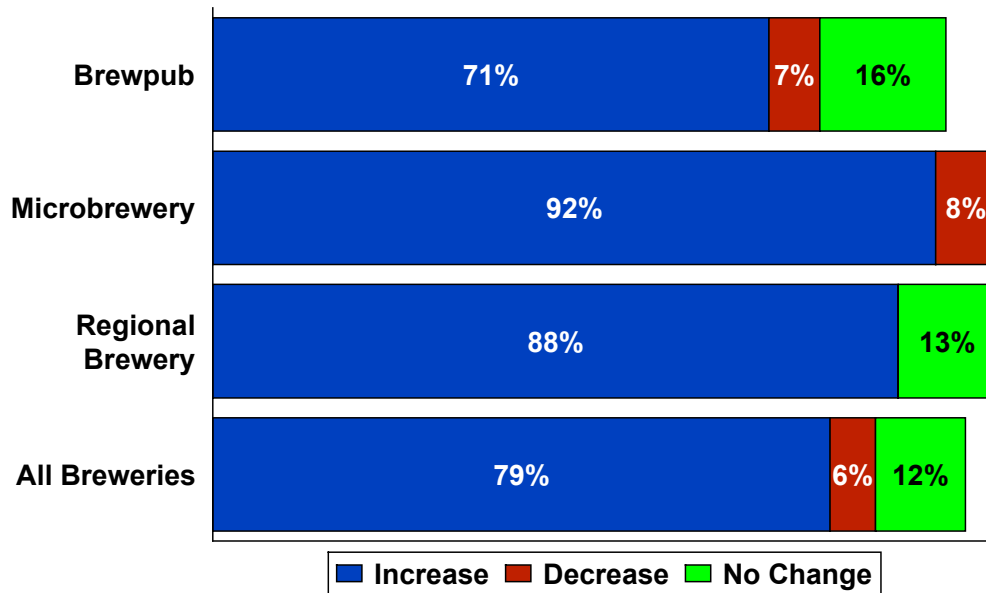


The graph above shows the average (mean) number of barrels produced in the year 2000 for each type of brewery surveyed. In the year 2000, brewpubs produced an average of 1,000 barrels of beer, while microbreweries produced 4,000 barrels and regional breweries produced an average of 73,000 barrels annually.

3.1 Production Needs: Projected Change in Production for 2001

As seen on the graph below, the vast majority of breweries expect their beer production to increase in 2001. This finding is comparable to the industry data (and optimism reported by the surveyed breweries) described in section 1.0 where it was suggested that the craft brewing industry is on the verge of a rebound.

Percent of Breweries Projecting a Change/No Change in Business for 2001



Seventy-one percent of the brewpubs expect their beer production to increase in the year 2001, while 92% of the microbreweries and 88% of the regional breweries expect to see an increase this year. Among all breweries, 79% expect their production to increase in 2001.

Shown below is the average (mean) percent *increase* projected by the breweries surveyed. Among breweries that expect to see an increase in their 2001 beer production, the average (mean) percent increase is expected to be 23% among all breweries. Brewpubs forecast a 24% increase, while microbreweries expect to have a 27% increase and regional breweries project an 11% increase in production.

Q. What percentage change, in the number of barrels produced, do you project for your business in the year 2001?

	Average % Increase
Brewpub	24
Microbrewery	27
Regional Brewery	11
All Breweries	23

3.2 Production Needs: Malted Barley

Malted barley is the greatest production need in the brewing process. The paragraphs below describe the process of malting barley as written in *The Brewers Handbook* by Ted Goldammer¹¹.

Malting serves the purpose of converting insoluble starch to soluble starch, reducing complex proteins, generating nutrients for yeast development, and the development of enzymes. The three main steps of the malting process are steeping, germination, and kilning.

Steeping begins by mixing the barley kernels with water to raise the moisture level and activate the metabolic processes of the dormant kernel. The water is drained, and the moist grains are turned several times during steeping to increase oxygen uptake by the respiring barley. Draining is done to remove dissolved carbon dioxide and to reintroduce oxygen-rich water. Steeping is complete when the white tips of the rootlets emerge, which is known as chitting. At this point the grains will have swollen one and one-third times their original size.

In the next step, the wet barley is germinated by maintaining it at a suitable temperature and humidity level until adequate modification has been achieved. Germination is done on floors, in drums, or in boxes.

The final step is to dry the green malt in the kiln. Malts are kilned at different temperatures. The temperature regime in the kiln determines the color of the malt and the amount of enzymes, which survive for use in the mashing process. Low temperature kilning is more appropriate for malts when it is essential to preserve enzymatic (diastatic) power. These malts are high in extract but low in coloring and flavoring compounds. Pilsner and pale ale malts are examples of malts kilned at low temperatures. Malts kilned at intermediate temperatures, such as Munich and Vienna malts, are lower in enzymes but higher in coloring and flavoring compounds. Malts kilned at high temperatures, such as crystal and chocolate malts, have little if any enzymes, and thus are lower in extract.

3.3 Production Needs: Two Row Verses Six Row Barley

The two types of malted barley that are commonly used in brewing are two and six row barley. The following paragraphs explain the difference between the two types.

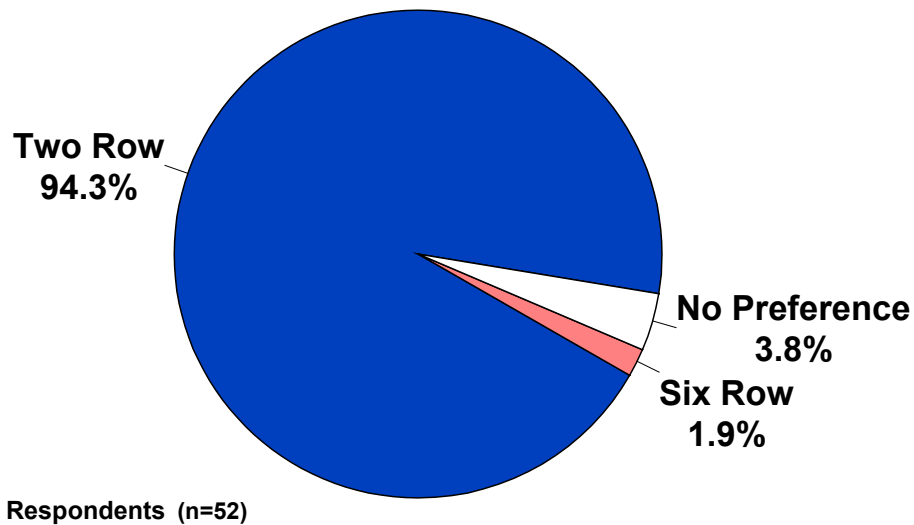
The *Brewers Handbook* helps explain the difference between two-row and six-row barley. As Goldammer writes, “*two-row* barley has a lower enzyme content, less protein, more starch, and a thinner husk than *six-row* barley. Of the first two of these characteristics, the protein content of two-row barley depends greatly on the barley strain, and enzyme content depends very much on the strain and degree of kilning. In comparison to six-row barley, two-row has a higher starch content – the principal contributor to extract. The thinner husk associated with two-row barley makes for mellower (less astringent) beers due to lower levels of polyphenols¹²”.

¹¹ <http://www.beer-brewing.com/index.htm>.

¹² <http://www.beer-brewing.com/barley-malts/two-row-barley-malt.htm>.

As Goldammer also explains, “*six-row barley* has a higher enzyme content, more protein, less starch, and a thicker husk than two-row barley. The higher level of diastatic enzymes makes six-row barley desirable for conversion of adjunct starches (those that lack enzymes) during mashing. On the down side, the higher protein content can result in greater break material (hot and cold), as well as possibly increased problems with haze in the finished beer. The husk is high in polyphenols (tannins) that not only produces a haze, but also imparts an astringent taste¹³”. As seen below, nearly all of the breweries surveyed prefer to purchase two-row barley.

Q. Given a choice, do you prefer malt that is made with...?

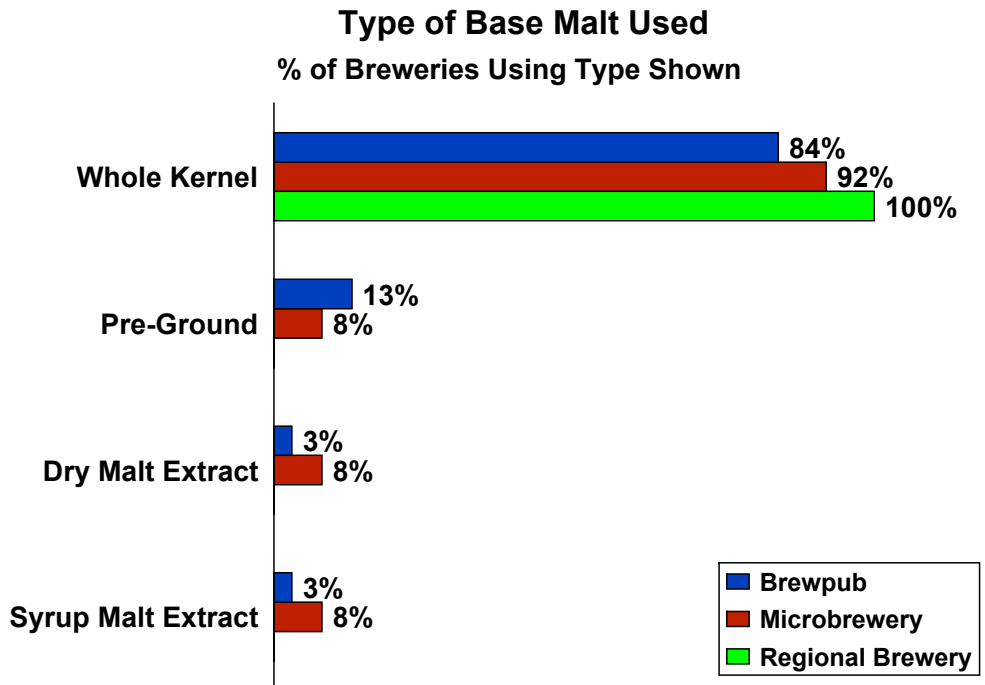


The breweries overwhelmingly prefer to purchase malt made with two-row barley (94% mention) rather than six-row barley (2% mention). Only 4% of the breweries did not have a preference between the two types of malt.

¹³ <http://www.beer-brewing.com/barley-malts/six-row-barley-malt.htm>.

4.0 Base Malt Needs: Type Used

A brewery's malt needs can be broken down into the base and specialty malt that the brewery purchases to brew its beer. Goldammer writes that "base malts usually account for a large percent of the total grain bill, with darker-colored specialty malts accounting for 10 to 25% of the grain bill. The only exception is wheat malt (see section 7.0), which can make up to 100% of the total grain bill in brewing wheat beers. Base malts and, to some extent, light-colored specialty malts provide most of the enzymatic (diastatic) power to convert starches into fermentable sugars. The base malts provide the highest extract potential. Dark-colored specialty malts, caramelized malts, roasted malts, unmalted barely, and other malted grains are added in smaller quantities to obtain darker colors and to enhance flavor characteristics. Depending on the style of beer brewed, the brewer may use only one or two types of barley malts, or as many as seven or eight"¹⁴. The breweries were surveyed on their use of four principle types of base malt: whole kernel, pre-ground, dry malt extract, and syrup malt extract. As seen below, the vast majority of breweries purchase malt in the whole kernel form and then process the malt themselves.



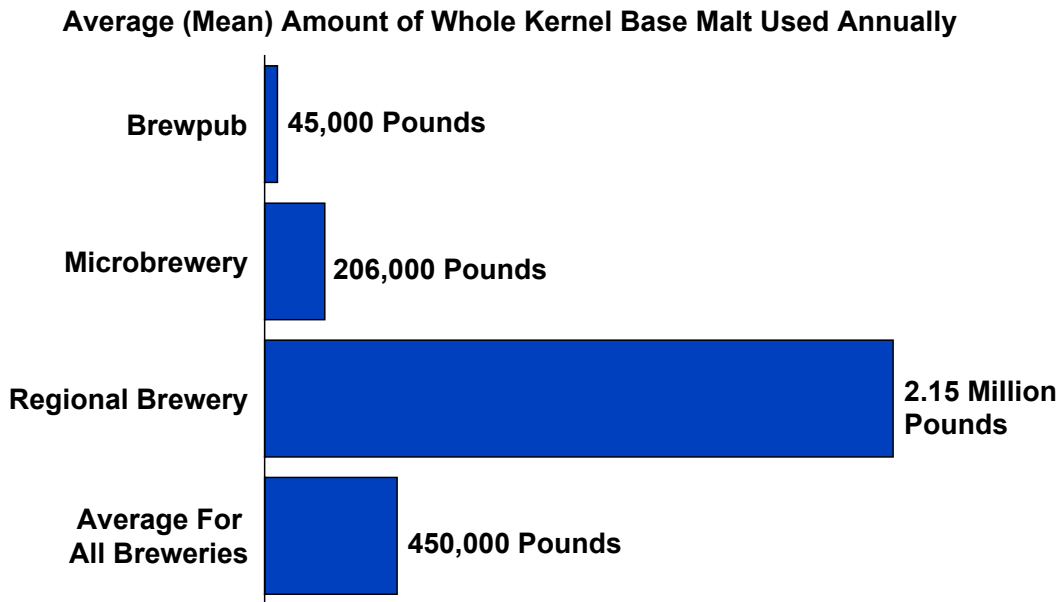
Whole kernel malt was by far and away the most prevalent type of base malt used with 84% of the brewpubs, 92% of the microbreweries, and all of the regional breweries using this product. Thirteen percent of the brewpubs and eight percent of the microbreweries used pre-ground base malt. Three percent of the brewpubs and eight percent of the microbreweries used a dry malt extract and a syrup malt extract.

¹⁴ <http://www.beer-brewing.com/barley-malts/base-malts.htm>.

4.1 Base Malt Needs: Annual Whole Kernel Use

In order to supply the brewery industry, it is important to know the size of the malt market. Only whole kernel base malt is analyzed here because of its dominance in the malt market (see section 4.0). The graph below indicates that whole kernel base malt use varies greatly between the different types of breweries.

Q. On average, please estimate how much (Whole Kernel Base Malt) malt you use per year.



The breweries were asked to estimate their annual base malt usage. The graph above shows the average (mean) amount of whole kernel base malt used by type of brewery. Brewpubs use an average of 45,000 pounds of whole kernel base malt per year, while microbreweries use 206,000 pounds annually. Regional breweries use over two million pounds of whole kernel annually on average and bring the overall average for all breweries surveyed to 450,000 pounds.

These numbers, by themselves, are not particularly useful to producers. However, the number of acres needed to support a brewery may be useful. A microbrewery stated that 60 pounds of malt is used to produce one barrel of beer. The brewery also stated that one barrel of beer is the equivalent of 1.12 bushels of barley. A regional brewery such as New Glarus Brewing Company in New Glarus, WI sold 9,406 barrels of beer in the year 2000¹⁵. To supply the New Glarus brewery a producer would need to provide 560,000 pounds of malt (60 pounds of malt x 9,406 barrels) on an annual basis. Based on a ratio of 1.12 bushels of barley to one barrel of beer, it would take approximately 10,500 bushels (1.12 x 9,406) of barley to supply the New Glarus brewery. Therefore, 175 acres of barley would be needed to supply New Glarus' annual production of beer¹⁶ or to supply nearly three "average" microbreweries (as illustrated in the above graph). Please note that this example is a rough estimate for illustrative purposes.

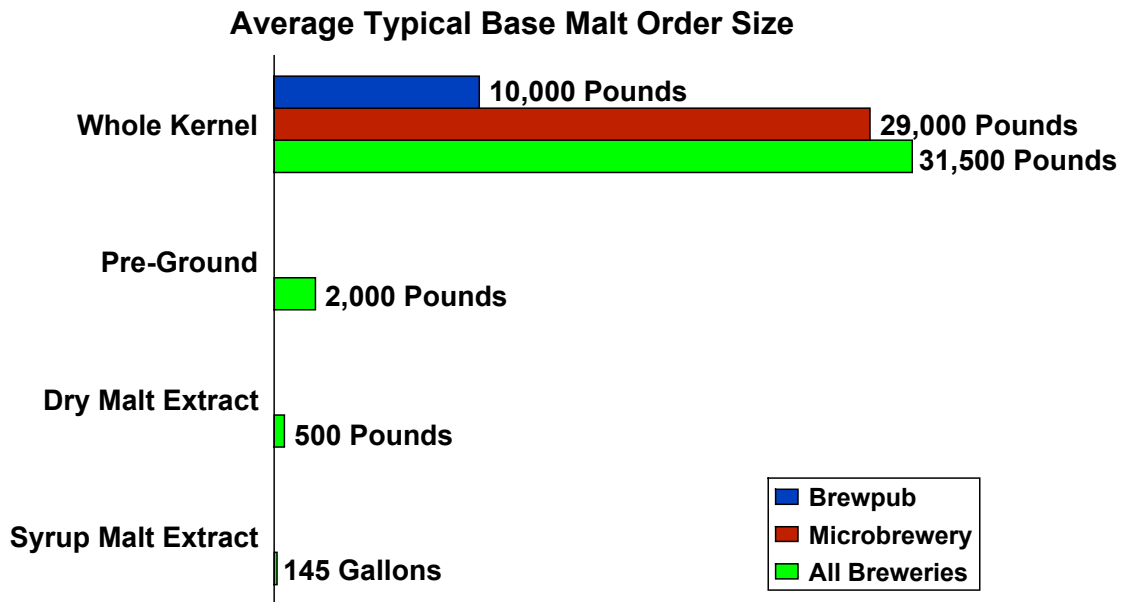
¹⁵ "Craft Brewers Demise Much Exaggerated," *Modern Brewery Age*, May 21, 2001.

¹⁶ Based on a harvest of 60 bushels of barley per acre

4.2 Base Malt Needs: Single Order Purchases

In order to supply a brewery, it is important to understand the other characteristics that surround a brewery's malt purchase. Some of the characteristics include: the typical malt order size; the type of packaging preferred by the breweries; their order frequency; and where the breweries purchase their malt and how it is shipped to them. The next few sections cover these questions.

Q. In a typical single order, what is the total quantity of (base) malt you purchase?

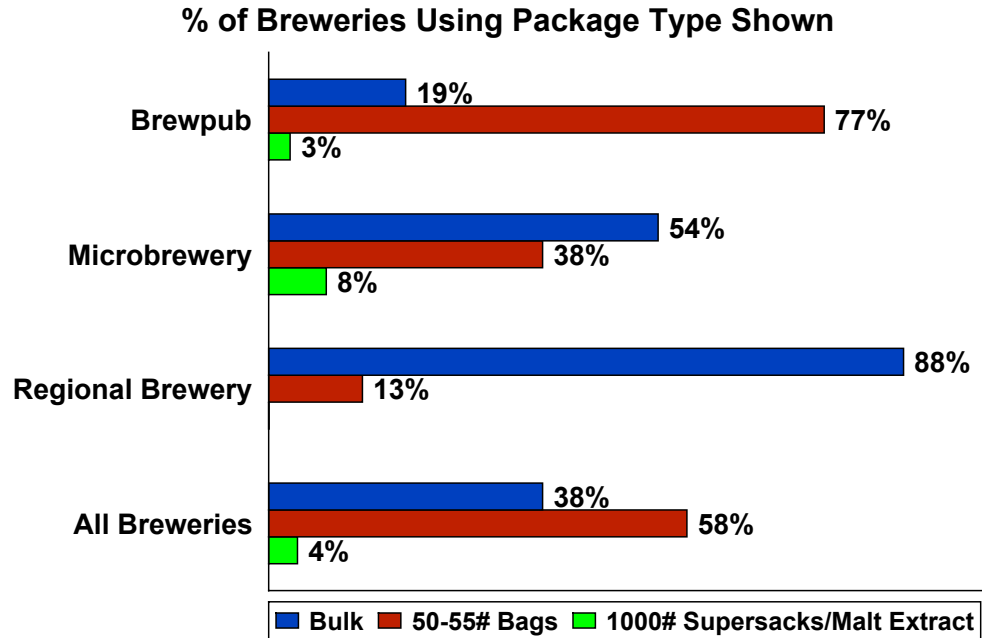


The graph above shows the size of the typical base malt order by type of malt ordered. Whole kernel purchases are also broken down by brewpub and microbrewery orders. The average brewpub typically purchases 10,000 pounds of whole kernel base malt in a single order, while microbreweries will purchase an average (mean) of 29,000 pounds. Regional breweries (not shown in graph) will typically purchase 102,000 pounds of whole kernel base malt in a single order. For all breweries, the average (median) order size of whole kernel base malt is 31,500 pounds.

Among breweries who purchase pre-ground base malt, the average (median) order size is 2,000 pounds. Among breweries who purchase dry malt extract the average (median) order size is 500 pounds. Breweries who order syrup malt extract typically order in 145 gallons in a single order.

4.3 Base Malt Needs: Package Type

Q. In what package type do you purchase the majority of your malt?



The breweries were asked to list the package type in which the *majority* of their base malt is purchased. The vast majority of brewpubs (77%) purchase their base malt in 50-55 pound bags, while 19% purchase it in bulk. Over half of the microbreweries (54%) purchase their base malt in a bulk form, while 38% buy it in 50-55 pound bags. Eighty-eight percent of the regional breweries purchase their base malt in bulk, while 13% buy it in bags.

4.4 Base Malt Needs: Order Frequency

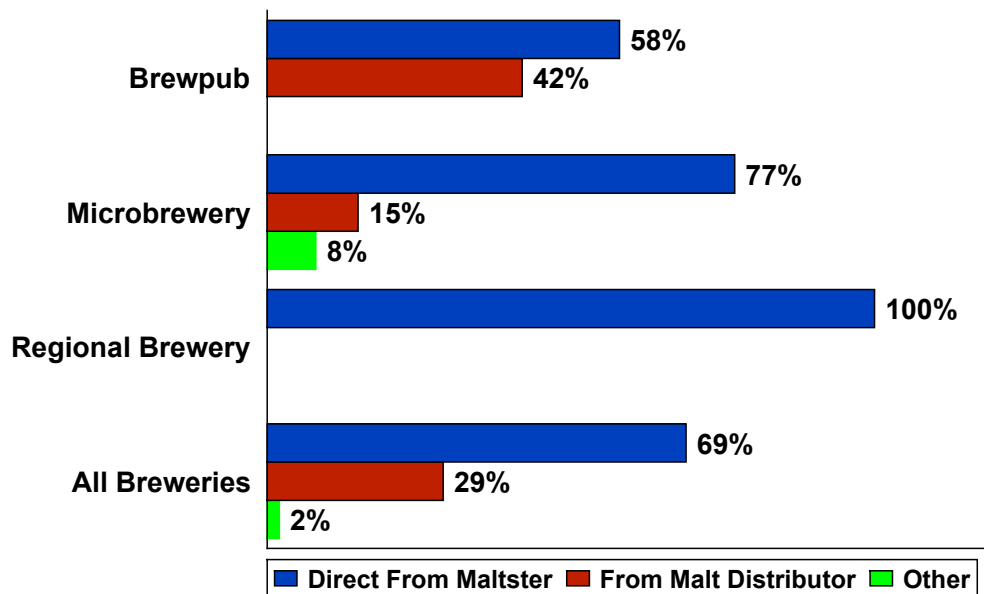
Q. How often do you typically order (base) malt?

	<u>All Breweries</u>	<u>Brewpub</u>	<u>Microbrewery</u>	<u>Regional Brewery</u>
Weekly	10%	6%	8%	25%
Twice Monthly	12%	6%	15%	25%
Monthly	23%	23%	23%	25%
Quarterly	38%	45%	46%	0%
Semi-Annually	4%	6%	0%	0%
Annually	2%	0%	0%	13%
Other	12%	13%	8%	13%

The table on the previous page shows the frequency in which base malt is ordered broken down by type of brewery. Nearly half of the brewpubs and microbreweries (45-46%) order their base malt quarterly, while 23% order monthly. Regional Breweries are more likely to purchase their base malt on a frequent basis with 75% ordering their malt weekly, twice monthly or monthly.

4.5 Base Malt Needs: Where Purchased

Q. Where do you purchase the majority of your (base) malt?



The graph above illustrates where breweries purchase their base malt. The majority (58%) of brewpubs surveyed purchase base malt direct from a maltster, while 42% purchase through a malt distributor. Seventy-seven percent of the microbreweries purchase base malt direct from a maltster, while only 15% purchase from a malt distributor. All of the regional breweries purchased base malt direct from a maltster.

The brewpubs that purchase from a malt distributor may be paying a premium price (see pricing under section 10.0) for the additional distribution segment or “middleman” that is involved with the malt distributor. This circumstance presents a potential opportunity for a producer or group of producers who may want to add value to their barley (through the malting process) in that they could possibly service the brewpubs and smaller microbreweries. As seen in the last few sections, this group of breweries orders in smaller quantities, on a less frequent basis (possibly to avoid high distribution costs or to reach minimum order sizes with the maltsters), and pays a premium price for their malt. If malt could be produced, on a local level, priced competitive with the premium that these breweries are currently paying, and delivered on a more frequent basis (so that it is fresher—see section 6.0 on the importance of freshness), then this product *may* be attractive to brewpubs and small microbreweries for their production needs.

4.6 Base Malt Needs: Base Malt Supplier

Q. Please list the maltster(s) from whom you purchase base malt.

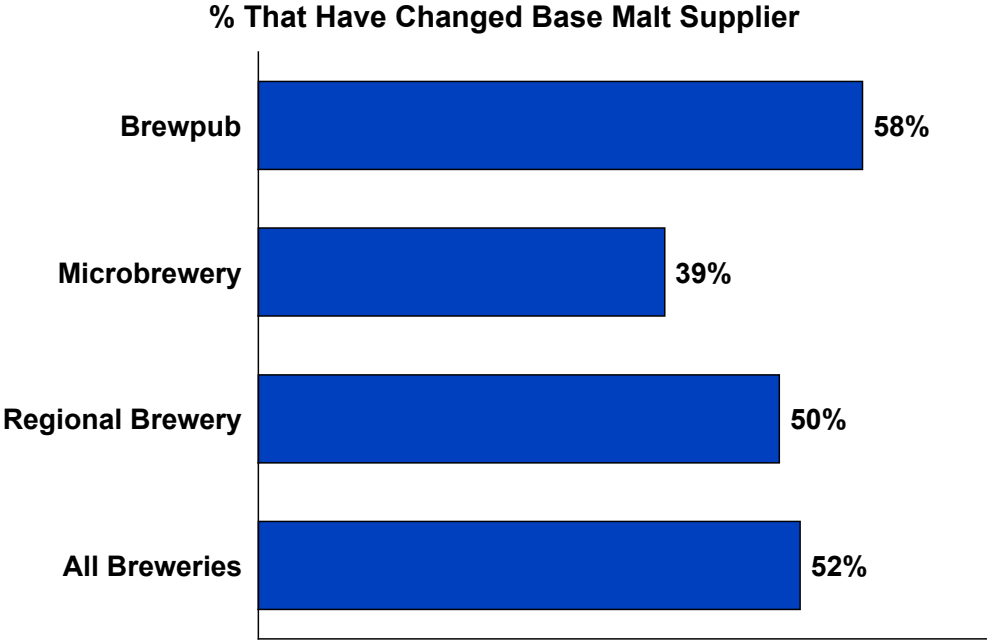
Base Malt Supplier by Type of Brewery Share of Mention (First Three Mentions) Shown

	All Breweries	Brewpub	Micro- brewery	Regional Brewery
Briess	24%	24%	38%	8%
Cargill	17%	14%	13%	33%
Minnesota Malting	13%	19%	6%	0%
Great Western Malting Co.	10%	7%	25%	0%
Mid America Brewing	6%	5%	0%	17%
Schreier	6%	5%	6%	8%
Pauls Malt Limited	4%	5%	6%	0%
L.D. Carlson	3%	5%	0%	0%
Five Star	3%	0%	0%	17%
Durst Malz/G.W. Kent	3%	2%	0%	8%
Gambrinus Malting Co.	1%	2%	0%	0%
Rahr Malting Co.	1%	2%	0%	0%
Beeston Malting Co.	1%	2%	0%	0%
Midwest Brewing Supply	1%	0%	6%	0%
ConAgra	1%	0%	0%	8%
Northwestern	1%	2%	0%	0%
De Wolf	1%	2%	0%	0%
Premier Malt Products	1%	2%	0%	0%

The table above shows the base malt suppliers ranked by their share of base malt supplier mentions. Briess was the top ranked malt supplier with a 24% share of mentions including a 38% share among microbreweries. Cargill was ranked second with a 17% share of mentions including a 33% share among regional breweries. Minnesota Malting was ranked third (13% share) followed by Great Western (10% share).

4.7 Base Malt Needs: Percent That Have Changed Base Malt Supplier

Q. Have you ever changed your Base Maltster/Supplier?

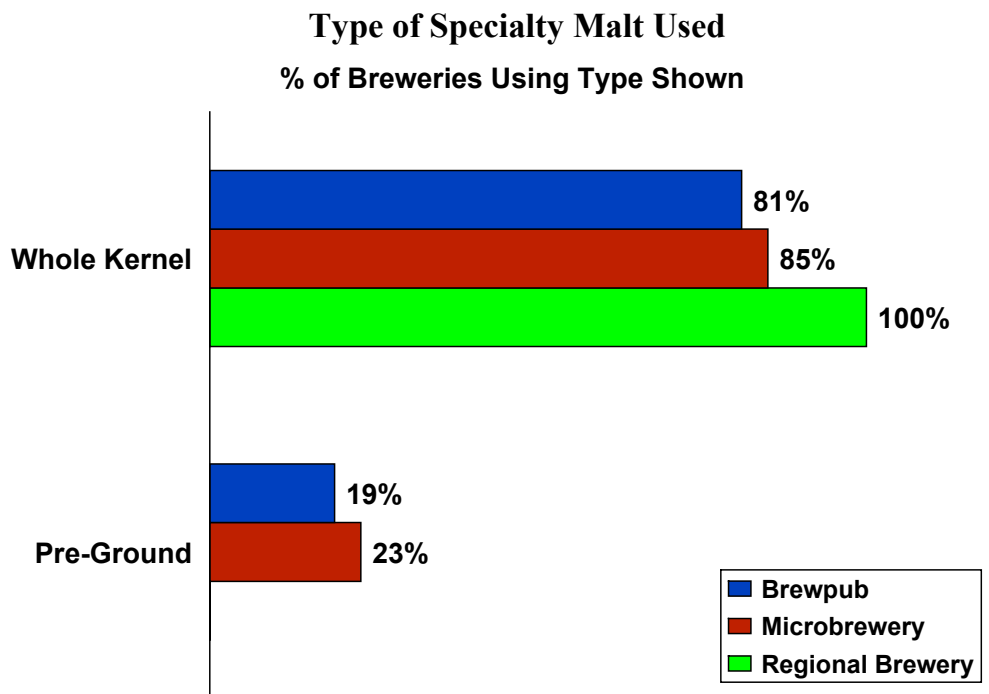


Over half (52%) of the breweries have changed their base malt supplier at one time or another. Fifty-eight percent of brewpubs have changed their base malt supplier, while 39% of the microbreweries and 50% of the regional breweries have changed suppliers.

5.0 Specialty Malt Needs: Type Used

As mentioned in section 4.0, specialty malts such as caramelized malts, roasted malts, un-malted barely, and other malted grains are added in smaller quantities to obtain lighter or darker colors and to enhance flavor characteristics. Goldammer writes, “light-colored specialty malts are kilned at higher temperatures than base malts and impart a deeper color and a fuller malt flavor and aroma to the finished beer. Vienna and Munich malts are examples of specialty light-colored malts. These malts are used in relatively smaller amounts than light-colored specialty malts because of their strong flavoring and coloring components. Some styles of beers, such as stout and Bock, cannot be made without the use of these specialty malts. Amber and brown malts are examples of specialty dark-colored malts. Caramel malt is made from green malt that is produced by drying the wet germinated barley at controlled temperatures, causing the starches to convert to sugars and caramelize. The major variable in the process is the roasting temperature, which determines the depth of the color and the degree of caramel flavor. Caramelized malts come in a wide range of colors, from light to very dark amber, and with flavors ranging from a mild sweet caramel to caramel/burnt sugar. It is primarily known for its color control but can also provide body (dextrins), mouthfeel, and some sweetness. Caramel malt will also improve foam stability. Light caramel malts accentuate the soft malt flavor, while darker caramel malts promote a caramel, slightly sweet taste, European in flavor¹⁷”.

Specialty malt is typically ordered in smaller quantities. The graph below illustrates the form in which the *specialty* malts are typically purchased.



Among the breweries surveyed, there were only two forms of specialty malt purchased—whole kernel and pre-ground. Whole Kernel Malt was the predominant specialty malt used with 81%

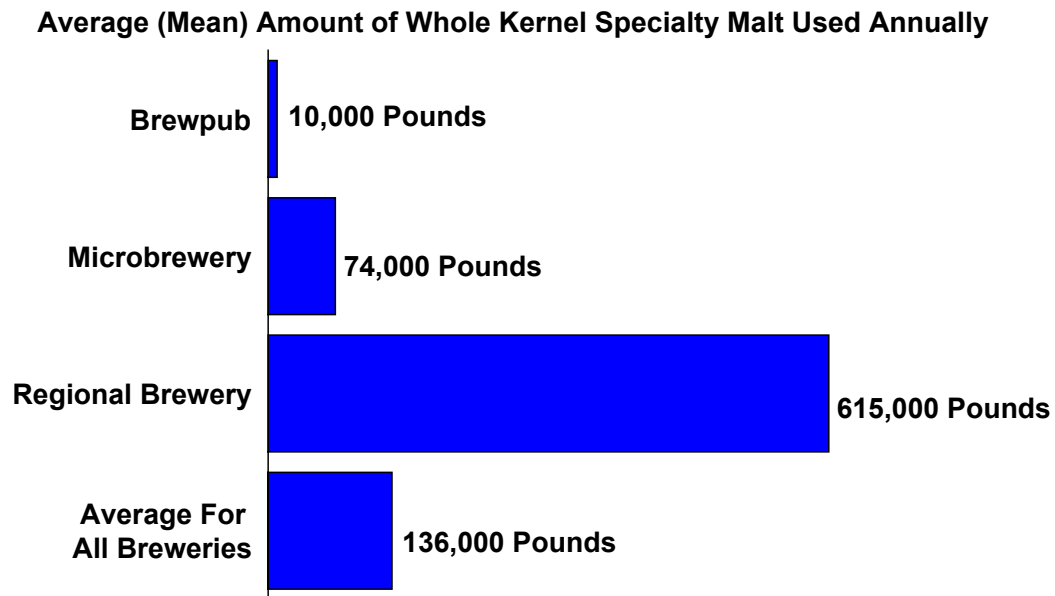
¹⁷ <http://www.beer-brewing.com/barley-malts/types-barley-malt.htm>

of the brewpubs, 85% of the microbreweries, and all of the regional breweries using this product. Nineteen percent of the brewpubs and 23% of the microbreweries used pre-ground base malt.

5.1 Specialty Malt Needs: Annual Whole Kernel Use

As covered in section 4 (base malt), it is important to understand the characteristics that surround a brewery's malt purchase. Some of the characteristics include: the typical specialty malt order size; the type of packaging preferred by the breweries; the type of specialty malt used; their order frequency; where the breweries purchase their malt and how it is shipped to them. The next few sections cover these questions.

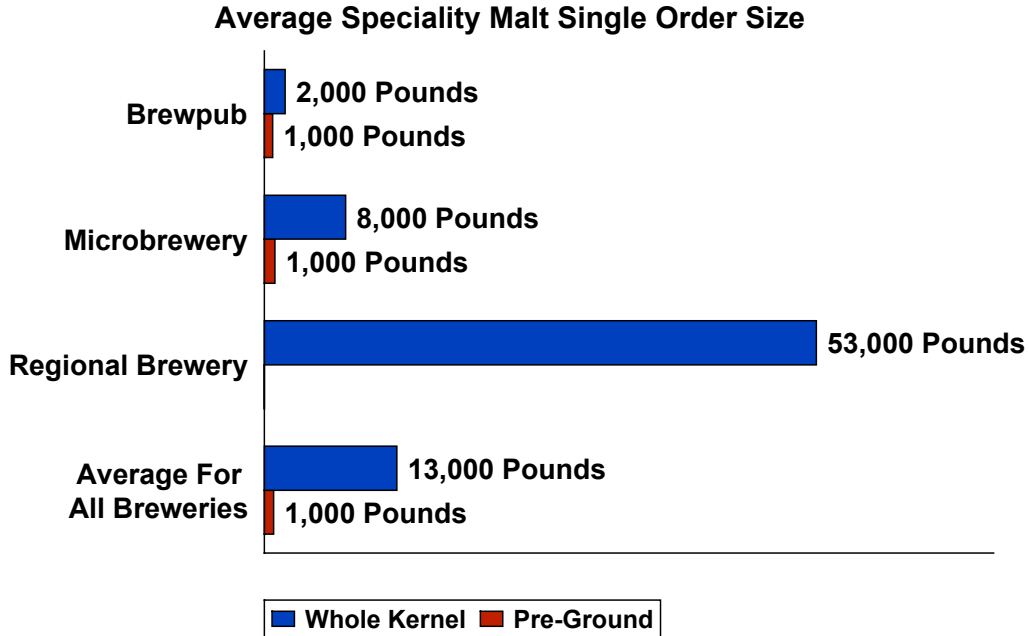
Q. On average, please estimate how much (Whole Kernel) Specialty malt do you use per year?



The breweries were asked to estimate their annual specialty malt usage. The graph above shows the average (mean) amount of whole kernel specialty malt used by type of brewery. Brewpubs use an average of 10,000 pounds of whole kernel specialty malt per year, while microbreweries use 74,000 pounds annually. Regional breweries use an average of 615,000 pounds of whole kernel specialty malt annually. The overall average for all breweries surveyed was 136,000 pounds.

5.2 Specialty Malt Needs: Single Order Purchases

Q. In a typical single order, what is the total quantity of malt you purchase?

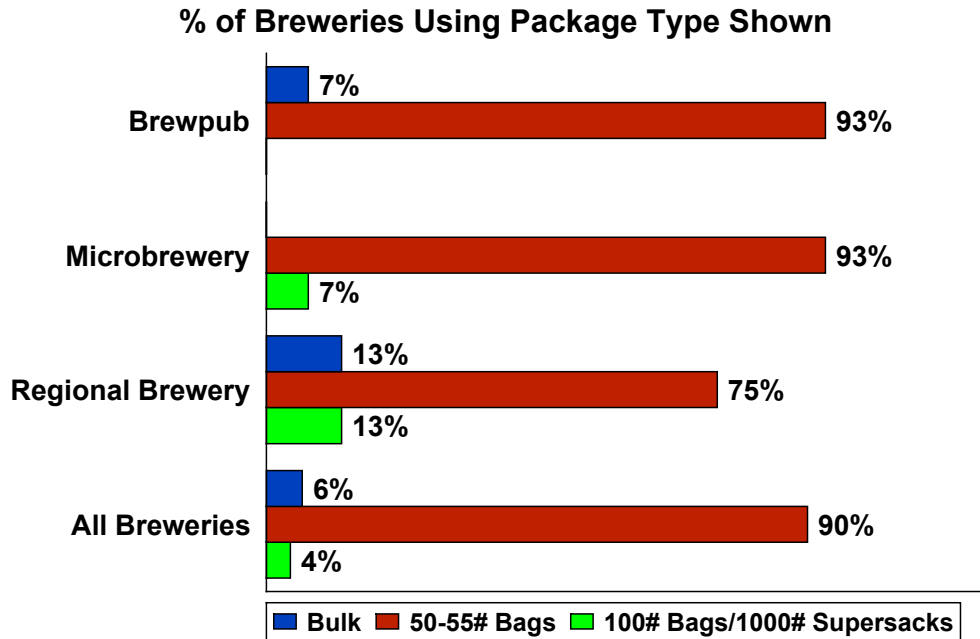


The graph above shows the size of the typical specialty malt order by type of malt ordered. The average brewpub typically purchases 2,000 pounds of whole kernel specialty malt in a single order, while microbreweries will purchase an average (mean) of 8,000 pounds. Regional breweries typically purchase 53,000 pounds of whole kernel specialty malt in a single order. For all breweries surveyed, the average (median) order size of whole kernel specialty malt is 13,000 pounds.

Pre-ground specialty malt is ordered in much smaller quantities. Among breweries who purchase pre-ground specialty malt, the average (median) order size is 1,000 pounds.

5.3 Specialty Malt Needs: Package Type

Q. In what package type do you purchase the *majority* of your malt?



The breweries were asked to list the package type in which the *majority* of their specialty malt is purchased. The vast majority of breweries (90%) purchase their specialty malt in 50-55 pound bags, while only 6% purchase it in bulk.

5.4 Specialty Malt Needs: Order Frequency

Q. How often do you typically order (specialty) malt?

	<u>All Breweries</u>	<u>Brewpub</u>	<u>Micro- brewery</u>	<u>Regional Brewery</u>
Weekly	4%	3%	8%	0%
Twice Monthly	15%	10%	23%	25%
Monthly	35%	35%	31%	38%
Quarterly	31%	35%	38%	0%
Semi-Annually	2%	3%	0%	0%
Annually	2%	0%	0%	13%
Other	12%	13%	0%	25%

The table above shows the specialty malt order frequency by type of brewery. Seventy percent of the brewpubs and microbreweries order their specialty malt monthly or quarterly. Regional Breweries are more likely to purchase their base malt on a more frequent basis with 38% ordering their specialty malt monthly and another 25% ordering twice a month.

5.5 Specialty Malt Needs: Types of Specialty Malt

The table below shows the most popular types of specialty malt among the sample of breweries. According to the survey, the three most popular types of specialty malt are Munich (23% share of mention among all breweries), Carmel (21% share among all breweries), and Crystal Malt (9% share). Wheat malt (discussed in section 7) is omitted from this analysis

Top Specialty Malts Used in Craft Beer Brewing *

Percent Listing Specialty Malt as One of The Top Three Malts Used in Brewing

<u>Specialty Malt</u>	<u>All Breweries</u>	<u>Brewpub</u>	<u>Micro- brewery</u>	<u>Regional Brewery</u>
Munich	23%	23%	22%	25%
Carmel	21%	20%	25%	17%
Crystal	9%	11%	3%	13%
Chocolate	5%	4%	6%	4%
Carmel Pils	4%	2%	6%	8%
Dextrin	4%	6%	3%	0%
Amber	3%	3%	0%	4%
Roasted or Black Barley	1%	2%	0%	0%
Vienna	1%	2%	0%	0%
Aromatic	1%	1%	3%	0%
Black	1%	0%	0%	4%
Honey	1%	1%	0%	0%
Rye	1%	0%	3%	0%
Mild Ale	1%	1%	0%	0%
Carmel Pils--Carapils	1%	0%	0%	4%
Special B	1%	1%	0%	0%

5.6 Specialty Malt Needs: Where Purchased

The table on the next page illustrates where breweries purchase their specialty malt. More than one-third (35%) of breweries surveyed purchase their specialty malt direct from a specialty maltster, while 31% purchase through a distributor. Thirty-four percent of the breweries order their specialty malt from their base maltster including 15% who order from a base maltster who has an alliance with a specialty maltster (the base maltster distributes the specialty maltster's product). Seventy-five percent of the regional breweries purchase specialty malt direct from a specialty maltster.

* Wheat Malt is excluded from this analysis

Q. Where do you purchase the majority of your (specialty) malt?

	All Breweries	Brewpub	Micro- brewery	Regional Brewery
	%	%	%	%
Direct From Specialty Maltster	35	32	15	75
Direct From Base Maltster	19	13	38	13
From Base Maltster (Alliance With Specialty Maltster)	15	19	8	13
Through A Distributor	31	35	38	0

As discussed in section 4 (base malts), a significant number of brewpubs and microbreweries (in the case of specialty malts) receive their specialty malt through a distributor. These breweries typically order in smaller quantities (possibly paying a higher premium) and order less frequently (possibly to lower their distribution costs and meet minimum order sizes). By ordering on a less frequent basis these breweries *may, at times*, be forced to use product that is not as fresh as they would like to use (see section 6.0 for freshness). As with base malts, this dilemma may present an opportunity to supply these types of breweries.

5.7 Specialty Malt Needs: Specialty Malt Supplier

Q. Please list the maltster(s) from whom you purchase specialty malt.

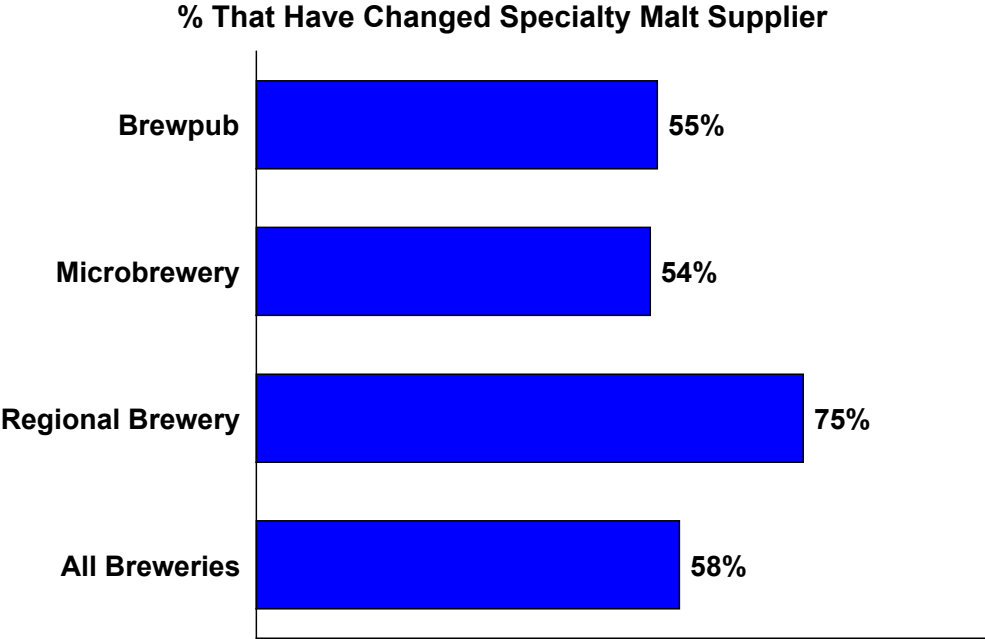
Specialty Malt Supplier by Type of Brewery Share of Mention (First Three Mentions) Shown

	All Breweries	Brewpub	Micro- brewery	Regional Brewery
Briess	29%	30%	33%	20%
Schreier	11%	9%	14%	13%
Mid America Brewing	9%	13%	5%	0%
Great Western Malting Co.	8%	8%	5%	13%
Hugh Baird	6%	6%	0%	13%
Cargill	6%	4%	5%	13%
Gambrinus Malting Co.	4%	4%	10%	0%
Durst Malz/G.W. Kent	3%	4%	5%	0%
Pauls Malt Limited	2%	4%	0%	0%
Weyermann Malting Co.	2%	2%	5%	0%
De Wolf	2%	2%	5%	0%
Crosby Baker	2%	2%	0%	7%

The table on the previous page shows the specialty malt suppliers ranked by their share of specialty malt supplier mentions* by the breweries. Briess was the top ranked specialty malt supplier with a 29% share of mentions. Schreier was ranked second with an 11% share and Mid America Brewing was ranked third (9% share of mentions).

5.8 Specialty Malt Needs: Percent That Have Changed Specialty Malt Supplier

Q. Have you ever changed your specialty Maltster/Supplier?



Fifty-eight of the breweries have changed their specialty malt supplier at one time or another. Fifty-five percent of brewpubs have changed their specialty malt supplier, while 54% of the microbreweries and 75% of the regional breweries have changed suppliers.

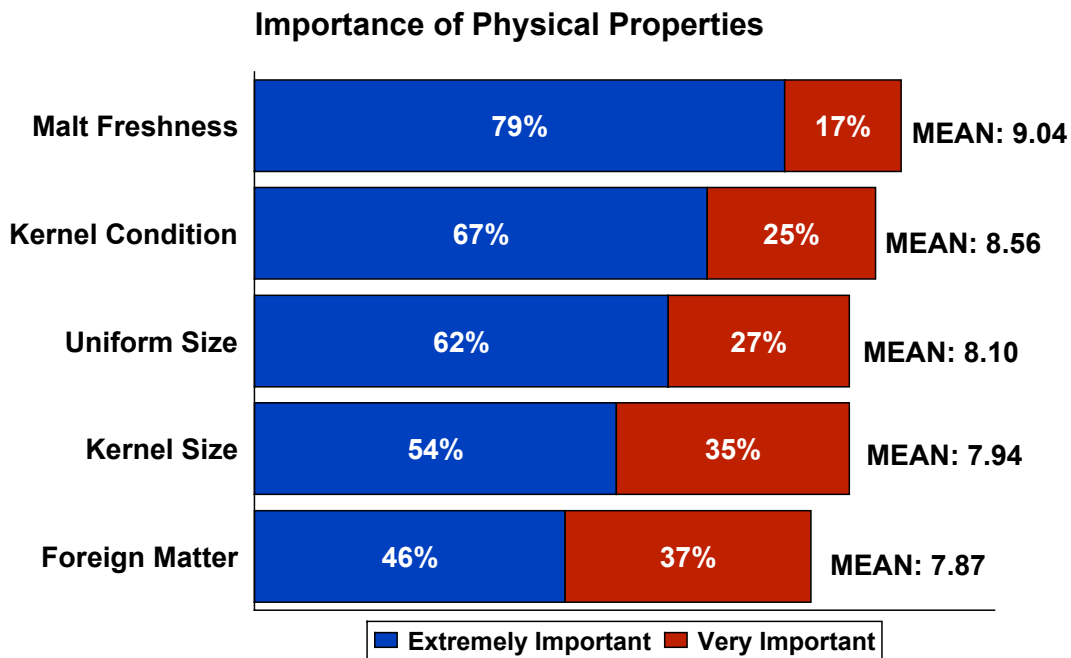
* Mentions of 2% or more shown

6.0 Attributes Important in A Brewery’s Raw Material Purchasing Decisions

This section focuses on an assessment of selected attributes that are considered in the purchase of brewing ingredients and malt, and the degree of importance of the attributes in a brewery’s purchasing decisions. Four categories were assessed: 1) Physical Properties, 2) Chemical Properties, 3) Services Offered, and 4) Price.

6.1 Importance of Physical Properties

Q. Thinking about your Base/Specialty Malt suppliers, please rank the following for their level of importance in purchasing decisions (on a scale of 1 to 10 with 1 as not very important and 10 as extremely important).



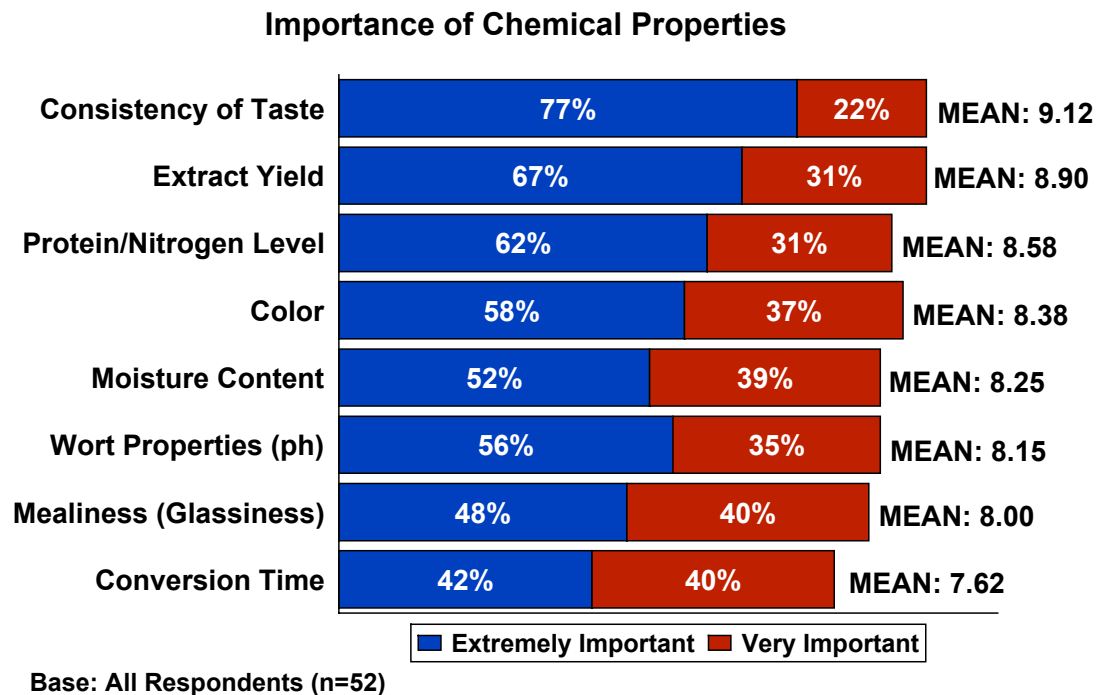
Base: All Respondents (n=52)

The respondents were asked to rank the importance (on a scale of 1 to 10 with 10 as extremely important) of five physical attributes in ingredients and malt purchasing decisions. Malt freshness was the top ranked attribute. Ninety-six percent of the respondents said that malt freshness was very or extremely important (a rating of six or above) in their purchasing decisions with 79% saying that freshness was *extremely* important (a rating of nine or ten) to them. The average (mean) rating was a 9.04. As mentioned in sections 4 and 5, the importance of freshness may present an opportunity for locally produced malt. If the smaller microbreweries and brewpubs could order in small, more frequent orders (and pay a price comparable to their current price), they *may* be interested in sourcing locally produced malt.

Kernel condition was the second ranked attribute with an average score of 8.56 and 92% saying that this attribute was very or extremely important. Uniform size was ranked third with an average score of 8.1 and 89% saying that the attribute was very or extremely important to them. Kernel size and the (lack of) foreign matter were also extremely important to about half of breweries.

6.2 Importance of Chemical Properties

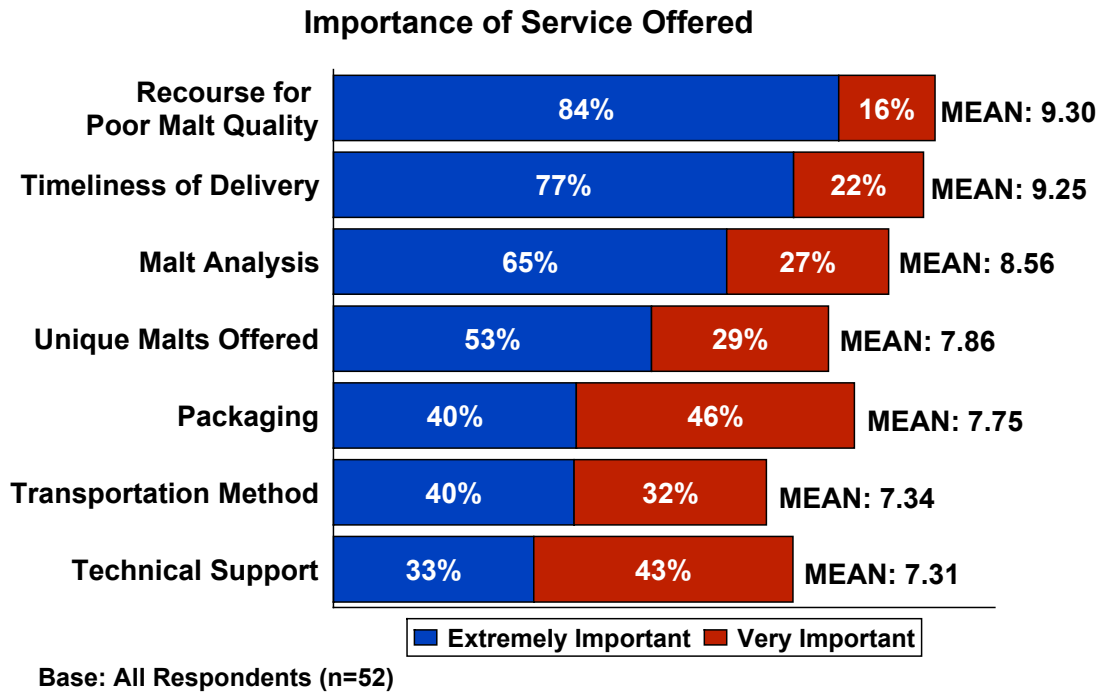
Q. Thinking about your Base/Specialty Malt suppliers, please rank the following for their level of importance in purchasing decisions (on a scale of 1 to 10 with 1 as not very important and 10 as extremely important).



The breweries were asked to rank the importance of eight chemical attributes in ingredients and malt purchasing decisions. Consistency of taste was the top ranked attribute with nearly all (99%) of the breweries saying that this attribute was very or extremely important to them. The average (mean) rating of this attribute was a 9.12. Extract yield was the second ranked attribute with an average score of 8.90 and 98% saying that this attribute was very or extremely important. Protein/Nitrogen level was ranked third with an average score of 8.58 and 93% saying that the attribute was very or extremely important to them. The attributes of color, moisture content, and wort properties (ph level) were also very or extremely important to more than 90% of the breweries.

6.3 Importance of Services Offered

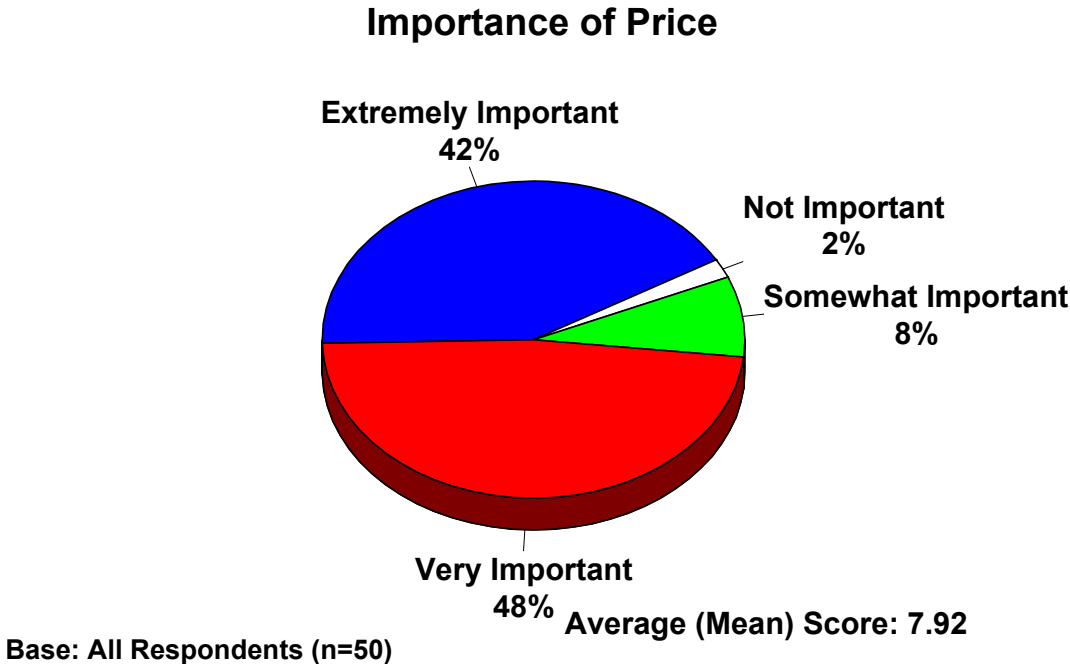
Q. Thinking about your Base/Specialty Malt suppliers, please rank the following for their level of importance in purchasing decisions (on a scale of 1 to 10 with 1 as not very important and 10 as extremely important).



The breweries were also asked to rank the importance of seven service attributes in ingredients and malt purchasing decisions. Recourse for poor malt quality was the top ranked attribute with all (100%) of the breweries saying that this attribute was very or extremely important to them. The average (mean) rating of this attribute was a 9.30. Timeliness of delivery was ranked a close second with an average score of 9.25 and 99% saying that this attribute was very or extremely important. Malt analysis was ranked third with an average score of 8.56 and 92% saying that the attribute was very or extremely important to them. The attributes of unique malts offered by the maltster, packaging, transportation method, and technical support were also highly important with each having an average score of more than 7.3 on the 10 point scale.

6.4 Importance of Price

Q. Thinking about your Base/Specialty Malt suppliers, please rank the following for their level of importance in purchasing decisions (on a scale of 1 to 10 with 1 as not very important and 10 as extremely important).



The price of an ingredient or malt used in brewing was very or extremely important to 90% of the breweries. Only 2% said that this aspect was “not important”. The average rating of this attribute was 7.92 on the 10-point scale.

6.5 Importance of Attributes by Type of Brewery

The table below shows the importance of all attributes surveyed in the question by type of brewery. The numbers represent the average or mean scores for the attribute and are ranked according to the mean score. The attributes of “recourse for poor malt quality”, “timeliness of delivery”, “consistency of taste”, and “malt freshness” each had an average score of 9.0 or a ranking of “extremely important” by all of the breweries. Extract yield closely followed with a mean score of 8.9. Protein/nitrogen level and moisture content had an average score of 9.0 or above (extremely important) to *microbreweries*. Malt analysis had an average score of 9.0 (extremely important) to *regional breweries*. It is interesting to note that price (mean score of 7.92) was ranked fifteenth in importance among *all* breweries and seventeenth (mean of 7.57) among *brewpubs*. Transportation method (7.34 mean) and technical support (7.31 mean) are less important (but still relatively important) with transportation being slightly more important (8.25 mean) to *microbreweries*.

In order to successfully compete in the brewing industry, a producer or producer owned maltster has to meet the needs of its customers (breweries). These needs are in the form of the attributes listed below. Price is an important consideration, but as seen below, it is not the most important consideration. If a producer can deliver an ingredient or malt that meets the needs of the attributes that rank higher than price (especially recourse, timely delivery, taste, freshness, and extract yield) then he *may* not need to be *as* competitive on price. A local malt or ingredients supplier can use their close proximity to the brewery as an advantage in providing a fresh, timely distributed product where their “personal” relationship can also provide the quality and consistency that the brewery desires.

	All Breweries	Brewpub	Micro- brewery	Regional Brewery
Recourse for Poor Malt Quality	9.30	9.23	9.46	9.33
Timeliness of Delivery	9.25	9.13	9.62	9.13
Consistency of Taste	9.12	9.07	9.23	9.13
Malt Freshness	9.04	9.16	9.23	8.25
Extract Yield	8.90	8.90	9.15	8.50
Protein/Nitrogen Level	8.58	8.32	9.23	8.50
Kernel Condition	8.56	8.81	8.31	8.00
Malt Analysis	8.56	8.45	8.54	9.00
Color	8.38	8.23	8.77	8.38
Moisture Content	8.25	8.23	9.00	7.13
Wort Properties (ph)	8.15	8.10	8.23	8.25
Uniform Size	8.10	8.23	8.23	7.38
Mealiness (Glassiness)	8.00	7.81	8.46	8.00
Kernel Size	7.94	8.13	7.92	7.25
Price	7.92	7.57	8.75	8.00
Foreign Matter	7.87	8.10	7.69	7.25
Unique Malts Offered	7.86	7.90	8.54	6.43
Packaging	7.75	7.55	8.62	7.13
Conversion Time	7.62	7.55	7.69	7.75
Transportation Method	7.34	6.90	8.25	7.63
Technical Support	7.31	7.23	7.54	7.29

7.0 Wheat Beer

Although malted barley is the main ingredient in the brewing of beer there are many other ingredients that are part of the brewing process. The most common of these “other” ingredients is wheat. Traditionally, wheat brews are made with at least 50% malted wheat, in addition to the usual barley malt. Wheat, though, is rarely chosen as the exclusive grain for the brew. Being huskless, unlike barley, it has a tendency to clog the mashing vessel used by brewers. When used in conjunction with barley (whose husks form a natural filter) a unique tart brew is produced¹⁸. As seen in the graph below, more than 90% of the surveyed breweries brew wheat beer.



Q. Do you brew any wheat beer?

7.1 Wheat: Form Purchased

Q. Given a choice, do you prefer wheat that is...?

	All Breweries %	Brewpub %	Micro- brewery %	Regional Brewery %
Raw	23	17	17	57
Processed (Pre-Ground)	8	10	8	0
Wheat Malt	65	69	67	43
No Preference	2	0	8	0
Other	2	3	0	0

Base: Breweries who brew wheat beer (n=48)

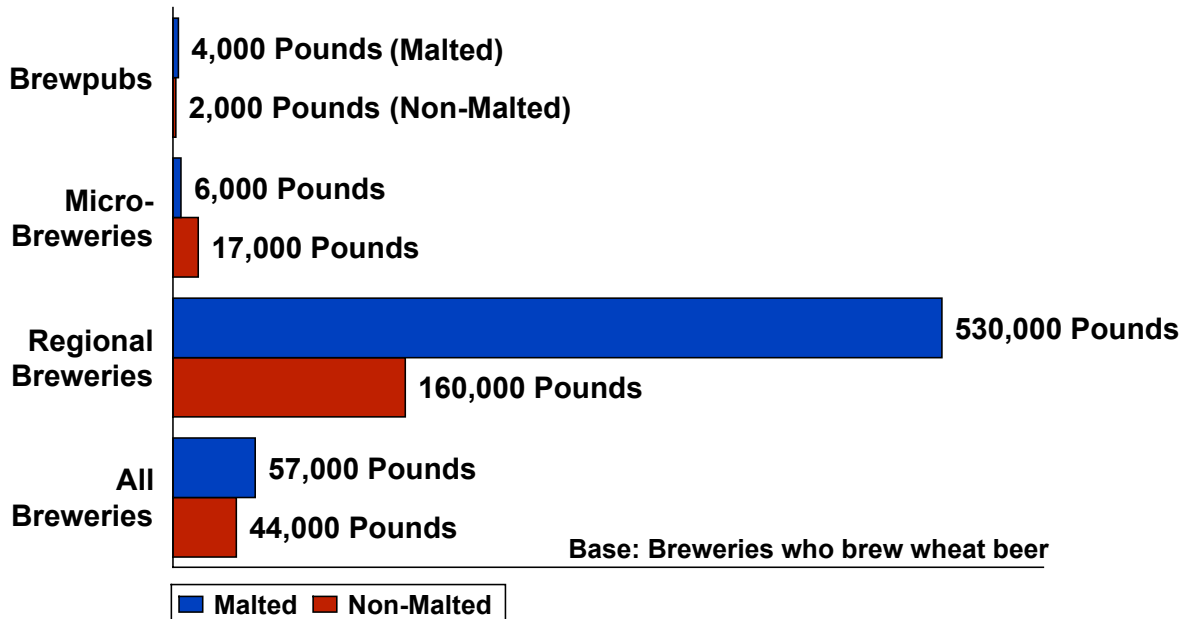
The table above shows the form in which the breweries (among those who brew wheat beer) purchase their wheat. The vast majority of the breweries (65%) prefer to purchase their wheat malted, while 23% prefer to purchase wheat in a raw form. Fifty-seven percent of the regional

¹⁸ <http://www.maproom.com/beerjnl/brwheat.htm>

breweries prefer to purchase their wheat in a raw form. Only 8% of the wheat breweries prefer to purchase processed or pre-ground wheat, and 2% indicate no preference in the form they purchase.

7.2 Wheat: Amount of Wheat Used

Q. On average, how much wheat do you use per year?



Average (Mean) Amount Used Annually Shown

The breweries were asked to estimate their annual wheat usage. The graph above shows the average (mean) amount of wheat used by type of brewery. The graph is broken down by the average malted wheat use and non-malted (pre-ground or raw wheat) use. Brewpubs use an average of 4,000 pounds of malted wheat per year and 2,000 pounds of non-malted, while microbreweries use 6,000 pounds of malted wheat and 17,000 pounds of non-malted wheat annually. Regional breweries use 530,000 pounds of malted wheat annually and 160,000 pounds of non-malted wheat. Since the numbers are the average (mean) number of pounds for the category they cannot be added together for total wheat use.

Acreage Needed to Supply Breweries' Wheat Use

The table below shows total wheat use after the malted wheat pounds are converted to raw wheat pounds¹⁹. Note that this data includes *only* the reported volume from the breweries that responded to the survey. The largest (regional) brewery in the sample purchases 1,562,500 pounds of wheat annually.

Estimated Wheat Acreage Needed Among Survey Respondents

	<u>Pounds</u>	<u>Bushels*</u>	<u>Acres**</u>
For the states of IA, WI, MO, & MN (n=31)	2,574,688	44,390	1,230
For Colorado & Nebraska (n=21)	254,063	4,380	120
For All Breweries (n=52)	2,828,750	48,770	1,350

* Based on a yield of 58 lbs. per bushel

** Based on a yield of 36 Bushels per acre

With 20% of the breweries responding, the numbers above provide an estimate that can be used for projection purposes. This projection is shown in the table below. It would take more than 2,800 acres of wheat to supply all of the wheat beer breweries in the six-state region including 700 acres to supply Colorado and Nebraska wheat breweries. The Colorado and Nebraska acreage estimate could even be enlarged after the expected production expansion of New Belgium Brewery in Colorado. Although when compared to the overall acreage for wheat, this may be a relatively small niche market—it may be a highly profitable niche market (see section 10.0).

Projected* Wheat Acreage Needed**

	<u>Projected Pounds</u>	<u>Projected Bushels*</u>	<u>Projected Acres**</u>
For the states of IA, WI, MO, & MN (N=138)	4,489,200	77,400	2,150
For Colorado & Nebraska (N=123)	1,461,600	25,200	700
For All Breweries (N=261)	5,950,800	102,600	2,850

* Based on a yield of 58 lbs. per bushel

** Based on a yield of 36 Bushels per acre

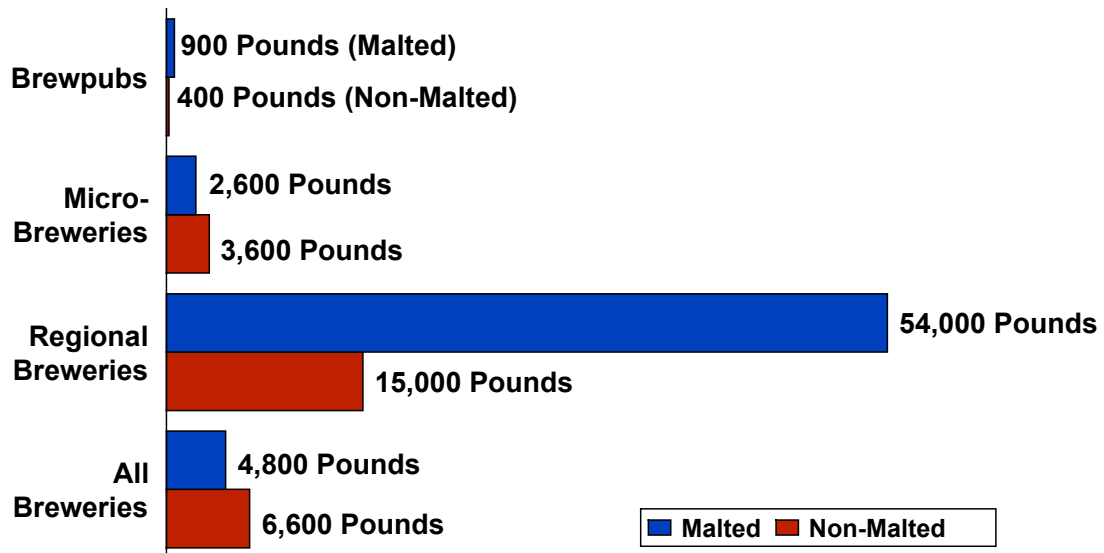
*** Based on return rates (22.4% for IA, WI, MO & MN and 17% for NE & CO)

¹⁹ A maltster reported that there is an estimated weight loss of 20% in wheat that is malted

7.3 Wheat: Single Order Purchases

In order to supply a brewery, it is important to understand the other characteristics that surround a brewery’s wheat purchase. Some of the characteristics include: the typical order size; the type of packaging preferred by the breweries; and where the breweries currently purchase their wheat, as well as the frequency of their orders. The next few sections cover these questions.

Q. In a typical single order, what is the total quantity of wheat you purchase?



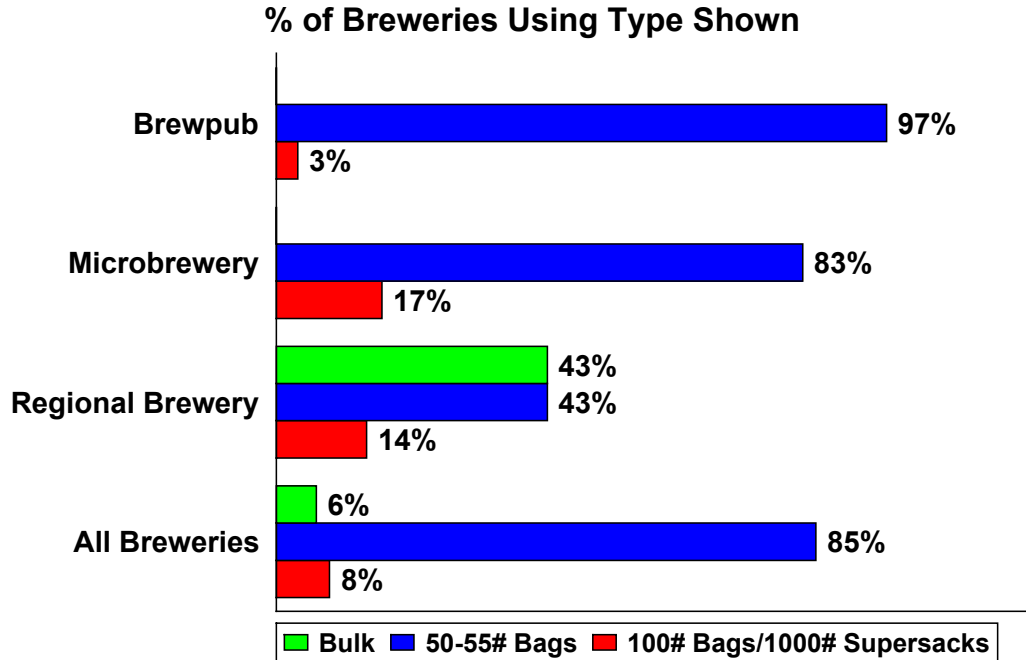
Base: Breweries who brew wheat beer;
Average (Mean) order size shown

The graph above shows the size of the typical (average) wheat order by type of brewery. The average brewpub typically purchases less than 1,000 pounds of malted wheat in a single order, while microbreweries will purchase an average (mean) of 2,600 pounds of malted wheat and 3,600 pounds of non-malted wheat. Regional breweries typically purchase 54,000 pounds of malted wheat in a single order and 15,000 pounds of non-malted wheat.

7.4 Wheat: Package Type

The breweries were asked to list the package type in which the *majority* of their wheat is purchased. As seen in the graph on the next page, nearly all of brewpubs (97%) purchase their wheat in 50-55 pound bags. Eighty-three percent of the microbreweries purchase their wheat in 50-55 lb. bags, while 17% buy it in 1,000 pound supersacks. Forty-three percent of the regional breweries purchase their wheat in bulk, while another 43% buy it in bags. Overall, 85% of the breweries purchase their wheat in 50-55 pound bags.

Q. In what package type do you purchase the *majority* of your wheat?



7.5 Wheat: Where Purchased and Order Frequency

Q. Where do you purchase the majority of your wheat?

	<u>All Breweries</u>	<u>Brewpub</u>	<u>Micro- brewery</u>	<u>Regional Brewery</u>
Maltster	68%	64%	75%	71%
From a grain distributor	30%	32%	25%	29%
Other	2%	4%	0%	0%

The table above shows where breweries purchase the majority of their wheat. More than two-thirds (68%) of breweries surveyed purchase wheat from a maltster, while 30% purchase through a grain distributor.

Wheat Order Frequency

Q. How often do you typically order wheat?

	All Breweries	Brewpub	Micro- brewery	Regional Brewery
	<u>%</u>	<u>%</u>	<u>%</u>	<u>%</u>
Weekly	2	0	8	0
Twice Monthly	9	11	0	14
Monthly	32	21	33	71
Quarterly	36	43	42	0
Semi-Annually	9	11	8	0
Annually	4	4	8	0
Other	9	11	0	14

The table above shows the specialty malt order frequency by type of brewery. Forty-three percent of the brewpubs and 42% of the microbreweries order their wheat on a quarterly basis. Regional Breweries are more likely to purchase their wheat on a more frequent basis with 71% ordering their wheat monthly and 14% ordering twice a month.

7.6 Wheat: Attributes Important in a Brewery's Purchase

In order to supply a brewery with wheat (or any other ingredient), it is important to know the characteristics *they* look for in their wheat purchases. Some of these characteristics may increase the cost of producing the wheat, but they are very important to the sale of the product. The most important characteristics (verbatim) that the surveyed breweries look for in their wheat purchases are listed on the next page.

Q. Please list the most important characteristics that you look for in your wheat purchases.

Clean

Color, Freshness, Uniform Size

Color, Protein level, Yield

Consistency (2 Mentions)

Consistency, correct color

Consistency, Extract, Freshness, Moisture Content

Extract, Kernel Size, Freshness, Lack of debris

Extract Yield, Color, Friability, Kernel Size, Modification

Flavorful, kernel in good condition

Foreign Matter, Kernel Condition, Malt Freshness, Kernel Size, and Uniform

Free of foreign material, protein levels, uniform kernel

Good conversion and taste

Kernel Size

Kernel Size, Freshness, Uniformity, Taste, Low CH₂F

Kernel Size, Moisture Content

Low Protein

Low Protein, Great Malting

Malted, low protein, European grown, winter wheat

No Foreign Matter, Plump Kernels, Variety of Colors and Styles

Physical Properties

Price, color

Price, Transportation, cost

Protein Levels, Extract

Protein/Nitrogen, extract, color

Plump Kernels, Uniform Size, Coloration--No pink or Black Berries

Quality and Consistency

Quality and flavor

Quality, consistency, price

Run-Off, Consistency,

Same as barley malt (2 Mentions)

The malted wheat is properly modified (malted)

Type, moisture, dp, extract, protein (total and soluble), pogrercan, grain size, viscosity,

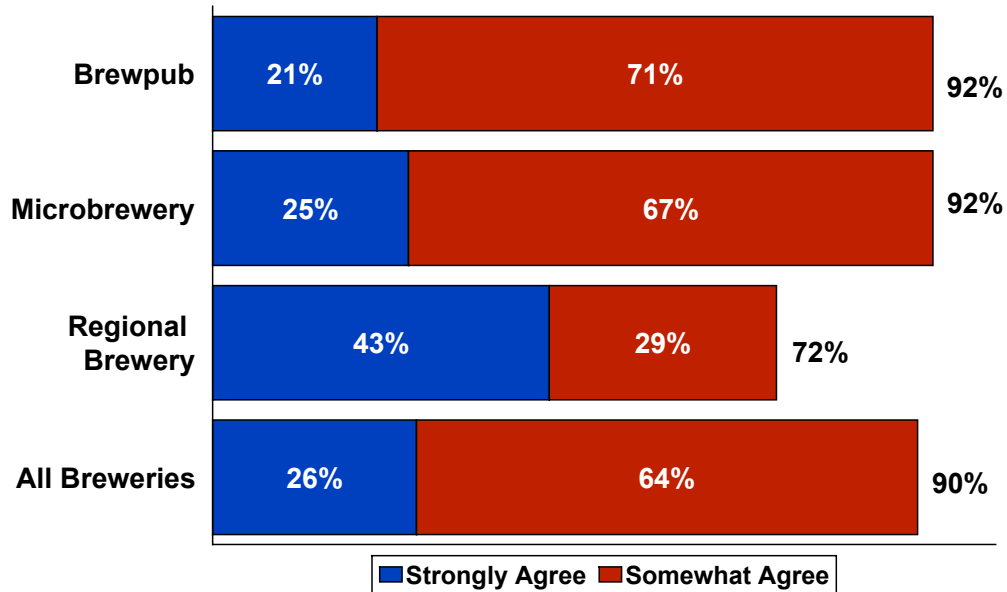
Variety, Type, Total Protein/Soluble Protein, Extract, Size

Wheat Usage: 90% Hard Red, 5% Soft White, 5% raw (unmalted). All must be consistent high

7.7 Wheat: Future Consumer Demand For Wheat Beer

As the graph below illustrates, consumer demand for wheat beer should continue to grow in the foreseeable future.

Q. Consumer demand for wheat beer will continue to grow for the foreseeable future (agreement with statement was assessed on scale of 1 to 10 with 1 as Strongly Agree and 10 as Strongly Disagree).



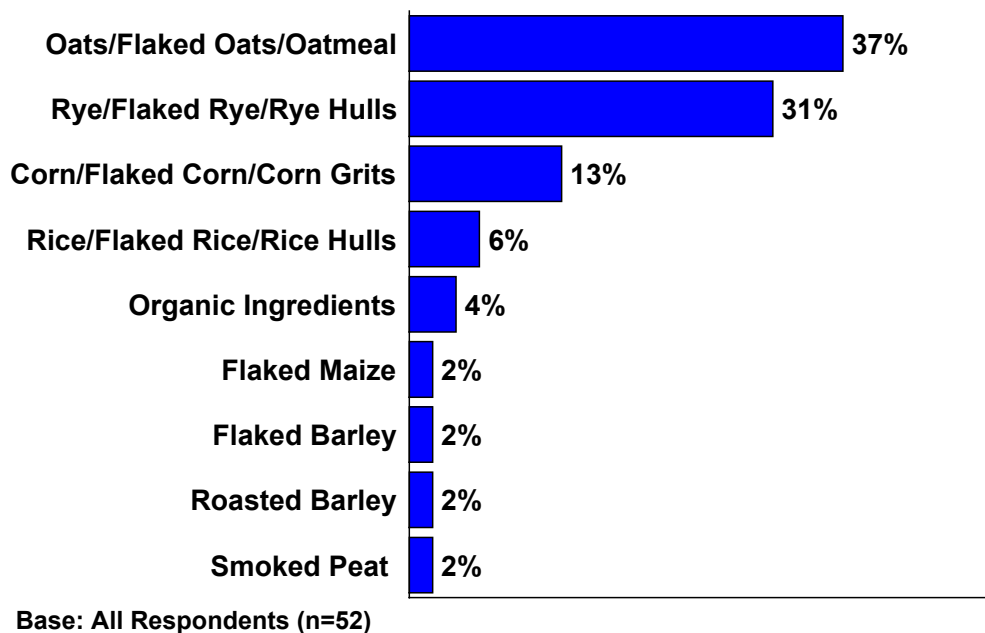
The graph above shows the percent of respondents that strongly agreed and somewhat agreed with the above question. Overall, 90% of the breweries agreed with the statement that consumer demand for wheat beer would continue to grow. Forty-three percent of the regional breweries strongly agreed with the statement.

8.0 Other Ingredients to Supply the Brewery Industry

There are many ingredients that are used to brew beer, especially the specialty beers that are brewed by the craft brewing industry. The graph below shows some of the ingredients used by the surveyed breweries. Thirty-seven percent of the breweries use some form of oats in their brewing process. Thirty-one percent use rye, flaked rye, or rye hulls, while 13% purchase varieties of corn. Four percent of the breweries manufacture a beer that is brewed with organic ingredients.

Q. Please list below any additional grains (other than wheat and barley) that you are currently purchasing.

Q. Do you brew organic beer?

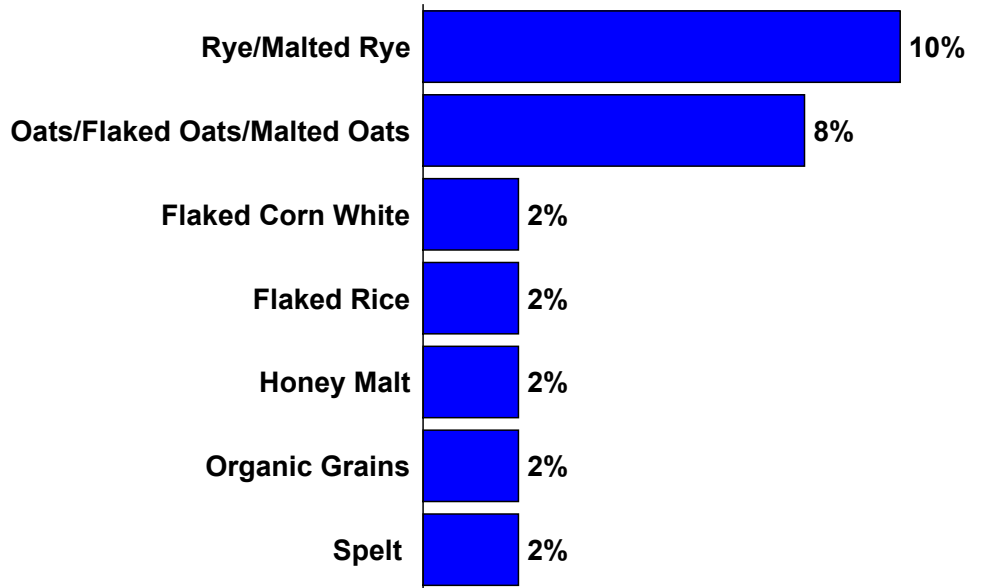


Although only 4% of the breweries reported that they use organic ingredients, this niche may grow in the future. As Modern Brewery Age reports “Rockies Brewing Company and Avery Brewing Company recently began working on handcrafted, certified, organic beers. Both companies will use organic barley and hops to make their beers. Avery is making organic beer for Boulder-based Wild Oats Markets Inc., the second largest natural products supermarket chain in the nation”²⁰. The breweries that brewed organic beer indicated that it was difficult for them to source organic ingredients.

²⁰ “Organic Beers Newest Wrinkle for Micros,” *Modern Brewery Age*, November 8, 1999

8.1 Future Use of Other Ingredients

Q. Please list below any additional grains that you are not currently purchasing but are considering purchasing in the future.



Base: All Respondents (n=52)

Ten percent of the breweries plan to use rye or malted rye in the future, while 8% plan to use some form of oats. Two percent plan to source organic grains.

9.0 Demographical Profile of Sample

<u>Type of Business</u>	<u>%</u>	<u>Respondent's Primary Job Function</u>	<u>%</u>
Brewpub	59.6	Owner Operator	32.7
Microbrewery	25.0	Head Brewer	65.4
Regional Brewery	15.4	Assistant Brewer	1.9
<u>Number of Units Owned</u>	<u>%</u>	<u>Years of Brewing Experience</u>	<u>%</u>
One	86.5	1-4 Years	19.2
Two	3.8	5-9 Years	59.6
Three	3.8	10 Years or More	21.1
More than Three	5.8	Average (Median)	6 Years
<u>Number of Years in Operation</u>	<u>%</u>	<u>State</u>	<u>%</u>
1 Year	11.5	Colorado	32.7
2-4 Years	17.3	Iowa	3.8
5-9 Years	48.1	Minnesota	15.4
10-15 Years	15.4	Missouri	11.5
More Than 15 Years	7.7	Nebraska	7.7
Average (Median)	6 Years	Wisconsin	28.8

Shown above are the demographics of the breweries. Sixty percent of the breweries were brewpubs, while 25% were microbreweries and 15% were regional breweries. The vast majority (86.5%) were sole proprietorships. Nearly half of the breweries had been in operation five to nine years with six years as the average length of operation. Sixty-five percent of the respondents were head brewers, while 33% were owner operators. Sixty percent of the respondents had five to nine years of brewing experience.

10.0 Conclusions and Unanswered Questions

Fifty-two craft breweries (brewpubs, microbreweries, and regional breweries) in the states of Colorado, Nebraska, Iowa, Missouri, Minnesota, and Wisconsin were surveyed by mail. The head brewer or owner/operator was surveyed to determine the craft brewing industries' interest in purchasing locally grown and produced ingredients and malt, as well as the procurement needs for the ingredients they purchase. The following conclusions were drawn from this survey:

Although the breweries surveyed were optimistic on the growth of the craft brewery industry, the vast majority believed it was necessary for them to investigate new markets. This need presents an opportunity for producers and craft breweries to partner and develop a market for beer that is produced with locally grown and produced ingredients and/or malt. The survey concluded that the majority of craft breweries were very supportive of the ability to make the claim that their beer was made with locally grown or produced ingredients and/or malt.

A brewery's malt needs can be broken down into the base and specialty malt that the brewery purchases to brew its beer. A significant number of brewpubs and microbreweries receive their base and specialty malt through a distributor. The brewpubs that purchase from a malt distributor *may* be paying a premium price for the additional distribution segment or "middleman" that is involved with the malt distributor. Further research will verify this finding. This circumstance presents a potential opportunity for a producer or group of producers who may want to add value to their barley (through the malting process) in that they could possibly supply the brewpubs and smaller microbreweries.

A number of microbreweries and brewpubs order their base and specialty malt in smaller quantities, on a less than frequent basis (possibly to avoid high distribution costs or to reach minimum order sizes with the maltsters), and pay a premium price for their malt. By ordering on a less frequent basis, these breweries *may, at times*, be forced to use product that is not as fresh as they would like to use. If malt could be produced, on a local level, priced competitive with the premium that these breweries are currently paying, and delivered on a more frequent basis (so that it is fresher when used in brewing) then this product *may* be attractive to brewpubs and small microbreweries. An example given of converting pounds of malt to acres of planted barley indicated that 175 acres of barley could supply nearly three "typical" microbreweries with their annual supply of base malt.

In order to successfully compete in the brewing industry, a producer or producer owned brewery supplier has to meet the needs of its customers (breweries). These needs are in the form of the attributes found to be most important in this report. The attributes of "recourse for poor malt quality", "timeliness of delivery", "consistency of taste", and "malt freshness" each had an average score of at least 9 (on a scale of 1 to 10) or an "extremely important" ranking among all breweries. Price is an important consideration but was ranked fifteenth in importance among all breweries and seventeenth among brewpubs. If a producer or group of producers can deliver an ingredient or malt that meets the needs of the attributes that rank higher than price (such as recourse for poor malt quality, timely delivery, taste, freshness, and extract yield) then their product *may* be very attractive to the breweries. A local malt or ingredients supplier can use their close proximity to the brewery as an advantage in providing a fresh, timely distributed

product where the producers “personal” relationship can also provide the quality and consistency that the brewery desires.

Although malted barley is the main ingredient in the brewing of beer, there are many other ingredients that are part of the brewing process. The ingredient that *may* have the greatest potential for producers is wheat. More than 90% of the surveyed breweries brew wheat beer. The vast majority of the breweries (65%) prefer to purchase their wheat malted, while 23% prefer to purchase wheat in a raw form. It was estimated that it would take more than 2,800 acres of wheat to supply all of the wheat beer breweries in the six state region including 700 acres to supply Colorado and Nebraska wheat breweries.

Overall, 90% of the breweries agree with the statement that consumer demand for wheat beer will continue to grow. More research needs to be conducted on the quantity and types of wheat used, the processing of wheat into wheat malt, and the potential opportunity for producers to supply this ingredient to the craft brewing industry.

Other locally grown or produced ingredients that may provide opportunities for producers include oats, rye and corn. Although only 4% of the breweries reported that they use organic ingredients, this niche may grow into future opportunities for producers to supply organic grains to the craft brewing industry.

Unanswered Questions

While this survey brought forth many important conclusions and potential opportunities for producers, it also left several unanswered questions that only future—and more in depth—research will help answer. Some of these questions are outlined below.

Malted Barley

The breweries were asked to estimate the average price of malted barley (including delivery charges) to their business. Among all breweries, the average price was 28 cents a pound for whole kernel base malt and 35 cents a pound for pre-ground malt. Upon analyzing the price of whole kernel malted barley, considerable price variance was found between the breweries. *Brewpubs* incurred the highest costs with an average (mean) cost of 33-cents/lb., but this price ranged from 16 to 60-cents/lb. between the brewpubs surveyed. *Microbreweries* paid an average (mean) price of 22-cents/lb. for whole kernel malted barley but this price ranged from 16 to 30-cents/lb between the microbreweries surveyed. The data concluded that brewpubs pay a premium of 50% (over microbreweries) for their malt. Two sets of questions that could build on this survey’s research include:

1. Is the difference in price between breweries and types of breweries due to their smaller production capacity or due to different types of base malt? In other words, more data is needed to better define the pricing structure to breweries and producers.
2. Questions designed to further understand the malting process for barley and wheat (cost, equipment needed, etc.) to help explain the difference in prices between breweries.

Wheat and Wheat Brewing

Although the breweries were asked to estimate the average price of wheat (including delivery charges) to their business, there was again considerable variance in the replies to the question. Among all breweries, the average *raw* wheat price was 32 cents a pound, however, this price ranged from 18 to 60 cents per pound between the breweries. Processed or pre-ground wheat averaged 47 cents a pound and had a range of 41 to 50 cents per pound. Malted wheat averaged 34 cents per pound and had the greatest price variance with a range of 25-cents/lb to \$1.05 per pound.

With this data one could conclude that, although the number of wheat acres used for brewing production is relatively small (compared to the commodity wheat acreage), supplying wheat to craft breweries *may* be a highly profitable niche market. However, the type of wheat used (i.e. hard red winter wheat or white spring wheat) was not assessed in the survey and had an indefinite effect on the price range, as did the quantity purchased. Consequently, to gain a better understanding of the variance in the price of wheat used for brewing, the following questions need to be addressed at a future time:

1. What are the different types of wheat used in wheat beer brewing and how does the breweries' cost vary between the types? Are there reasons—other than type of wheat—that would help explain the wide range in the prices given for raw wheat and for malted wheat between the breweries?
2. How is wheat processed into malt and what are the costs associated with this processing? Why is there little difference between the average price of raw wheat versus malted wheat?
3. What price (in relation to the commodity market) do producers receive for wheat (and barley) purchased for brewing or malting purposes?

If the wheat (and barley) price variance between the breweries could be explained and the costs associated with processing could be determined, then an accurate estimated revenue per acre could be established for wheat (and barley as well) planted for the craft brewing industry. The estimated revenue per acre for each type of wheat used would be extremely helpful to anyone pursuing the idea of supplying craft breweries with wheat.

11.0 Survey Instrument

Section I. General Questions About Your Business

1. What is your primary business (please circle one)?
 - a. Brewpub (a restaurant/brewery, majority (greater than 50%) of beer sold on-site)
 - b. Microbrewery ((sales of less than 15,000 bbl (17,600 hectoliters))
 - c. Regional Brewery (sales of 15,000 to 2 Million bbl (17,601 to 2.35 Million hectoliters))
 - d. Large Brewery (sales over 2 Million bbl (2.35 Million hectoliters))
 - e. Other _____
2. How many units (brewery establishments) are in your company? _____
3. How many years have you been in operation? _____ Years

Section II. Propensity to Purchase Locally Produced Ingredients

4. Consumer demand for craft brewing products will continue to grow for the foreseeable future. (Circle the number of your response)

Strongly		Somewhat			Somewhat			Strongly	
Agree		Agree			Disagree			Disagree	
1	2	3	4	5	6	7	8	9	10

5. Do you perceive the degree of knowledge/sophistication of your clientele regarding craft brewing products will continue to increase in the foreseeable future? (Circle the number of your response)

Strongly		Somewhat			Somewhat			Strongly	
Agree		Agree			Disagree			Disagree	
1	2	3	4	5	6	7	8	9	10

6. To survive in the craft brewing industry, I must investigate new markets. (Circle the number that is most appropriate)

Strongly		Somewhat			Somewhat			Strongly	
Agree		Agree			Disagree			Disagree	
1	2	3	4	5	6	7	8	9	10

7. What would be your level of interest in the ability to make a claim (through your label or promotional material) that your beer was made with _____? *(Please indicate your interest on a scale of 0 to 10 with 0 as No Interest and 10 as Extremely Interested)*

	No Interest		Not Very Interested		Somewhat Interested			Very Interested			Extremely Interested	
	0	1	2	3	4	5	6	7	8	9	10	
a. Grains Produced Grown Locally	0	1	2	3	4	5	6	7	8	9	10	
b. Grains Produced/Grown in my State/Region	0	1	2	3	4	5	6	7	8	9	10	
c. Malt Produced Locally	0	1	2	3	4	5	6	7	8	9	10	
d. Malt Produced in my State/Region	0	1	2	3	4	5	6	7	8	9	10	

Section III. General Questions About Your Business's Malt Needs (Exclude Any Figures That May Include Organic Malt)

8. Given a choice, do you prefer malt that is made with...?
 a. Two-Row Barley b. Six-Row Barley c. No Preference

9. On average, please **estimate** how much malt do you use per year? (Please fill out both columns)

<u>Base Malt</u>	<u>Specialty Malt</u>
_____ Pounds (Whole Kernel)	_____ Pounds (Whole Kernel)
_____ Pounds (Pre-Ground)	_____ Pounds (Pre-Ground)
_____ Pounds (Dry Malt Extract)	_____ Pounds (Dry Malt Extract)
_____ Gallons (Syrup Malt Extract)	_____ Gallons (Syrup Malt Extract)
_____ Pounds (Other Please Specify Below)	_____ Pounds (Other Please Specify Below)

10. In a typical single order, what is the total quantity of malt you **purchase**? (Please fill out both columns)

<u>Base Malt</u>	<u>Specialty Malt</u>
_____ Pounds (Whole Kernel)	_____ Pounds (Whole Kernel)
_____ Pounds (Pre-Ground)	_____ Pounds (Pre-Ground)
_____ Pounds (Dry Malt Extract)	_____ Pounds (Dry Malt Extract)
_____ Gallons (Syrup Malt Extract)	_____ Gallons (Syrup Malt Extract)
_____ Pounds (Other Please Specify Below)	_____ Pounds (Other Please Specify Below)

11. In what package type do you purchase the **majority** of your malt? (Please fill out both columns)

<u>Base Malt</u>	<u>Specialty Malt</u>
a. Bulk	a. Bulk
b. Bagged 50-55#	b. Bagged 50-55#
c. Bagged 100-110#	c. Bagged 100-110#
d. Supersacks of 1,000# or more	d. Supersacks of 1,000# or more
e. Malt Extract	e. Malt Extract
f. Other (Please Specify Below)	f. Other (Please Specify Below)

12. How often do you typically order malt? (Please fill out both columns)

<u>Base Malt</u>	<u>Specialty Malt</u>
a. Weekly	a. Weekly
b. Twice Monthly	b. Twice Monthly
c. Monthly	c. Monthly
d. Quarterly	d. Quarterly
e. Semi-Annually	e. Semi-Annually
f. Annually	f. Annually
g. Other (Please Specify Below)	g. Other (Please Specify Below)

13. For base malt, please **estimate** the average cost of malt delivered to your business (Total cost of malt including shipping).

_____ \$ Per Pound (Whole Kernel) _____ \$ Per Pound (Dry Malt Extract)
 _____ \$ Per Pound (Pre-Ground) _____ \$ Per Gallon (Syrup Malt Extract)
 _____ \$ Per Pound (Other)

14. Please circle the top three (3) types of specialty malts based on amount used by your business.

- | | | |
|---------------------|----------------------------|-------------------|
| a. Amber Malt | f. Dextrin Malt | k. Chocolate Malt |
| b. Black Malt | g. Honey Malt | l. Crystal Malt |
| c. Brown Malt | h. Munich Malt | m. Rye Malt |
| d. Caramel Malt | i. Peated Malt | n. Wheat Malt |
| e. Carmel Pils Malt | j. Roasted or Black Barley | o. Other _____ |

15. For the three (3) specialty malts chosen in question 14, please provide: rank according to usage, **estimated** cost (total cost of malt including shipping) and the form in which you receive the specialty malt.

<u>Rank</u>	<u>Type of Malt</u>	<u>Cost/Pound</u>	<u>Form Received</u>
<i>Example</i>	<i>Carmel</i>	<i>\$0.50/pound</i>	<i>Whole Kernel/Pre-Ground/Extract</i>
1.	_____	_____ Gal. or /pound	_____
2.	_____	_____ Gal. or /pound	_____
3.	_____	_____ Gal. or /pound	_____

Section IV. General Questions About Your Malt Supplier(s)

16. Do you purchase the **majority** of your malt... (Please answer both columns)

Base Malt

- a. Directly from the Base Maltster
- b. From a distributor
- c. Other (Please Specify Below)

Specialty Malt

- a. Directly from the Specialty Maltster
- b. Through Base Maltster
- c. Through Base Maltster but Base Maltster has an alliance with Specialty Maltster (order through base maltster)
- d. From a distributor
- e. Other (Please Specify Below)

17. Please list the maltster(s)/supplier(s) from whom you purchase base malt. _____

18. Please list the maltster(s)/supplier(s) from whom you purchase specialty malt. _____

19. Have you ever changed ... **Base Maltster/Supplier** **Specialty Maltster/Supplier**
a. Yes b. No a. Yes b. No

20. Thinking about your Base/Specialty Malt suppliers, please rank the following for their level of importance in your purchasing decisions (on a scale of 1 to 10 with 1 as not very important and 10 as extremely important).

	Not Very Important		Somewhat Important			Very Important			Extremely Important	
I. Physical Properties										
a. Foreign Matter	1	2	3	4	5	6	7	8	9	10
b. Kernel Condition	1	2	3	4	5	6	7	8	9	10
c. Malt Freshness	1	2	3	4	5	6	7	8	9	10
d. Kernel Size	1	2	3	4	5	6	7	8	9	10
e. Uniform Size	1	2	3	4	5	6	7	8	9	10
f. Other (Please Describe Below)	1	2	3	4	5	6	7	8	9	10

	Not Very Important		Somewhat Important			Very Important			Extremely Important	
II. Chemical Properties										
a. Moisture Content	1	2	3	4	5	6	7	8	9	10
b. Extract Yield	1	2	3	4	5	6	7	8	9	10
c. Color	1	2	3	4	5	6	7	8	9	10
d. Protein/Nitrogen Level	1	2	3	4	5	6	7	8	9	10
e. Mealiness (Glassiness)	1	2	3	4	5	6	7	8	9	10
f. Conversion Time	1	2	3	4	5	6	7	8	9	10
g. Consistency of Taste	1	2	3	4	5	6	7	8	9	10
h. Wort Properties (ph)	1	2	3	4	5	6	7	8	9	10
i. Other (Please Describe Below)	1	2	3	4	5	6	7	8	9	10

	Not Very Important		Somewhat Important			Very Important			Extremely Important	
III. Services Offered										
a. Technical Support	1	2	3	4	5	6	7	8	9	10
b. Malt Analysis	1	2	3	4	5	6	7	8	9	10
c. Recourse for Poor Malt Quality	1	2	3	4	5	6	7	8	9	10
d. Timeliness of Delivery	1	2	3	4	5	6	7	8	9	10
e. Transportation Method	1	2	3	4	5	6	7	8	9	10
f. Packaging	1	2	3	4	5	6	7	8	9	10
g. Unique Malts Offered	1	2	3	4	5	6	7	8	9	10
h. Other (Please Describe Below)	1	2	3	4	5	6	7	8	9	10

IV. Price	1	2	3	4	5	6	7	8	9	10
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Section V. Wheat Beer

21. Do you brew any wheat beer? a. Yes b. No (Skip to question 31)
22. On average, how much wheat do you use per year? _____ Bushels **Or** _____ Pounds
23. In a typical single order, what is the total quantity of the wheat you purchase?
_____ Bushels Or _____ Pounds
24. Consumer demand for wheat beer will continue to grow for the foreseeable future. (Circle the number of your response)

Strongly	Somewhat	Somewhat	Strongly
Agree	Agree	Disagree	Disagree
1 2	3 4 5	6 7 8	9 10

25. Given a choice, do you prefer wheat that is...?
a. Raw
b. Processed (Pre-Ground)
c. Other (Please Specify) _____
d. No Preference
26. In what package type do you purchase the majority of the wheat? (Please circle one)
a. Bulk c. Bagged 100-110#
b. Bagged 50-55# d. Supersacks of 1,000# or more
e. Other (Please Specify) _____
27. How do you purchase the **majority** of your wheat? (please circle one)
a. Direct from a farmer or group of farmers?
b. From a farmer's co-op
c. From a grain distributor _____ (Please specify name and location)
d. Other _____ (Please specify name and location)
28. How often do you typically order wheat? (Please circle one)
a. Weekly e. Semi-Annually
b. Twice Monthly f. Annually
c. Monthly g. Other (Please specify below)
d. Quarterly
29. For your wheat, please estimate the average cost delivered to your business (total cost of wheat including shipping)?
_____ \$ Per pound Or _____ \$ Per bushel
30. Please list the most important characteristics that you look for in your purchase of your wheat?

Section VI. Organic Beer

31. Do you brew any organic beer? a. Yes b. No (Skip to question 40)
32. How much organic beer did you produce in the year 2000? _____ Barrels
33. In terms of number of barrels produced, what change did your organic beer production experience in the year 2000?
a. Increase, # of barrels? _____ b. Decrease, # of barrels? _____ c. No Change
34. In a typical single order, what is the total quantity of the organic malt you purchase?
_____ Pounds (Whole Kernel) _____ Pounds (Dry Malt Extract)
_____ Pounds (Pre-Ground) _____ Gallons (Syrup Malt Extract)
_____ Pounds (Other—please specify)
35. In what package type do you purchase the majority of the organic malt? (Please circle one)
a. Bulk d. Supersacks of 1,000# or more
b. Bagged 50-55# e. Malt Extract
c. Bagged 100-110# f. Other (Please specify below)
36. Where do you purchase your organic malt? (Please be as specific as possible)
37. How often do you typically order organic malt? (Please circle one)
a. Weekly e. Semi-Annually
b. Twice Monthly f. Annually
c. Monthly g. Other (Please specify below)
d. Quarterly
38. For organic malt, please estimate the average cost of malt delivered to your business (total cost of malt including shipping).
_____ \$ Per Pound (Whole Kernel) _____ \$ Per Pound (Dry Malt Extract)
_____ \$ Per Pound (Pre-Ground) _____ \$ Per Gallon (Syrup Malt Extract)
_____ \$ Per Pound (Other)
39. Please list the most important characteristics that you look for in your purchase of organic malt.

Section VII. Business and Industry Demographics and Trends

40. I am confident that the supply of malt for the craft brewing industry is reliable. (Circle the number that is most appropriate)

Strongly	Somewhat	Somewhat	Strongly
Agree	Agree	Disagree	Disagree
1 2	3 4 5	6 7 8	9 10

41. Please list below any additional grains (other than wheat and barley) that you are currently purchasing.

42. Please list below any additional grains that you are not currently purchasing but are considering purchasing in the future.

43. How much beer was produced (rather than sold) in your business in the year 2000? _____ Barrels

44. What percentage change, in the number of barrels produced, do you project for your business in the year **2001**?

- a. Increase _____% b. Decrease _____% c. No Change

45. What is your primary job function? (Please circle one)

- a. Owner/Operator d. Public Relations
b. Head Brewer e. Management/Administration
c. Assistant Brewer f. Other (Please specify below)

46. How many years have you worked in the craft brewing industry? _____ Years

47. Name and City of Brewery (Optional) _____

48. If you are interested in a copy of the results of the survey please list your e-mail address (list mailing address if an e-mail is not available)

Appendix: Brewery Industry Links

Shown below is a list of web links that are related to the brewing industry. This list will be updated over time with additional entries added to the list.

Associations

American Malting Barley Association	http://www.ambainc.org/index.htm
Association of Brewers	http://www.beertown.org/
Institute for Brewing Studies	http://www.beertown.org/IBS/ibs.htm

Information on Brewing

The Brewers Handbook	http://www.beer-brewing.com/index.htm
Brewers On-Line Market Guide	http://www.brewingtechniques.com
Brewery Database	http://beerismylife.com/index.shtml
Brewery Database	http://www.brewersadvocate.org/members.htm
Research/Market Guide	http://www.probrewer.com
Example of Online Malt Pricing	http://northcountrymalt.com/thomas-prices.html
Information on Malted Barley	http://www.agric.gov.ab.ca/agdex/100/1402002.html