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The Use of and Interest in Ancient Grains in Northeastern Institutional Kitchens

J.G. Malacarne¹, Cheryl Bilinski², Bruce Wyatt¹, Kevin Leavitt¹

Summary

We report on a survey of institutional kitchens in the Northeast, seeking to better understand the extent to which institutions currently use locally produced grain products and what barriers they face in increasing their use of local grain products. We focus additional attention on local, organic grains, and ask specifically about a set of “ancient” grains: barley, einkorn, farro, rye, and spelt. Results indicate that current use of these products is extremely low. Familiarity with the grains in question, both by kitchen staff and their customers, emerges as a first-order barrier to expanding use of ancient grains in institutional kitchens. Additionally, while many of the respondents are open to the idea of substituting ancient grain products for their current grain products (rice, wholewheat flour), limited budgets, uncertainties regarding the procurement process and staff and equipment limitations pose additional challenges.

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Support Acknowledgment

This research was supported by the intramural research program of the U.S. Department of Agriculture, National Institute of Food and Agriculture, Organic Agriculture Research and Extension Initiative (OREI) Award Number 2020-51300-32379.

Additional support was provided by the USDA National Institute of Food and Agriculture, Hatch project number ME022325 through the Maine Agricultural & Forest Experiment Station.

The findings and conclusions in this preliminary report have not been formally disseminated by the U. S. Department of Agriculture and Should not be construed to represent any agency determination or policy.

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The average adult consuming a 2,000 calorie diet should consume 6 oz. of grains per day, of which half should be consumed as whole grains (USDA 2024). Whole grains provide numerous health benefits that go above and beyond refined grains. The American diet has evolved to prefer highly processed (refined) grains that make breads and baked items light, soft and easy to eat. To create such light breads the refined grains have been stripped of the fibrous bran and germ that make grains tough to eat. However, when the bran and germ are removed many B vitamins, 90 percent of the vitamin E, and virtually all of the grain's fiber is lost. Studies have shown that consumption of whole grains is associated with improved digestive health and a lower risk of cardiovascular disease, diabetes and cancer. (Harvard, 2018). Acknowledging this nutritional loss, the USDA implemented new rules beginning with the 2022-2023 school year requiring at least 80 percent of the grains in school lunch and breakfast menus to be whole grain-rich (USDA 2023).

The northeastern United States (from here forward, the Northeast) is not typically known for grain production. This is, in part, due to the perception that grain production requires large tracts of land and heavy investment in specialized equipment. Just one percent of small grain acreage was located in a northeastern state in 2023 (USDA-NASS, 2023). Nonetheless, Northeastern farmers may still find grain production to be a valuable addition to their cropping system, both in terms of a commercial product as well as the potential agroecological benefits. While many of the capital intensive production challenges can be overcome through equipment sharing and contracting out aspects of production and processing, the existence of a stable market outlet for the final product remains a key challenge for expanding grain production in the Northeast.

In this document, we report on a survey of institutional kitchens in the Northeast. The survey sought to better understand the extent to which institutions, a potentially large and stable market outlet for high quality, locally produced grain products, currently use grain products and the barriers they face to increasing their use of local grain products. We focus additional attention on local, organic grains, and ask specifically about a set of "ancient" grains (barley, einkorn, farro, rye, spelt).

Our survey results show that while many of the facilities are open to the idea of substituting ancient grain products for their current grain products (rice, wholewheat flour), many barriers exist to expanding institutional use of grain generally and local, organic, ancient grains in particular. In addition to clear challenges related to tight budgets, staff shortages, and insufficient time and equipment, both kitchen staff and consumers are largely unfamiliar with ancient grains. From the kitchen perspective, this includes not knowing where to obtain ancient grains and a lack of recipes that call for the grains mentioned by our survey. From the consumer perspective, a lack of familiarity can bring skepticism toward new product offerings and a lack of "pull demand", in which consumer desires motivate the development of new product offerings.

While the survey highlights clear challenges, it also highlights a number of related opportunities. First, institutions offer a large, untapped market for local, organic grains; the 157 institutions that answered our survey serve over 2 million meals each week. The majority of the

respondents (94%) were K-12 schools that operate 10 months out of the year and must meet USDA guidelines that encourage the use of whole grains within their offerings. In addition, most states encourage the use of locally sourced food through a variety of reimbursement programs. In Maine, the Local Foods Fund matches \$1 for every \$3 spent on locally sourced food (Maine Dept. of Education 2024). Similarly, New York's local procurement incentive program, the 30% NY Initiative, increased its State reimbursement on school lunches from 5.9 cents/meal to 25 cents/meal when a participating school sources 30% or more of their food locally for use in the National School Lunch Program (New York 2024). Many other New England states have similar programs that allow increased reimbursement for locally sourced food.

The remainder of this document is organized as follows. We first provide additional detail on the survey instrument, its distribution, and the composition of responses. We then report on the type of activities undertaken by respondents and their current use of organic and local ingredients. From there, we turn to grains and organic ancient grains specifically. We report on familiarity with, current use of, and interest in expanding the use of a variety of ancient whole grains and flour products. Finally, we summarize the challenges and opportunities that emerge from the survey from the perspective of northeastern farmers interested in expanding production of organic ancient grains and from the perspective of institutions attempting to meet whole grain menu requirements.

Survey Design

The survey was conducted from March to April of 2023 and was distributed online to food administrators at various institutions in New England. The survey was shared directly with roughly 1,100 school food administrators in New York (987) and Maine (107), as well as being distributed through a variety of institutional food-related listservs. In total, 157 responses were completed, 136 from institutions in New York, 17 from institutions in Maine and 4 from other New England states. The majority of institutions were schools K-12 (94%), followed by higher education (2%) and the remaining 4% were non-school facilities. Because the majority of respondents represent K-12 schools, our report focuses on how to best meet their needs.

The institutions responding to the survey spanned a wide range of sizes, from around 350 meals per week to just over 350,000 meals per week. The mean (median) respondent comes from an institution providing 17,471 (4,800) meals per week. Responses from New York tend to come from larger institutions, preparing an average of 32,770 meals per week, while respondents from Maine prepare an average of 15,455 meals per week.

Local Food Use

As it refers to food and the origin of ingredients, 'local' is often an ambiguous term. Sixty-four percent of the institutions responding to the survey define local as a purchase within the state where they operate, while 31% define local using a set radius from their primary location. The remaining 5% of respondents use some alternative definition. Often, these definitions are influenced by the reimbursement programs in which institutions participate, though only 31% of respondents report utilizing a local incentive program.

We asked respondents to identify barriers to increasing local procurement. Of the barriers noted, we then asked respondents to identify the most significant barrier. Table 1 reports the primary barriers to increasing procurement of local food among respondents. Most notably, the seasonality of local food was viewed by respondents as a challenge. This barrier, however, may be more directed toward fresh vegetables and fruits than toward the grains on which we focus later in the report. Regardless, consistent availability is a major decision factor for many kitchens.

Cost and the difficulty of managing the procurement process emerged as the next most common barriers to increasing local food procurement. While state reimbursement programs may help reduce the perceived cost differential between local and non-local ingredients, the time and effort required to manage more complicated procurement and reporting requirements can quickly tax operations that are already struggling, as we'll discuss below, with limited staff support.

Table 1. Primary Barrier for Utilizing Local Food

Local Barrier Description	% Response	Local Barrier Description	% Response
Local is Only Seasonal	24%	Volume Not Available	2%
Local More Expensive	14%	Staff Lack Appropriate Skills	2%
Delivery Issues	14%	Client Acceptability	2%
Procurement Process is Challenging	14%	Limited Local Selection	2%
Staffing Shortages	10%	Equipment Limitations	1%
No Known Sources of Local Food	9%	Low Quality of Local	1%
Other	3%	Variability in Local Products	1%
Desired Form Not Available	2%	<i>n = 125</i>	

Many kitchens have ‘procurement goals’ that serve as guidelines or requirements set by administrators related to how food purchasing should take place. As an example, an institution might set a goal of devoting 50% of their food expenditures toward local or organic foods. When asked if their institution has a designated local procurement goal, 52% responded affirmatively. These procurement goals were driven by procurement incentives (25%), individual initiatives (18%), customer preference (15%), wellness policy (14%), administrative mandate (4%) and other influences (3%).

These results indicate that there is room for growth in terms of local food use in institutional kitchens, with a variety of factors driving demand. At the same time, significant barriers exist to increased local food procurement stemming primarily from consistent supply, cost, and managing more complicated procurement with limited staff.

Organic Food Use

Whereas over half of respondents had local procurement goals, only 5% of institutions surveyed reported having specific goals for organic procurement. Of those who reported having specific organic procurement goals, 33% reported individual initiative as the driving factor behind the goal, while 22% reported customer preference or an institutional wellness policy, and 11% reported either an administrative mandate or procurement incentives.

Respondents cite a variety of barriers to using more organic ingredients in their cooking (Table 2). The increased cost of organic products was the most frequently cited, with 48% of respondents indicating cost as the primary barrier to increasing organic procurement. Respondents also cited a limited selection of organic products (10%) and seasonality (9%) as primary barriers.

Table 2. Primary Barrier for Utilizing Organic Food

Organic Barrier Description	% Response	Organic Barrier Description	% Response
Organic More Expensive	48%	Procurement Process is Challenging	5%
Limited Organic Selection	10%	Staffing Shortages	3%
Organic is Only Seasonal	9%	Client Acceptability	2%
No Known Sources of Organic Food	8%	Desired Form Not Available	1%
Other	8%	Low Quality of Organic	1%
Delivery Issues	5%	<i>n = 107</i>	

Meal Preparation

Institutions have a variety of ways to provide food for clients. We separate meal preparation into four categories: scratch, speed scratch, pre-made, and vended. For the purpose of this survey, scratch cooking was defined as preparing meals starting from basic ingredients, such as flour, milk, raw eggs, and un-cut vegetables.

‘Speed scratch’, in comparison, refers to preparing meals using pre-made food items with fresh ingredients. For example, a kitchen might keep frozen cheese pizzas on hand and then add fresh toppings and bake. Preparing meals using canned beans and cut, frozen vegetables would also fall into the ‘speed scratch’ category.

Institutional kitchens may also sell meals made from pre-made/pre-packaged foods. In this case, the food is already in its final form and, at most, requires re-heating. An example would be warming a frozen pizza in which all toppings are already applied and no additional work is involved.

Lastly, meals may be comprised of vended products, where a kitchen uses an outside vendor to prepare and sell food. In this case, the institution provides the space for meals to be presented and sold. Some kitchens may prepare meals using a variety of these methods depending on the day and type of meal to be produced.

Our respondents report a variety of meal prep methods. We asked kitchens what percent of their meals are prepared using the methods described above. The most popular category was speed scratch cooking, which accounted for 48% of prepared meals. Scratch cooking followed with 34% of meals, then pre-made/pre-packaged with 15%, and finally vended items with 3%. Kitchens that prepare scratch and speed scratch cooking have the best chance of incorporating whole grains into the menu, and so much of the remaining analysis focuses on the set of respondents that do at least some scratch or speed scratch cooking.

Survey respondents were asked what scratch/speed scratch cooking activities they do on a regular basis (Table 3). Respondents reported using fresh, whole fruits and vegetables, pre-cut or peeled frozen vegetables (70%), reheating meat products (68%), and using canned fruits and vegetables (65%) were the most common activities. A majority of respondents also indicate that their kitchens used at least some raw whole grains or prepared raw meat (54% each).

Table 3. Percent of Kitchens Using Ingredient When Scratch Cooking

Scratch Ingredients Used	% Response	Scratch Ingredients Used	% Response
Use fresh, whole fruits/vegetables	70%	Bake with frozen products	38%
Use pre-cut/peeled/frozen vegetables	68%	Make soups	38%
Reheat meat products	65%	Use dry/raw legumes	23%
Use canned fruits/vegetables	63%	Bake with mixes	21%
Prepare raw meat	54%	Make dressings	19%
Use raw whole grains	54%	Bake without mixes	17%
		<i>n = 82</i>	

Respondents cited several significant barriers to preparing more meals from scratch. A majority of respondents cited staff shortages (55%), while 38% cited the time required to prepare scratch meals as a significant barrier. Equipment limitations (31%) and cost of ingredients (22%) were also cited as significant barriers.

A smaller number of respondents cited food safety (20%), inadequate cold storage (18%), and staff training in preparing raw meats (15%). Less than 10% of respondents cited lack of recipes or a lack of staff ability to deal with fresh produce as significant barriers to producing more meals from scratch. This final barrier is notable as we turn to the use of grains, and ancient grains in particular, where lack of familiarity with the product emerges as a significant challenge.

Grains Use

To understand ancient grain use in kitchens we surveyed staff and administrators about the following products: barley, rye, farro, einkorn, oats and spelt. For a familiar reference some questions also included wheat berries, quinoa, white flour, whole wheat flour, and rice. To mask our interest in grains, we also asked a similar set of questions for dry beans and legumes.

Respondents were first asked to indicate which grains they regularly use in their cooking. While use of the reference products was common, significantly fewer respondents used the ancient grains. For example, while 95% of respondents use rice and 73% of respondents use white flour, less than half of respondents report using any of the ancient grains.

While this is true for both states, we note substantial differences between Maine and New York (Figure 1 & 2). In particular einkorn, farro, rye, spelt and wheat berries are only used within the New York institutions we surveyed. Furthermore, Figures 3 and 4 show that many respondents are not familiar with the ancient grains or do not know how to incorporate them into their meals.

Figure 1. Grain Use Type in Maine

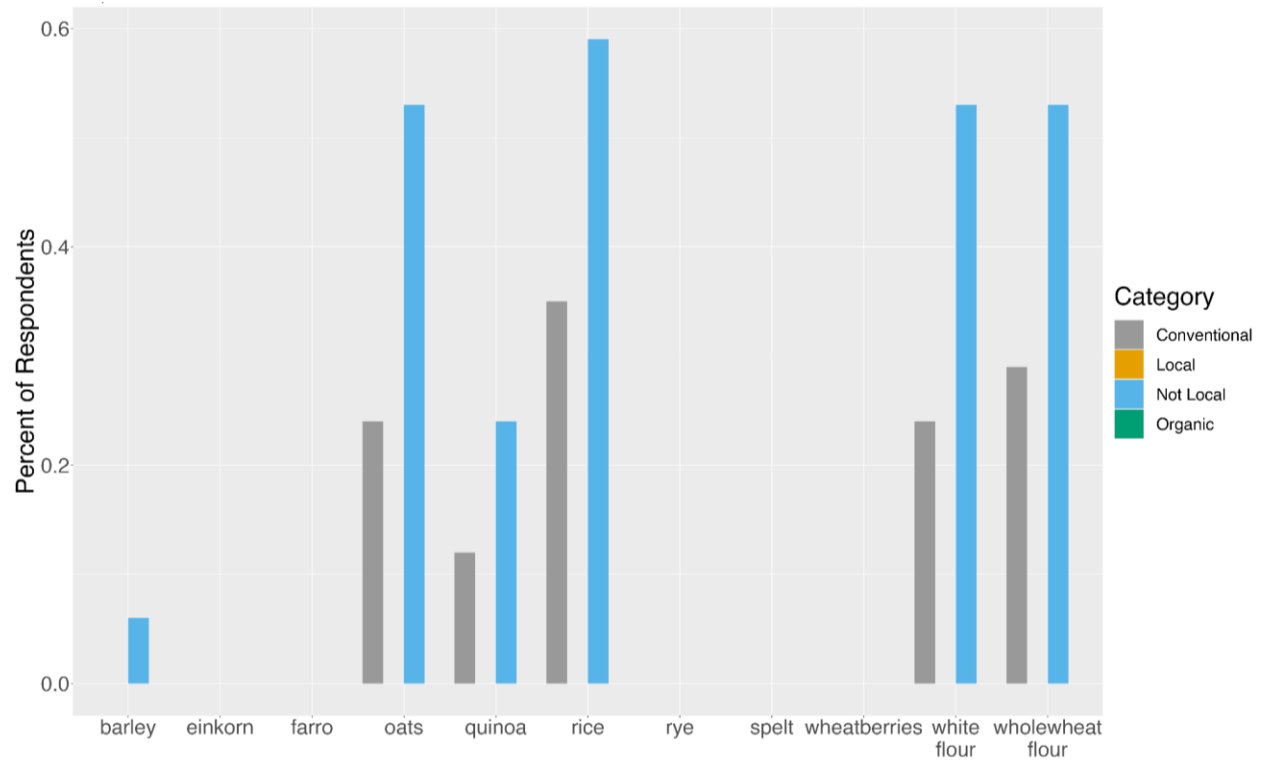


Figure 2. Grain Use Type in New York

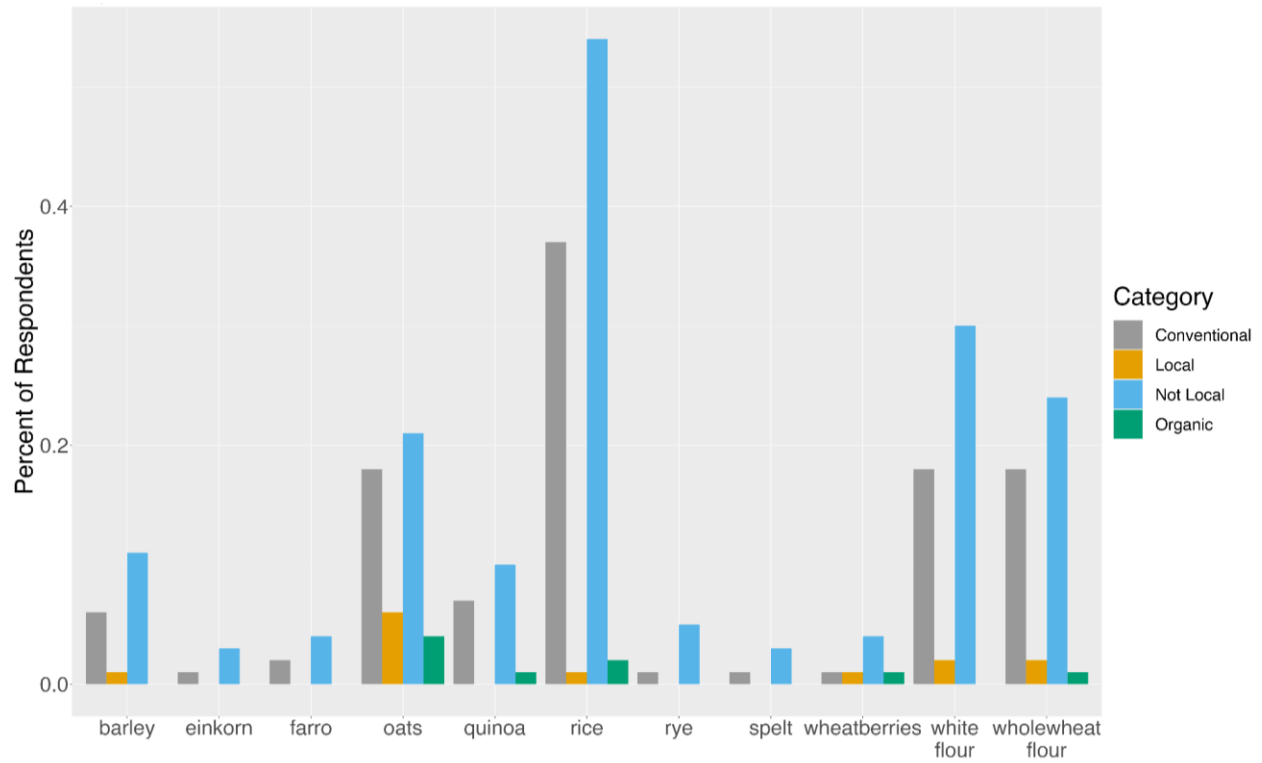


Figure 3. Staff Familiarity with Grains - Maine

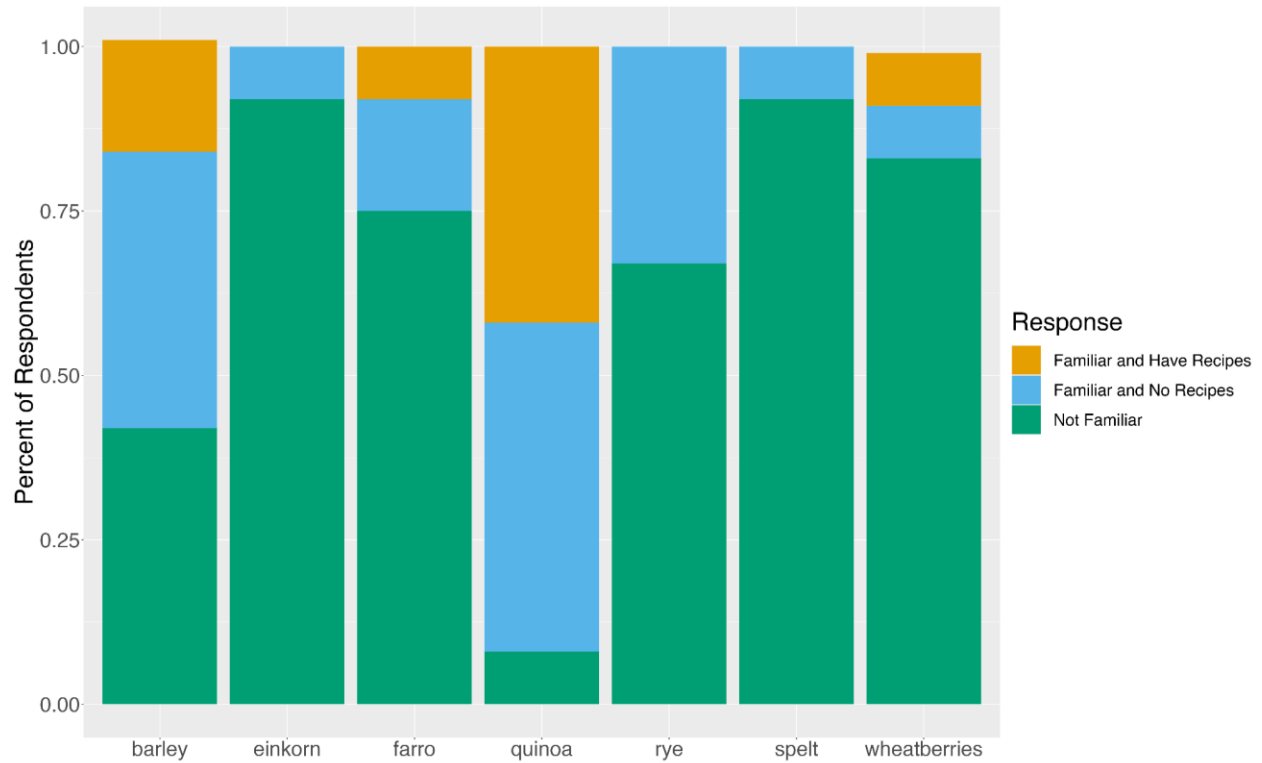
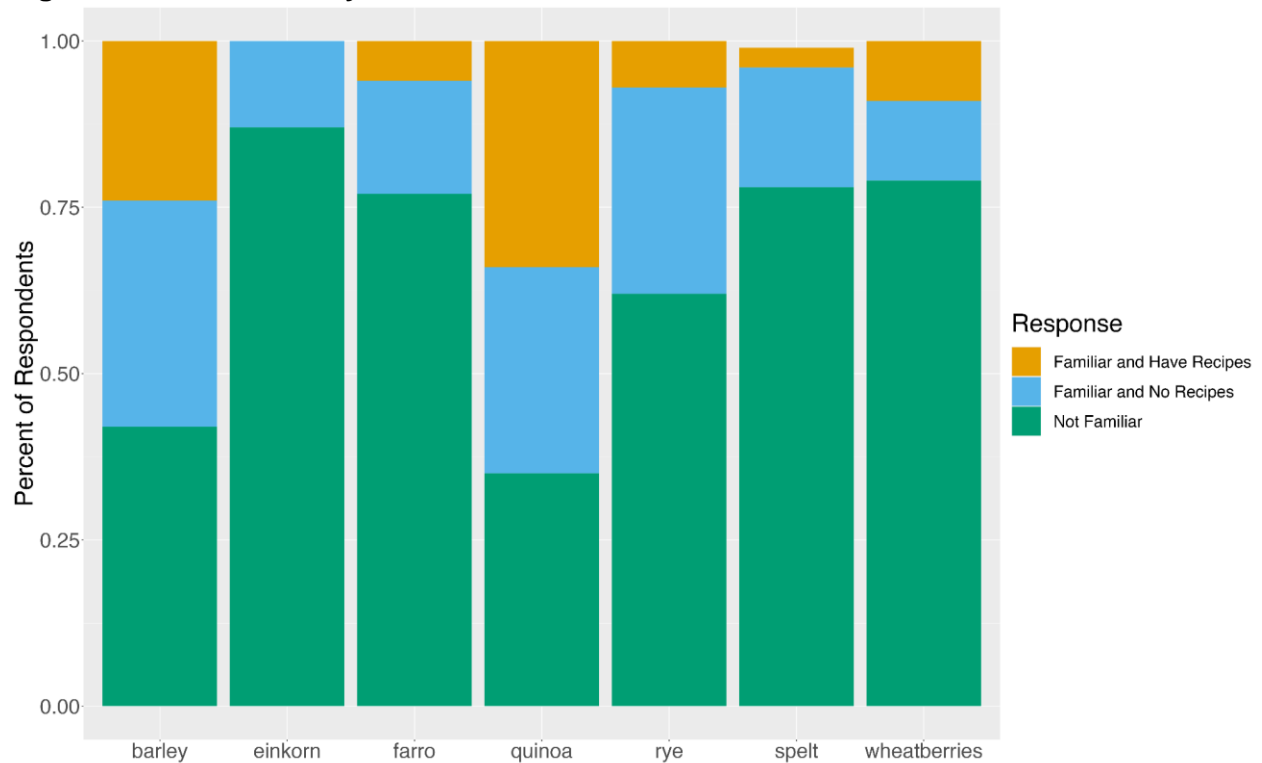
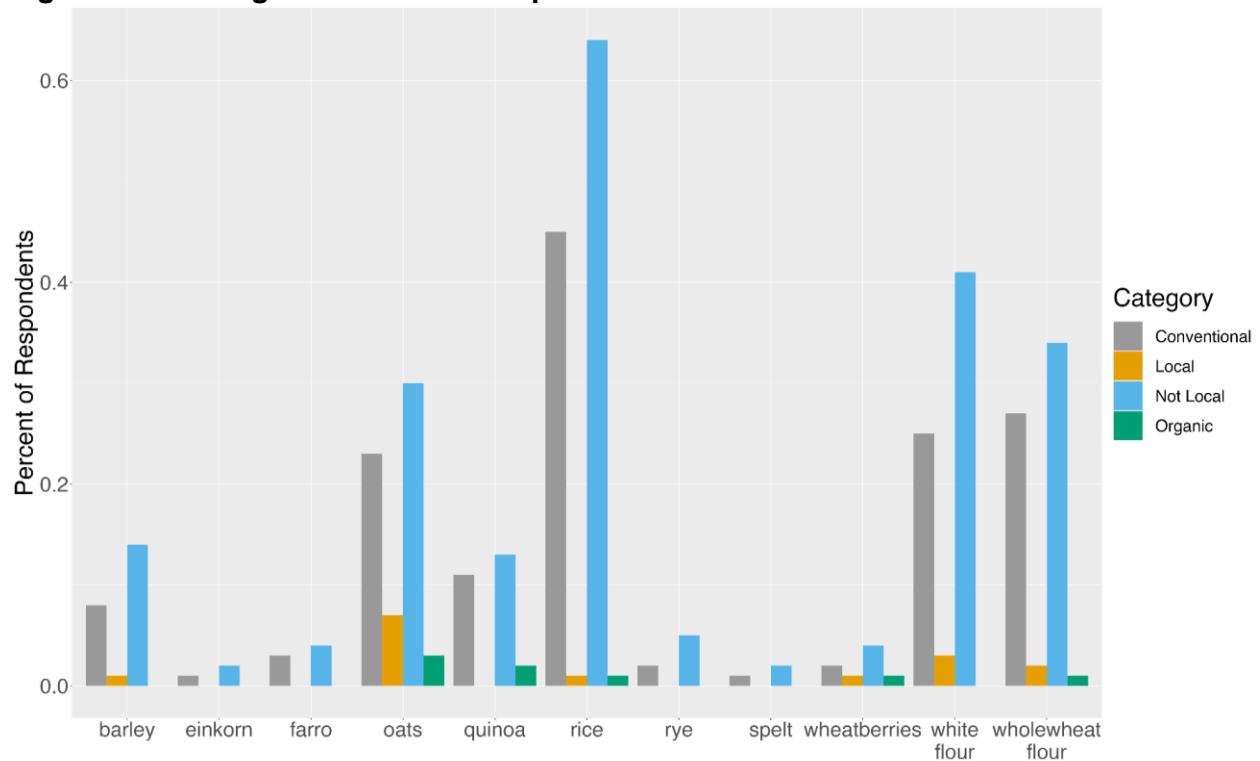


Figure 4. Staff Familiarity with Grains - New York



When examining how each grain product is sourced (Figure 5), we find that few respondents source local or organic grains. Organic and local oats are the most commonly reported, with only 4% and 5% of respondents respectively. Only 2% of respondents report using both local and organic oats. For every other grain, less than 2% of respondents report using either local or organic sources, and, for several grains, no respondent reported using the local or organic. Although a variety of grains are used by the survey respondents, the vast majority are sourced through conventional, non-organic and non-local methods.

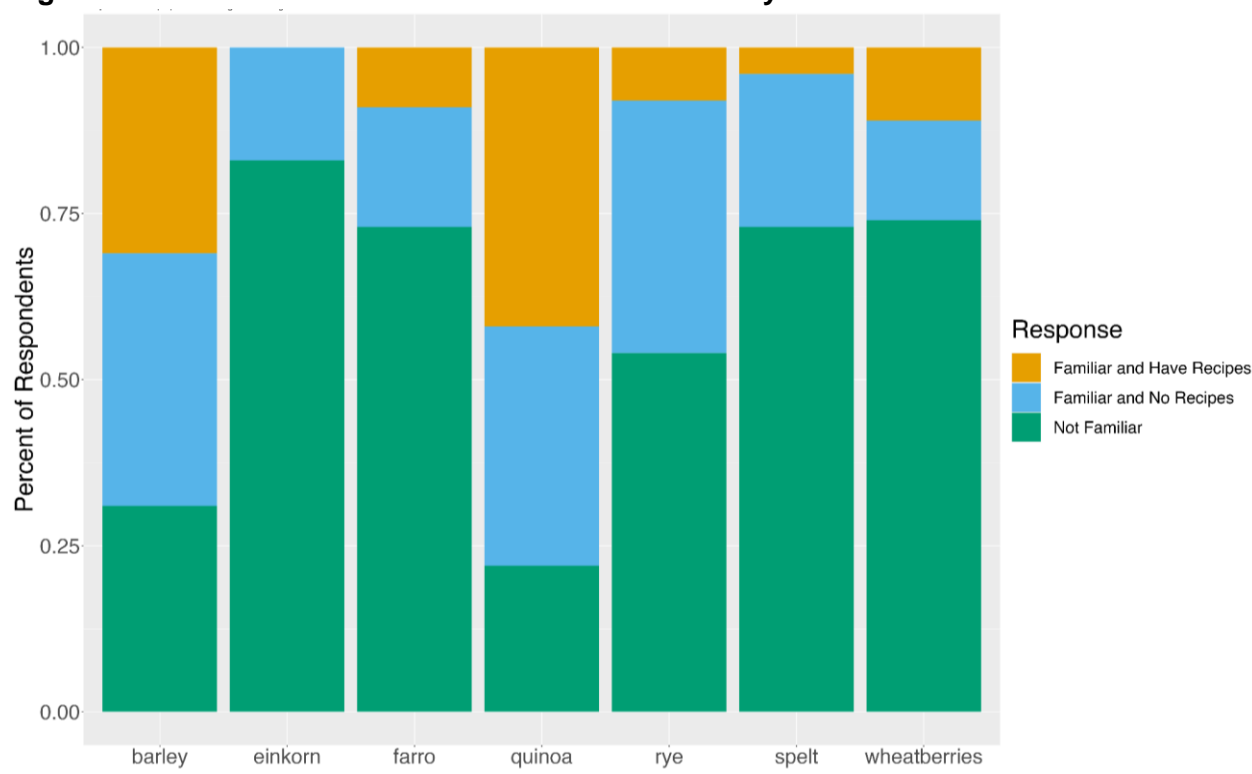
Figure 5. Sourcing of Grains - All Respondents



Of the institutional kitchens that make scratch meals, we found a majority of staff are unfamiliar with ancient grains. Those who report being familiar with the grain itself often report not having recipes that allow them to incorporate ancient grains into their meals (Figure 6). Staff were least familiar with einkorn, with 77% reporting that they were not familiar, 16% reporting that they were familiar but had no recipes, and 0% reporting that they were both familiar and had recipes. Farro, spelt, and wheat berries were all unfamiliar alternatives as well, with 68% of respondents reporting that their staff was unfamiliar with each of the grains. Rye had slightly better recognition, with only 49% of respondents reporting that their staff was not familiar, while barley and quinoa were much more familiar, with only 28% and 20% of respondents reporting staff unfamiliarity, respectively.

For reference our survey included quinoa, a commonly known ancient grain. We found it was the most familiar grain and was also the grain for which the most staff had recipes. Branding and marketing of quinoa has been prevalent over the last decade. Quinoa has seen its demand grow due to its many perceived health benefits and branding as a “superfood”. Since 2006 the use of quinoa has dramatically increased, and even causing demand to outweigh supply putting upward pressure on pricing in some years (AG-MRC, 2022). The market for quinoa has since moderated but the broad awareness of quinoa can be seen in our survey. As such, quinoa may hold useful lessons for expanding the market for other ancient grains.

Figure 6. Kitchens That Scratch Cook - Staff Familiarity with Assorted Grains



Consumer Preference

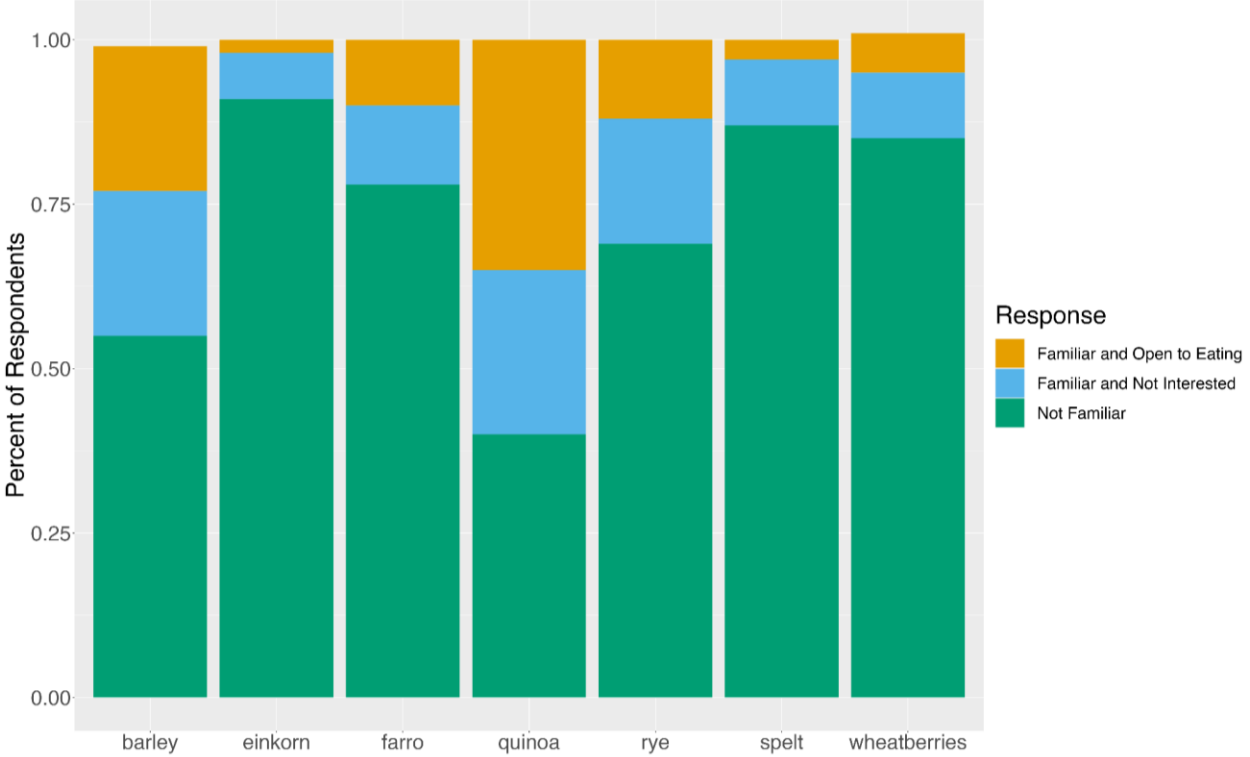
Our survey asked institutional kitchens to indicate how familiar their customers are with a variety of grains (Figure 7). With the exception of quinoa, over half of their customers are believed to be unfamiliar with the ancient grains, and many grains have over 75% unfamiliarity. In addition, for all ancient grains (except quinoa), less than 25% of respondents believe that their customers are open/willing to eat them. These figures are for all institutions surveyed, as respondents from Maine and New York did not exhibit dramatic differences.

Relatively few of the respondents reported that their customers were familiar with and open to eating any particular grain. The highest familiarity with willingness to consume was quinoa at 35%, followed by barley at 22%, with the smallest being einkorn (2%) and spelt (3%). The remaining grains fell somewhere in the middle. Six percent of respondents believed that their customers were familiar with and open to eating wheat berries, 10% believed their customers were familiar and open to eating farro, and 12% believed their customers were familiar with and open to eating rye. The proportion of respondents reporting that their customers were familiar with but **not** interested in eating the grains were similar: quinoa (25%), barley (22%), rye (19%), farro (12%), spelt (10%), wheat berries (10%), and einkorn (7%).

A much more significant portion of the respondents reported that their customers were not familiar with the grains. The lowest level of unfamiliarity was reported for quinoa (40%), followed

by barley (55%), rye (69%), farro (78%), wheat berries (85%), spelt (87%), and finally einkorn (91%). This lack of familiarity emerges from the survey as a key barrier to expanding institutional offerings of local, organic, ancient grains. It also, in turn, is a key barrier to ensuring the kind of stable market that might allow farmers to more confidently experiment with integrating organic ancient grains into their production mix.

Figure 7. Customer Familiarity with Grains - All Respondents

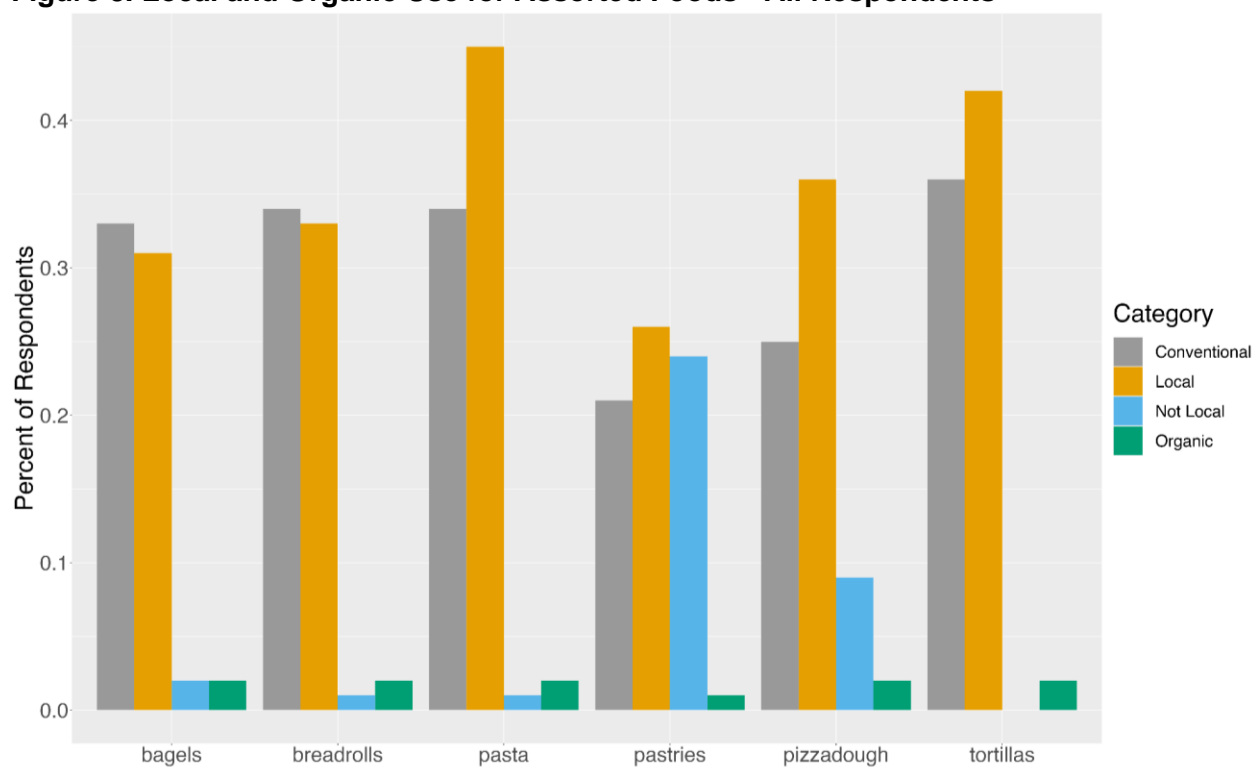


Prepared Food Sourcing

Institutions were asked what type of sourcing (local, non-local, organic, conventional) they regularly use for the following commonly prepared items: bagels, bread rolls, pasta, pastries, pizza dough, and tortillas (Figure 8). Sourcing categories were non-exclusive, meaning that respondents could indicate that they sourced, for example, both locally produced and non-locally produced bread rolls.

Respondents reported significant sourcing of local prepared items, though it is important to note that this likely refers to where the prepared item was produced, not where the grain it contains was produced. Pasta and tortillas were the most popular local items, with roughly 50% of respondents sourcing local varieties of either. Bagels and bread rolls followed closely behind with between 34% and 37% of respondents reporting using either the local or conventional varieties of both. Pizza dough was largely sourced locally, with more than 40% of respondents reporting using local dough. Pastries were more evenly split, with between 31% and 24% reporting using local and non-local products respectively.

Figure 8. Local and Organic Use for Assorted Foods - All Respondents



While sourcing of local products was common, sourcing of organic prepared products was not. Less than 3% of respondents reported using organic versions of any of the prepared grain products. Sourcing of organic products differed somewhat between the Maine and New York respondents (Figures 9 & 10). Respondents from New York reported some organic sourcing for all items, while respondents from Maine did not. Respondents from New York also had a higher use of non-local products across all items, with the exception of tortillas.

Figure 9. Local and Organic Use for Assorted Foods - Maine

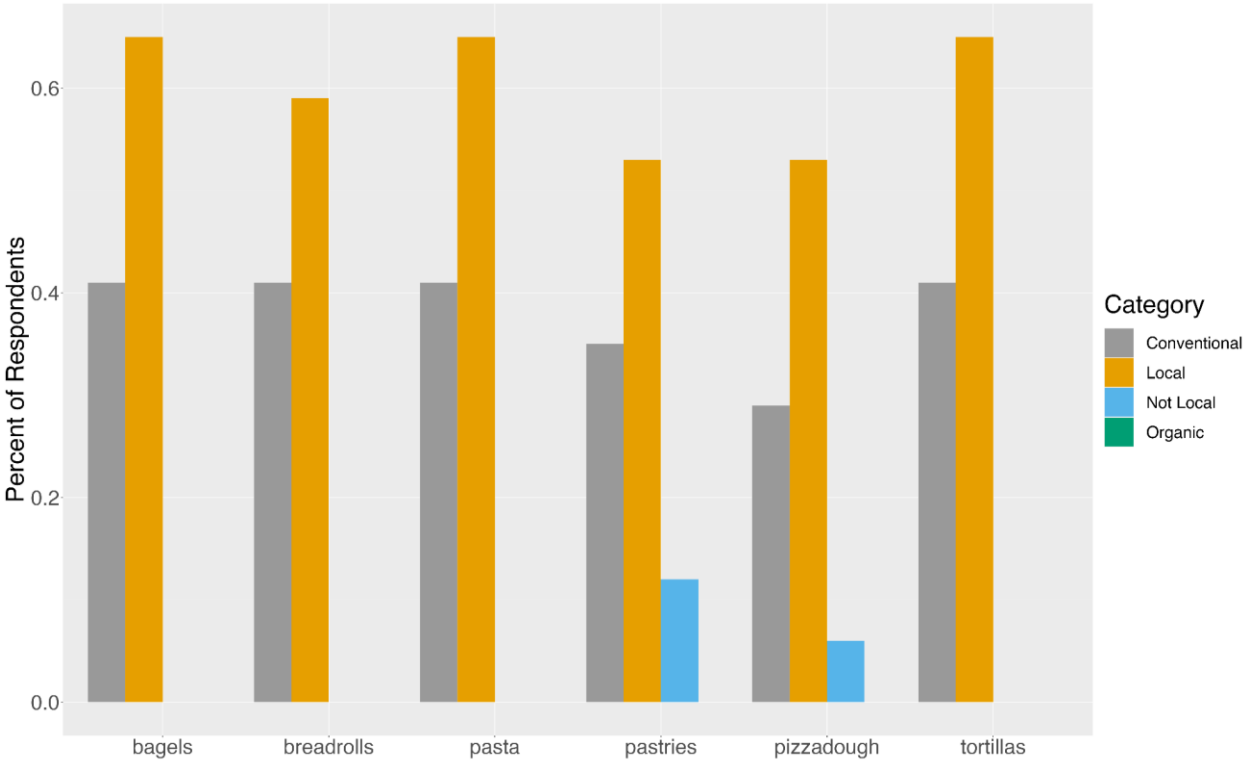
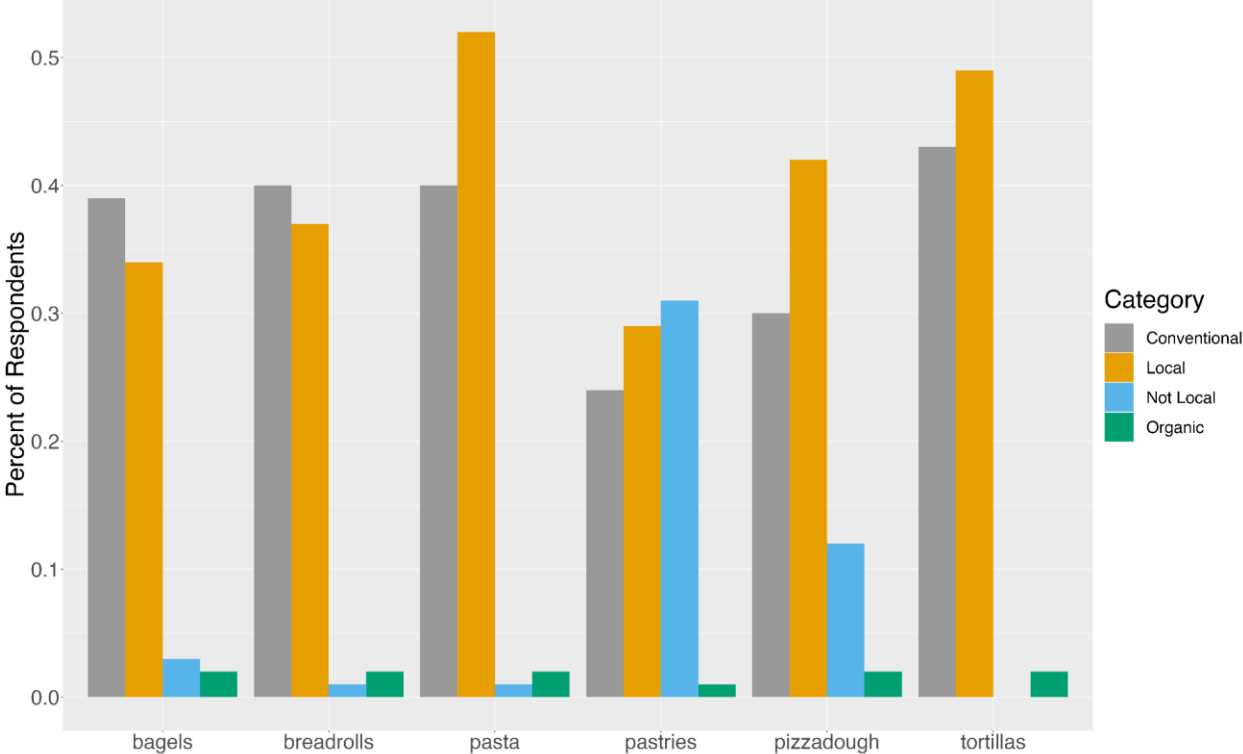


Figure 10. Local and Organic Use for Assorted Foods - New York



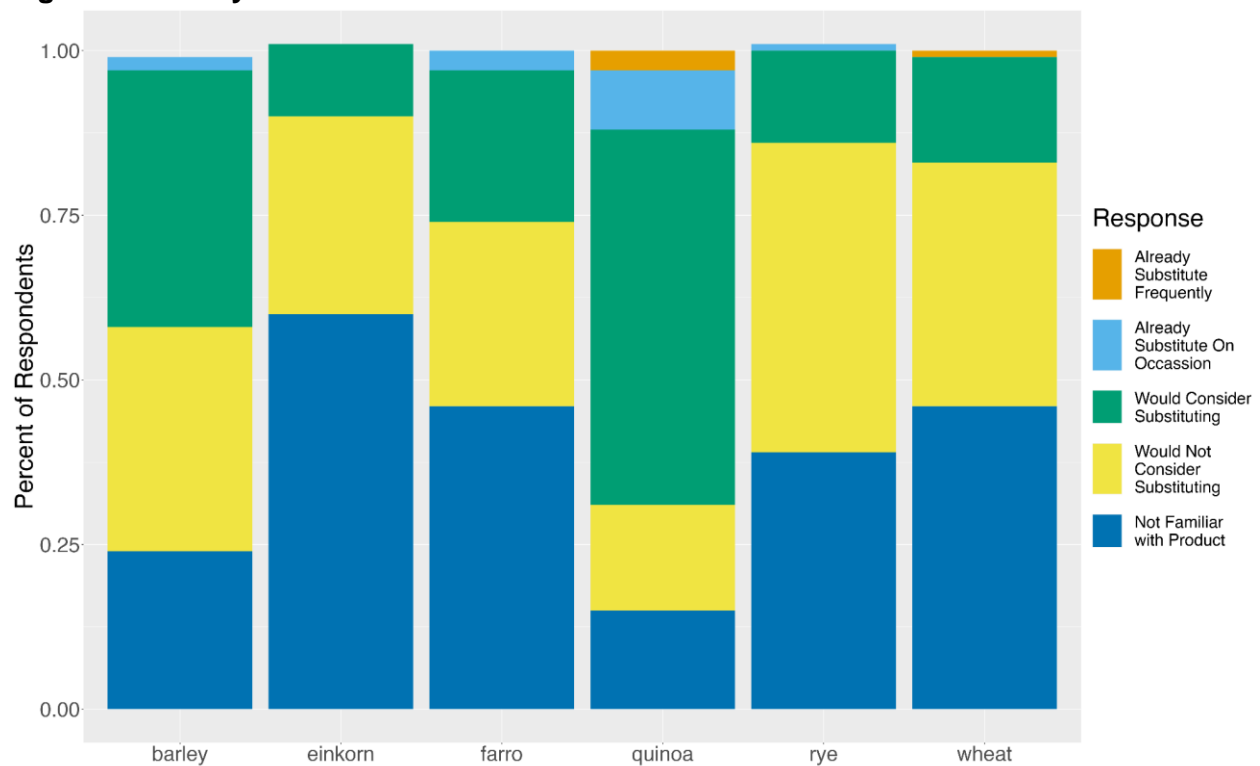
Ability to Substitute

The most common grain reported by respondents was, far and away, rice. In order to obtain one measure of the current market interest in ancient grains, we asked respondents to report on their propensity to substitute an ancient grain for rice in their recipes (Figure 11).

Lack of familiarity once again emerged as a significant barrier to the use of ancient grains. For all ancient grains, with the exception of quinoa, 50% or more of respondents reported that they would not substitute an ancient grain for rice due to preference or lack of familiarity. Einkorn is most notable in that almost 90% of respondents would not substitute it and no respondent currently uses it as a substitute for rice.

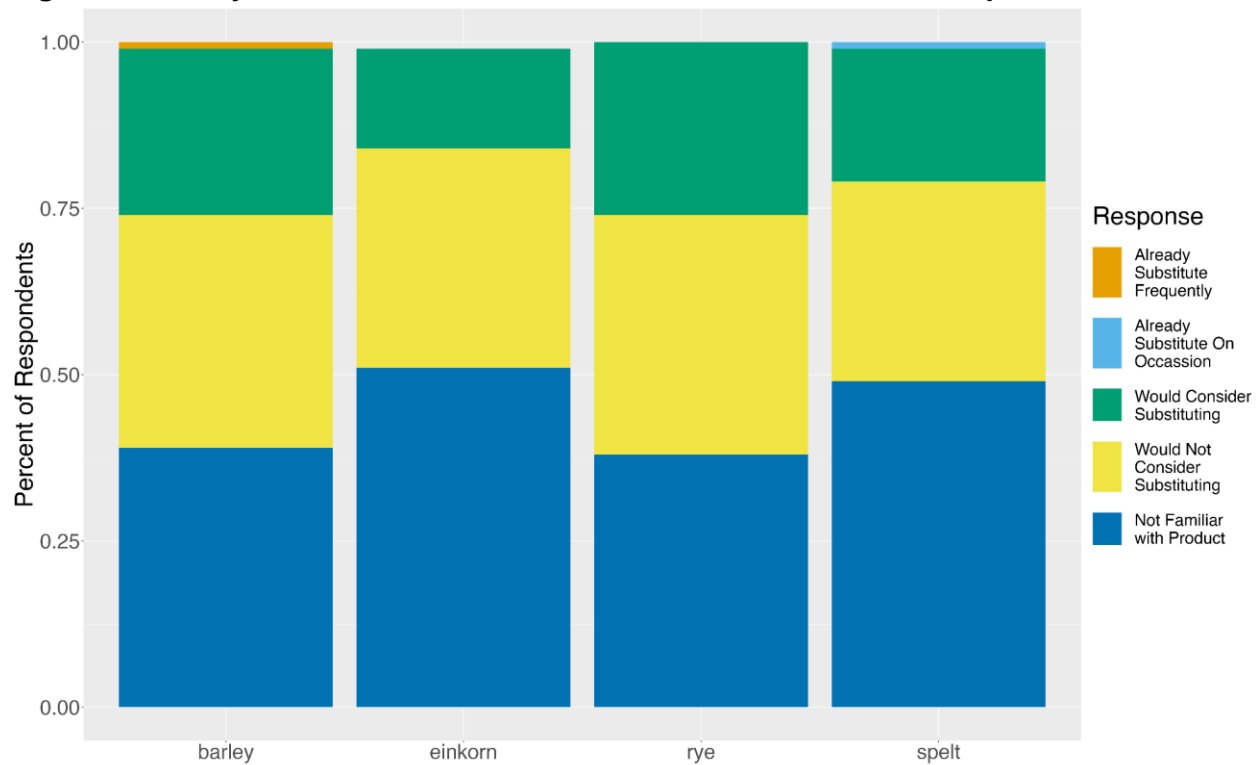
A small portion of respondents ‘frequently’ substitute one of the mentioned grains for rice in their recipes: 3% for quinoa and 1% for wheat berries. A slightly larger portion ‘occasionally’ substitutes barley (2%), farro (3%), quinoa (9%), or rye (1%). Quinoa appears to be the most popular potential substitute, with 57% of respondents reporting that they would consider substituting for rice, followed by barley (39%), farro (23%), wheat berries (16%), rye (14%), and einkorn (11%).

Figure 11. Ability to Substitute Ancient Grain for Rice



The same exercise was carried out with respect to willingness to substitute barley, einkorn, rye, and spelt flour for wheat flour (Figure 12). The current substitution of these grain flours is extremely low: no grain flour is 'frequently' or 'occasionally' used by more than 1% of respondents. The only two ancient grain flours that are currently substituted for wheat flour are barley and spelt, with 1% of respondents substituting barley flour 'frequently' and 1% substituting spelt flour 'occasionally'. Between 30% and 36% of respondents reported that they would not consider substituting these ancient grain flours for whole wheat flour. However, 17% of respondents would consider substituting barley, 18% would consider substituting rye, and 13% and 11% of respondents would consider substituting spelt or einkorn, respectively.

Figure 12. Ability to Substitute Ancient Grain for Wheat Flour - All Respondents



Key Take-aways

Despite its limited scope, the data described above highlight the large potential of the institutional food market. The 157 institutions participating in the survey provide over 2 million meals per week and have significant scope to expand their use of grain products. Local, organic, ancient grains could play a role in this expansion, either as additional products or through substitutions in existing products and recipes.

At the same time, the survey highlighted a number of significant barriers that must be addressed in order for the use of ancient grains to expand. Most notably, perhaps, are institutional constraints (related to staff, budget, and equipment) and the familiarity of kitchen staff and consumers with ancient grains, themselves. While overcoming these two sets of constraints likely require different types of support to institutional kitchens, there are some points of intersection. Supporting food businesses in expanding their production of prepared foods that use local, organic, ancient grains, for example, might further both customer and institutional awareness of ancient grains and provide accessible products to kitchens with limited capacity to undertake scratch cooking activities. Similarly, supporting farmers in integrating grains into their farm plans and minimizing barriers for these farmers to participate in the procurement processes already used by institutional kitchens represent clear pathways to increasing the availability of local, organic, ancient grains in the market.

While there is room for growth in the use of whole grains among institutional kitchens broadly, many opportunities exist to vary grain offerings by substituting organic, ancient grain products for more commonly used products like rice and wheat flour. The data show that many institutions are open to the idea of using substitutes but currently lack information. It is important to acknowledge, however, that awareness will not, by itself, be sufficient to increase the prevalence of organic ancient grains in the institutional market. Survey respondents were also clear that they operate under pressing budget constraints and that complicated procurement systems or limited availability will also impede use of any local product. These are solvable problems, but problems that require investment in both agricultural infrastructure and in relationships between producers, processors, retailers, and end market users.

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