

REVIVING GRAIN IN THE HUDSON VALLEY

A White Paper
for
The Local Economies Project of the New World Foundation

Prepared by Sarah Brannen
Upstream Advisors

Introduction

Local grain has become one of the most notable trends in the local food movement in the past several years. The high profile of grain is due in part to its importance to many other high value products, such as local meats, artisanal baked goods, micro brewed beer, and micro distilled spirits. Consumer demand and culinary trends toward each of these products has in turn fueled more attention to local, specialty grains.

As the Hudson Valley Food Hubs Initiative report confirmed, there has been remarkable growth in small-scale livestock production in the Hudson Valley in the past fifteen years.¹ These farms are seeking alternatives to conventional feed for their livestock, but find it difficult to source alternative grains affordably and locally. Additionally, there are a number of artisan bakeries that sell throughout the region, including through the New York City Greenmarket system. These bakers are motivated to buy local grain not only to meet consumers' demands for unique and local products, but also because Greenmarket instituted a rule requiring 15 percent of bakers' ingredients be locally grown.

Microbreweries have grown rapidly across the country, with more than two dozen in just the Hudson Valley and neighboring counties. Similarly, micro distilleries are beginning to open throughout the region. There are currently at least a dozen in or near the Hudson Valley. Part of the popularity and growth of these breweries and distilleries has been fueled by recent legislation creating farm brewery and farm distillery licenses, making it easier for small, artisan producers to enter the market in New York State. This same legislation requires the use of local grain, thus creating a new market for grain growers.

Despite these promising trends, local grains remain a niche product. The market, although growing, is small. Moreover, few farms in the Hudson Valley produce grains for the food or beverage markets. If the Hudson Valley is to promote further growth in the grain sector, investment will have to be made in developing both the production of local grains and the market for local grains. To better understand what investments are most needed now to grow the grain sector in the Hudson Valley, the Local Economies Project of the New World Foundation commissioned this report.

Over the course of five months, this research project sought to answer two main questions: what are the key barriers to increasing the production and purchasing of local grains and what resources would help alleviate those barriers. To answer these questions, the research included a review of current reports and publications. It also included attendance at workshops hosted by Cornell Cooperative Extension of Ulster County and NOFA-NY and a review of current programming throughout the northeast region. Lastly, the project culminated with a convening of experts from around New York State, held in August, and continued consultation with several of these experts.² The information gathered through this research forms the basis for the findings and potential programs outlined below.

¹ Report available at <http://www.localeconomies-hv.org/initiatives/food-hub/food-hubs-report/>

² The following experts were consulted for this report: June Russell, Greenmarket, GrowNYC; Robert Perry; NOFA-NY; Mark Sorrells, Cornell University Small Grains Program; Justin O'Dea, CCE Ulster; Elizabeth Dyck,

Hudson Valley Grain Production

Compared to other parts of the country, New York State produces relatively little grain. Within New York State, the Hudson Valley produces even less when compared to other regions. The USDA Census of Agriculture collects data on a number of grain types, including Amaranth, Barley, Buckwheat, Canola, Corn, Emmer, Flaxseed, Millet, Oats, Rye, Sorghum, Spelt, Triticale, and Wheat. None of the Hudson Valley counties have significant or measurable production in most of these grain types. The exceptions are barley, corn, oats, rye, and wheat. Among these grain types, corn for silage and grain are much more abundant, given their importance for feed in the dairy sector in the Hudson Valley.

Hudson Valley Acreage of Grains						
County	Barley	Corn as Silage	Corn as Grain	Oats	Rye	Wheat
Columbia	62	6,387	7,296	332	139	346
Greene	(D)	(D)	533	80	-	(D)
Dutchess	-	1,792	5,390	270	67	150
Ulster	-	1,144	1,316	39	(D)	(D)
Sullivan	(D)	882	(D)	(D)	(D)	(D)
Putnam	-	-	-	-	-	-
Orange	(D)	3,931	2,159	83	93	(D)
Westchester	(D)	(D)	(D)	-	-	-
Rockland	-	-	-	-	-	-
Hudson Valley	(D)	14,136	16,694	804	(D)	(D)
New York State	10,793	507,568	551,629	60,999	6,879	84,955
US	3,521,957	5,979,661	86,248,542	1,509,149	267,361	50,932,969
NY as % of US	0.3%	8.5%	0.6%	4.0%	2.6%	0.2%

Based on 2007 Census of Agriculture

(D) denotes data are not disclosed by USDA

Very few farms in the Hudson Valley currently grow grains on a commercial scale for the food and beverage markets. The limited group of farmers who are endeavoring to do this include both beginning farms and more established farms that are attempting to incorporate grain into their crop rotations. For example, Migliorelli Farm in Dutchess County has been growing wheat for three seasons and is partnering with Cornell University on small-scale variety yield trials. Thus far, their larger plots have not met food grade standards and they have sold their grain for animal feed. However, their crops have been progressing each season toward human consumption standards. Hawthorne Valley Farm in Columbia County has begun to incorporate grain into their crop rotations, although they are not yet selling grains for food or beverage processing and still do not produce the scale of food grade grain to fully service their own on-farm bakery. Lightening Tree Farm in Dutchess County is perhaps one of the more advanced grain farms in the region. They have the largest grain growing operation that has produced food grade grains in the region.

OGRIN; Don Lewis, Wild Hive Community Grain Project; Ralph Erenzo, Tuthilltown Spirits; and Joel Elder, Tuthilltown Spirits

Although they have partnered with the Wild Hive Community Grain project to sell some of their grains for milling, the bulk of their production is still sold to small livestock farms.

In addition to these larger, more established farms, there are a number of beginning farmers who have attended NOFA-NY and Cornell Cooperative Extension workshops to learn about growing grain and some of them have begun experimenting with small plots over the past several seasons. Yet, none of them are selling a robust volume of product for food and beverage processing. Among these different types of farms, grain production therefore remains a niche and experimental activity, but one that is gaining momentum.

Challenges to Local Grain Production

Grain production has been slow to gain a foothold in the Hudson Valley for a number of reasons. It has been more than a century since the region boasted significant grain production and the knowledge about farming these products in the local environment has been lost.³ Farmers lack information about the types of grains suited to the Hudson Valley climate, experience difficulty sourcing seed for grains, and struggle with harvest and post-harvest handling techniques. Although Cornell University has been researching various types of small grains suited to the primary grain-production counties of New York, their work in the Hudson Valley has been limited to one small field trial. Farmers have requested that research be done in the Hudson Valley and that several types of products be tested to provide more reliable information about the grains most viable given the local climate.

Farms trying to grow grain often struggle to increase their yields and maintain quality. Some are uncertain as to when to harvest the grains. In addition, more commonly, farmers in the Hudson Valley grapple with post-harvest handling of grains, such as drying and storing their grains. If grains are subject to a wet season or damp storage conditions, they are vulnerable to the *Fusarium* fungus, which then leads to vomitoxin, along with a variety of other molds and fungi. If vomitoxin or other fungi and mold content, measured in parts per million, is too high grains will not be accepted for milling, baking or other food uses. The farmer is then left with the choice of either selling the grain for animal feed or taking a greater loss on the crop.

Another barrier to increasing grain production in the Hudson Valley is one that is shared among small and mid-sized farms throughout the country—the lack of appropriately sized and affordable equipment. Grain production involves several steps, from planting to post-harvest processing on-farm. Each of these steps then requires specialized equipment, making grain production capital intensive. Planting grains requires a grain drill to ensure consistent planting. Once grains are ready for harvest, a farmer will need a combine to thresh the grain. Additional cleaning equipment may also be required during or after harvest for the farmer to clean the grains to remove the edible portion from the chaff and to remove weed seed from the grain. To store grains, farms will then require proper

³ Zimmerman, Andrea K. “Nineteenth Century Wheat Production in Four New York State Regions: A Comparative Examination.” *The Hudson Valley Regional Review*, September 1988, Volume 5, Number 2

facilities and containers, potentially including aeration and drying equipment to maintain dryness.

At each of these phases of production, farmers will require specialized equipment, much of which is no longer produced in the US for small and medium sized farms. Even if farms are able to find appropriately scaled, new equipment, it can be cost prohibitive. As an alternative, farmers have sought out used equipment, which may not be readily available. They have also imported and retrofitted foreign equipment or created their own equipment from other machinery and parts. These alternatives can present some risk to farmers as well since the parts may not be easily available for used and modified equipment and waiting six or eight weeks to obtain them can impact their harvest schedule and therefore their income.

The steep learning curve and difficulties in equipping new grain operations contribute to the numerous economic trade-offs and risks farmers face in transitioning to small grains. Yet there are other economic issues for farmers as well. For example, farmers cite the high price for commodity corn, which is a disincentive to transitioning to non-GMO or organic corn and small grains. Additionally, some farmers have raised the question of whether buyers in the processing sector need additional education about using local, small grains and the distinct characteristics they offer. Lastly, because much of the Hudson Valley crops are vegetables and fruit, particularly apples, farms have typically been able to earn a higher price per acre than they would by growing small grains. In part, this opportunity cost can be offset for vegetable growers who by rotating in grains can reduce their risk of diseases and pests while improving soil quality. This may help them achieve greater resilience on-farm and add to their long-term economic and environmental viability. As an added benefit, if they are able to sell the grains, they may be able to achieve a high enough income from grains in the longer-term to cover their costs of transitioning to grain rotations.

Addressing Challenges to Grain Production

Despite the challenges facing grain production in the Hudson Valley, farmers' interest in grains continues. Several types of investments could aid farmers in their transition to grain. These include 1) an expansion of research, 2) training and education programs, 3) equipment and infrastructure assistance, and 4) better marketing and coordination among local businesses.

Several programs throughout the northeast meet some of these needs. For example, Cornell University has a long-standing small grains program that tests varieties of small grains for "yield, nutritional quality, disease resistance, and other characteristics that increase the crop value and production efficiency."⁴ Their work has included field trials in various regions of New York State since 1907. The information they gather from these trials has enabled farms to learn what types of cultivars are most suited to their regions. However, to date, the program has not conducted extensive field trials in the Hudson

⁴ <http://plbrgen.cals.cornell.edu/cals/pbg/programs/departamental/smallgrains/about-small-grains-breeding-and-genetics.cfm>

Valley, a region which differs significantly from other regions of the state, such as western New York. Cornell recently conducted one small field trial on the Migliorelli Farm in Dutchess County, but additional testing is needed to gain a complete understanding of what types of grain are more viable and economical in the Hudson Valley region. Moreover, the lead researcher of the Cornell program, Dr. Mark Sorrells, typically requires three seasons of trials to account for weather variations and various diseases before he is able to reach definitive conclusions about the relative performance of different small grains varieties.

In addition to the research conducted at Cornell, there have been several education and training events targeting farmers hosted in or near the Hudson Valley. Cornell Cooperative Extension of Ulster County and NOFA-NY recently organized field days wherein they shared relevant research findings on varieties, offered presentations from experts in growing and processing grains, and fostered discussion among new and experienced farmers interested in growing grains. As part of a grant project called the OREI Value-Added Grains Project, which includes several organizations, there will be some additional workshops in the Hudson Valley in 2014 and 2015. However, these various educational events are not yet part of a longer-term education and training program targeting the Hudson Valley and could potentially be expanded with additional resources.

Despite the strong interest among a small cohort of farmers and food processors in local, small grains, the Hudson Valley and New York metro regions lack a formal network in which these businesses can share information and collaborate. One network, the Organic Growers Research and Information-Sharing Network (OGRIN), provides practical information to farmers through participatory research, information exchanges, forums, and publications on their website. This network, while not exclusively focused on local grains, focuses some of their work on local, organic grain production. While their work is promising and the expertise and information they provide valuable, they are headquartered in Chenango County, with their reach in the Hudson Valley therefore limited thus far.

As interest in local grains has grown over the past several years, these types of programs have offered some means for supporting farmers with research, education, and opportunities for collaboration. Yet none of them has specifically focused on the Hudson Valley and most are limited by their size and the resources available to them. As discovered during the research for this report, farmers in the region would benefit from an expansion of these types of activities. Below is a description of the recommendations offered by farmers and experts in the field that would enable further growth in grain production.

Research and information:

During the LEP convening held in August, many of the participants focused on the need for more research on the grain sector. Specifically, they cited the need for practical information on the varieties of grain suited to the Hudson Valley. Although Cornell has made significant contributions through their small grains program, farmers in the Hudson Valley would benefit from research that is tailored to the local climate. Such local field

trials would mitigate risk farmers face in planting new varieties and could potentially expedite increased production of small grains in the region. In particular, farmers indicated an interest in field research of wheat, rye, and barley varieties.

Training and education:

As a complement to on-the-ground research into suitable grain varieties, farmers would benefit from training and education programming. Whereas Cornell Cooperative Extension of Ulster County and NOFA-NY have begun offering some educational programming, an expansion of these types of opportunities could hasten farmers' ability to produce grains. Although the research findings that follow from a new project would offer valuable information to farmers, it would not fully address their practical questions that arise in the course of experimenting with new grains. Training and education programming could therefore help disseminate research findings, but also provide an opportunity for farmers to raise their concerns and solicit guidance about adapting their specific farms and growing practices to grains. One participant in the convening in August suggested a mentorship program between farmers who have experience in growing grains and farmers who are beginning to grow grains could be a promising model for training and education.

Infrastructure development:

Both farmers and grain researchers have indicated there is a bottleneck in equipment available for small and medium-sized operations that hinders the increased production of grains. Several forms of assistance could alleviate this bottleneck. As some farmers have relied on used or imported equipment, better networking among them and providing them with assistance in locating suppliers would be beneficial. Additionally, some farmers have retrofitted equipment on their own or have worked with others with mechanical skills to create more affordable equipment. One recommendation presented during the convening was to support engineers to create open source designs for smaller and medium scale harvest and post-harvest equipment. Such a program could potentially be housed at a university and then partner with others to disseminate the designs to farmers and mechanics serving farmers. Lastly, for those farmers who are at a scale of production necessitating new or larger equipment, assistance with financing could enable them to purchase equipment that is cost prohibitive and therefore potentially increase their production more quickly.

Marketing and coordination:

As demonstrated by the popularity of the Cornell Cooperative Extension and NOFA-NY workshops and the LEP convening on grains, farmers and grain processors are seeking opportunities for learning more about grains and for connecting with others in the field. Given the early stage of grain growing in the Hudson Valley, further opportunities to network and collaborate among grain growers and processors could catalyze the sector's

growth. Not only would such coordination enable them to learn from each other, but it would also provide marketing channels and supply chain information.

Participants at the LEP convening suggested the Hudson Valley and broader New York region form a guild for the various sectors producing and purchasing local grain. The recommended guild would serve as a “one stop shop” for networking and information among them. It could also be accompanied by an email listserv or other online platform to foster communication among farmers and others and could coordinate with the organizations, such as OGRIN, that are already working to disseminate information on local grains.

Understanding the Market for Local Grains

The market for local grains consists of a small cohort of businesses within several types of grain buyers: millers, bakers, brewers, distillers, and livestock farmers. Some of the momentum for local grains in the milling and baking sectors has been fostered through the New York City Greenmarket system, which requires their bakers to use 15 percent locally-sourced ingredients. Because many bakers reported having difficulty sourcing local grains and flour at the time Greenmarket instituted the rule, Greenmarket began a regional grain initiative to help connect millers to local farms and then bakers to millers.

Currently, Greenmarket publicizes through their regional grain initiative a list of eight mills in the northeast region, including one in the Hudson Valley, Wild Hive Community Grain Project. Each of these mills specializes in small and specialty grains, such as wheat, rye, spelt, emmer, barley, and corn meal. Yet even at their relatively small volumes of production, these mills typically source grains from a broad region to ensure a consistent supply. One of these mills reported using 100 tons of wheat each year, along with much smaller volumes of corn, rye, spelt, and triticale. Just to supply that one mill with wheat would require at least 100 acres of wheat, if produced with organic methods.⁵ Although the production of wheat in the Hudson Valley may come close to the volume needed to supply this one mill, it is not sufficient to supply several mills, plus the other segments of the grain market. Additionally, the mills attending the LEP convening in August, along with Greenmarket, have observed an increased demand for local and specialty grains from the baking sector, which could widen the supply gap between local grain production and the demand among millers and bakers. As more bakers seek local flour, millers will in turn increase their production to meet the demand.

Breweries are another promising market for local grains. There are more than 100 breweries throughout New York State⁶ and their numbers are growing as the national trend toward micro brewing continues and with the 2012 New York State farm brewery legislation, which makes it easier for companies to enter the market. In just the Hudson Valley and surrounding counties, there are more than two dozen breweries. In particular,

⁵ Don Lewis of Wild Hive Community Grain Project provided the yield estimates of 1 acre of wheat production equals roughly one ton of grain production, which yields approximately 1,700 pounds of wheat flour.

⁶ New York State Brewers Association list, available at <http://www.thinknydrinkny.com/breweries.php>

these breweries use barley and malt. They may also use wheat if they are producing a wheat-based beer. Although most of these do not use local grain, a handful of them have tried to source local grains and malt for their beers. One, smaller brewer in the region has indicated they use 600 tons of barley, 200 tons of wheat, and nearly 600 tons of malt each year. According to the USDA, the national average yield for barley is approximately 68 bushels per acre⁷, or just over 3,200 pounds of barley per acre.⁸ In New York State, the yields have been closer to 47 bushels, or 2,256 pounds per acre.⁹ Just to provide the grains used by this one brewer would then require 200 acres of wheat and 532 acres of barley. This does not include the acreage needed to provide malted barley. Even if only a portion of the two dozen nearby breweries used some local grains in their production, they would quickly exhaust the available supply of wheat and would not be able to source much, if any, barley from the Hudson Valley given the very limited production currently.

Farm distilleries throughout the region are another potential market for local grains and have been increasing rapidly in number since the state passed the farm distillery legislation in 2007 requiring half of their ingredients be locally sourced. There are now at least a dozen distilleries in the Hudson Valley and New York metro regions. The most common grains used in distilling are generally corn and rye, although distillers may also use wheat and malt. Though many of these farm distilleries are new and small operations, they generally source their New York State grains from outside the Hudson Valley given the limited production available locally. One distiller offered their annual grain usage for this research report. For their moderate production volume, they utilize more than 100 tons of rye, 400 tons of corn, and nearly 40 tons of wheat. With typical rye yields at two tons per acre in the northeast, it would take at least 50 acres of rye to supply just this one distillery.¹⁰

With the exception of barley, much of these business's individual grain needs could be served by the production of grains in the Hudson Valley. However, aggregating the needs of all buyer types—millers and bakers, brewers, and distillers—it is clear there is much room for added market capture among Hudson Valley farms. The market is more promising as each of these sectors' usage of local and specialty grains is growing as well. Although there are no economic analyses that quantify the growth in the local grain sector in the Hudson Valley and surrounding regions, there are several indicators of its promise, including the rise in farm breweries and distilleries and the usage of local grains among Greenmarket bakers and others, such as Eataly New York. Just these few businesses, when taken together, indicate a small but ready market for local farmers.

⁷ <http://usda01.library.cornell.edu/usda/current/CropProdSu/CropProdSu-01-11-2013.pdf>

⁸ The average weight of a bushel of barley is 48 pounds:

<http://www.unc.edu/~rowlett/units/scales/bushels.html>

⁹ <http://usda01.library.cornell.edu/usda/current/CropProdSu/CropProdSu-01-11-2013.pdf>

¹⁰ <http://www.uvm.edu/vtvegandberry/factsheets/winterrye.html>

Challenges in the Market for Local Grains

The market for local grain is not without its challenges. As discovered during the LEP convening, buyers who process grains for food and beverage products face three main challenges—1) a lack of experience in using specialty grains, 2) issues sourcing grains locally, and 3) needed infrastructure to grow their businesses.

Across all segments of the processing sector, there is a general lack of knowledge and difficulty in adapting to variations in the grain products available from local farms. Bakers, in particular, report they are not sure of which varieties of grain are most suited to their products and baking operations. They therefore are not sure what varieties to source from local mills and farms.

Another issue raised by those in the processing sector during the convening was their ability to source and afford increasing their usage of local grains. Several beverage processors indicated it is time consuming and complicated to source their needed volume of grains from several small producers. They find it difficult to identify farms that employ similar production practices and can offer consistent products. This is an issue because these variations can greatly affect flavor profiles and outcomes in both baking and beverage production. Adding to processors' sourcing difficulties is their fear that the prices for local grains will render their end products cost prohibitive for customers. However, some businesses have discovered that incorporating a percentage of local grains into their products can enhance product flavor and quality, while still keeping prices affordable. Others also report that consumers may be willing to pay a premium for local, heirloom, organic and other high value local grains.

Both food and beverage processors believe that an investment in infrastructure may enable them to more confidently and consistently incorporate more local grains into their products. Among the millers and bakers, there is a desire to test new grain varieties beyond the field. Currently, millers may send flour to a cereal lab to better understand the flour's qualities before incorporating it into their products. Such capacity closer to the region could be an amenity to local millers and bakers. Additionally, at least one local miller indicated there may be opportunity to expand milling equipment and facilities in the Hudson Valley to better take advantage of the increased demand they are seeing from customers.

Beverage processors, both in the beer and distilling sectors, have identified a bottleneck in the local grain supply chain due to a lack of malting capacity. Large commercial malt operations generally are not yet sourcing grains for malting from the Hudson Valley and surrounding regions given the likely mismatch in volume and price. That has opened an opportunity for smaller malt houses in the northeast.

At least seven small malt houses are in operation across New York and near the Hudson Valley: Valley Malt in Hadley, MA; New York Craft Malts in Batavia, NY; Malts of New York in Dryden, NY; Flower City Malt Lab in Rochester, NY; Farmhouse Malts in Newark Valley, NY; Capital Malt in Albany, NY; and Niagara Malt in Cambria, NY. All of these malt houses

are small and therefore target microbrew, nanobrew, and home brew customers. They are also very new operations; the oldest of them is Valley Malt, which began in 2010. Given they are all at the start up stage and are producing very small volumes, the brewers and distillers who operate in or near New York are left without a consistent and large enough supply of local malt. Yet there is no consistent opinion as to whether there is a need for a new malt house in the Hudson Valley to complement these other malt houses. One concern could be that a new, large malt house development would suffer from supply issues and potentially compete with these smaller enterprises around the region. An alternative strategy raised by a participant in the LEP grain convening was to support several small malting operations, rather than focus on one large facility given these potential issues.

Another infrastructure challenge raised by beverage producers is the need for better aggregation of grain products. As they explain, their difficulty sourcing local grains is due in part to the nature of production; it is small in volume and fragmented among a number of farmers. These buyers therefore recommend a facility or business aggregate local grains and market them to the beverage sector. In doing so, this aggregator would save buyers time and therefore cut their costs, but it may also help ensure quality and consistency across various farms.

Addressing Challenges in the Market for Local Grains

Although several challenges hinder the market for specialty grains, a number of businesses remain dedicated to sourcing locally. Investments in training, education, and marketing could assist these businesses in their efforts and potentially expand the market for local grains. As a number of food and beverage processors are unfamiliar with the characteristics of specialty grains, training and education programs could expedite their local sourcing. Among millers and bakers, there is a need to connect grain research trials with processing trials to determine the flavor and other performance indicators of particular varieties. Given the small and motivated cohort of millers and bakers in and near the Hudson Valley, there are likely willing partners for this type of practical research. Their lessons from the milling and baking trials could then be disseminated to others in their sector as well. There may also be an opportunity for a more formal training program subsequently for bakers who are either operating on a commercial scale already or who are enrolled in a culinary program. Such an education program would serve two goals—to train bakers in adapting to specialty grains and to help market local farm products.

GrowNYC, NOFA-NY, and the New York Industrial Retention Network embarked on a project from 2010 to 2012, called Farm-to-Bakery.¹¹ This project aimed to connect local bakers with regionally produced flours. It incorporated baking trials using flours from several regional mills to test the flavor and performance of the local products in a commercial baking setting. Ten bakeries in New York City purchased flour through the program, tested it in their products, and provided feedback to the research team. Many of them reported positive outcomes with the products and a willingness to work with the millers and on their own recipes to better incorporate local flours into their products. This

¹¹ <http://www.grownyc.org/files/gmkt/FarmtoBakeryFinalReportNYSDAMGrant12-15-G-1121.pdf>

past project demonstrates the potential of local baking trials to open the market for local grains. However, it did not include trials of new grain varieties that were specifically produced in the Hudson Valley and did not include newly milled products; rather, the bakers purchased pre-existing flour products from regional mills. A new project that is focused on the Hudson Valley could therefore be modeled on this previous project, but incorporate the use of new grain varieties grown under local conditions, which would deliver particular characteristics in the new flours.

Greenmarket and OGRIN have held educational programs for grain processors to introduce them to regional products.¹² Valley Malt has also organized Farmer Brewer weekend workshops to teach buyers about locally available products.¹³ To date, these have included individual taste-testing events and forums with speakers, but have not been organized into a comprehensive and longer-term educational program for millers, bakers, and beverage producers. With additional planning in conjunction with these stakeholders and additional resources, such a program could offer a larger number of buyers the information they need to source local grains.

The attendance among businesses in the processing sector, including millers, bakers, brewers, distillers, and farmers at the various workshops and events related to regional grain demonstrates the growing community in the field. At the LEP convening in August 2013, participants were able to meet each other and share their knowledge. This experience was a positive one for many of the attendees, who suggested further opportunities to network and collaborate with one another would be valuable to them. Not only would such coordination enable them to learn from each other, but it would also provide marketing channels and supply chain information.

The participants recommended several means for better coordinating with each other. Processors, in particular, indicated there may be an opportunity for either shared purchasing of grain or better consolidation of information about where to source grain, rather than having to buy small amounts from a number of farmers. Others supported the suggestion to form a guild for the various sectors producing and purchasing local grain in the Hudson Valley and New York. Currently, there is a New York State Brewers Association and an informal network among local distillers, but there is no network that attempts to bring these different sectors together, with farmers, to foster communication and the overall growth of the local grain supply chain. A more formal project to do so would likely help catalyze the grain processing sector in the Hudson Valley and surrounding area.

Potential Projects

Numerous recommendations for projects arose in our discussions with experts in the field and during the LEP grain convening. Many of these projects would address the needs identified by farmers and local food businesses along the grain value chain and fall into the four categories outlined earlier in this report: 1) research and information on grains, 2)

¹² <http://www.grownyc.org/files/gmkt/grainsprocessing.pdf>

¹³ <http://valleymalt.com/events/2013/5/12/farmer-brewer-2013>

training and education, 3) infrastructure development, and 4) marketing and coordination. While some of the projects described below are feasible in the short-term, many of the concepts would require further planning and should therefore be considered longer-term strategies for exploration.

1) Research and information on grains

- **Hudson Valley Grain Variety Research & Processing Trials**

Both farmers and food processors indicated a need for better information on the varieties suited to the local climate and to their production needs. Gathering this information would require a dedicated research project, located in the Hudson Valley, to ensure the applicability of the research's results for local producers. Cornell University has a grain variety trial program whereby they select grain types, e.g. wheat or barley, and then several varieties within each type to test their performance in various growing conditions around New York State. These trials offer valuable information to farmers about what to plant, when to harvest, and what their disease resistance, quality characteristics, and yields may be. Bringing a new, comprehensive grain variety trial program to the Hudson Valley would produce much valuable information for farmers and processors.

It is therefore recommended that a new research project be supported to test several varieties of grains. Doing so would require at least a three-year project to account for variations among seasons. It would also require identifying host farms for the research trials. These host farms would set aside a portion of their farm for the variety trials. Typically, these trials require only a small plot for each grain type. However, it is also recommended that trials cover larger plots of land, at one to one and one half acres per variety for a number of varieties. This would enable the trials to have a broader applicability than they usually would because at this larger scale, the grains grown each season could also be evaluated in processing trials by a partner miller and partner baker.

The processing trials would occur each season and would entail identifying a local miller that could accept the grains and would be willing to work with the researchers to record their experience. Additionally, a baker would then have to be enlisted to conduct a baking trial to test the flour and record their trial outcomes. It is also possible that a local brewer or distiller would be interested in a processing trial, in which case the size of the plot would have to be considered such that the harvest could supply both types of processing trials.

- **Develop research facilities for test baking, grain & flour testing**

At least one baker and one miller working with local grains suggested during the LEP convening that the region would benefit from research facilities for baking and flour testing. Given the potential scale of this development project, it may be prudent to

begin with the variety trials and processing trials and then assess the need for more infrastructure development to test local grain products and their performance.

2) Training and education

- **Training programs for millers and bakers**

As we learned from millers and bakers alike, working with local grains can be a challenge if the processor has no previous experience. Although some have successfully incorporated local grains into their products, there is a need to expand the market through education and training for millers and bakers. Two potential models for exploration were suggested for delivering this type of training.

The first model is a training program geared toward bakers such as the model organized previously by OGRIN and GrowNYC. In the past example, OGRIN and GrowNYC identified a commercial bakery willing to host the training in their kitchen. They then identify a baker instructor who has experience in working with local grains, but also has superior general baking skills and some experience teaching. As Elizabeth Dyck of OGRIN reported, Stefan Senders of Wide Awake Bakery (Trumansburg, NY), the baker-instructor for these baking short courses, believes much of the skill required to successfully bake with local grains harkens to best baking practices. To bring the program to the Hudson Valley would require identifying a host bakery and partnering with a local organization to conduct outreach to enroll interested students.

The second training option for bakers suggested during our research would follow a train-the-trainer model. In this program, existing commercial bakers and future commercial bakers would be targeted in a “boot camp” or other style short course hosted by a culinary school. First, baking instructors would undergo training about working with local grains and then would be enlisted to assist in creating an enrichment course to accompany the culinary school’s existing baking curriculum. If the course were part of the continuing education curriculum, then existing commercial bakers might be targeted. Alternatively, if the course were part of the degree program at the culinary school, then future commercial bakers would be targeted. As part of the training, existing experts in the field could be invited as guest lecturers.

- **Mentorship and Training Program for Farmers**

The research project for variety trials described above is expected to produce information valuable for years to come for farmers seeking to transition to grains in the Hudson Valley. However, where the research falls short is in providing farmers with customized information to assist them in planning production of grain on their own farms and trouble-shooting along the way. There is therefore a need for more customized training for farmers in the Hudson Valley. One model suggested by attendees at the convening would be a mentorship program that pairs aspiring grain farmers—whether established or new farmers—with more experienced grain farmers.

To date, no such program exists in the Hudson Valley that could be modeled and it would therefore have to be newly designed, with some research into other mentorship programs required. Given the small cohort of farms currently in the Hudson Valley who are interested in grain, the program would likely begin small, with only two to three farms chosen to be mentored annually. As a new model, the program could be evaluated after the first two seasons to determine its effectiveness.

3) Infrastructure development

- **Fund shared equipment for small farms' grain cleaning**
Because grain farm equipment is specialized and expensive, it is one of the main barriers to entry for farmers. One potential means for addressing this challenge would be to fund the purchase of grain cleaning equipment that would be stationed at a centrally located farm and made available on a fee-for-service basis to small farms. This project would require someone, a farmer or an organization, to lead the development of the project. Additionally, sufficient demand for this program would have to be demonstrated before investment in the equipment.
- **Finance equipment for individual grain farmers**
Farms that are larger and well established, but need equipment to increase their grain production, may require some financing for equipment. The type of financing could vary, from low interest loans to equipment leases.
- **Fund equipment design and production through an educational institution**
As appropriately-scaled equipment for small and medium grain farms is difficult to source domestically, there is a need for retrofitting services and design information to assist farmers in building equipment. One suggestion raised in the LEP grain convening was to fund an engineering school and an agricultural school to partner on creating open source designs that could be utilized by farmers wishing to create their own equipment.
- **Develop an aggregation & processing facility**
Several of the grain processors who attended the LEP grain convening indicated a need for easier access to local grains through an aggregation site, which would alleviate the burden they face in sourcing from multiple suppliers. Such a centralized aggregation and processing facility could be developed in conjunction with existing sites and businesses, however, to date there are no plans for such a facility in the Hudson Valley being explored currently.
- **Finance malting facility expansion**
There is widespread consensus among brewers that the lack of malting capacity is a main barrier to their use of local grains. To fill this gap in the supply chain, several malting facilities have been developed or are in development within a day's drive from the Hudson Valley. Although their capacity is still limited, the rapid growth of

these small ventures indicates there are entrepreneurs prepared to meet this market need. Given they are very new, it is not clear if they will require additional capital for development or if there is a need for capacity in the Hudson Valley specifically. It is therefore recommended support for the malting sector be explored in collaboration with existing facilities and in the longer-term.

4) Marketing and coordination

- **New York Grain Guild**

One recommendation offered during the grain convening and supported by both farmers and processors was to form a grain guild. The guild would aim to better network actors along the supply chain, help processors coordinate buying and identify local grain producers, and provide a forum for information sharing and networking. Although the guild could be headquartered in the Hudson Valley and focused there, it should target businesses from New York City and nearby areas as well to maximize the breadth of the program, given the currently small grain community locally. Doing so would also increase the amount of valuable information available to local businesses.

The guild's activities could include establishing an online website and/or listserv for member communication; collecting and disseminating information on events, publications, or projects; focus on equipment sourcing and maintenance issues; and establishing a buying club for seed. The guild could also partner with existing programs and organizations on events and workshops. It would require a host organization to dedicate a staff person to operate and market the program to ensure its continued relevance and effectiveness.