

Building Successful Microenterprises
Using Locally Grown Grains:

CASE STUDY: SMALL VALLEY MILLING

Winter 2015



Photos: J. Russell/CrowNYC.

Small Valley Milling

The evolution of a grain-processing facility on a family farm



GrowNYC and the Organic Growers' Research and Information-Sharing Network (OGRIN) collaborated to create research-based case studies that share best practices of regional grain producing and processing enterprises with entrepreneurs who seek to join this growing economy. This case study was made possible with funding from the United States Department of Agriculture Rural Development's Rural Microentrepreneur Assistance Program. To read additional case studies, visit gownyc.org/grains and ogrin.org.



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Photo: J. Russell/GrowNYC

Above Eric Steigman climbing a grain storage bin.

Cover Small Valley Milling's dehulling and milling facility outside Harrisburg, Pennsylvania.

Among the pioneers who are recreating a viable food grain system in the Northeast is the Steigman family. Joel and Elaine Steigman and their son Eric, who grow grain crops on 350 acres in central Pennsylvania, have over the last 15 years built **Small Valley Milling** into a dehulling and flour milling facility that markets to bakeries, food stores and food processors throughout the Northeast. Their experience and insights provide practical guidance for those starting up grain processing businesses. Their story also exemplifies how on-farm processing can be used to help Northeastern family farms survive and prosper.

THE STEIGMAN FAMILY FARM

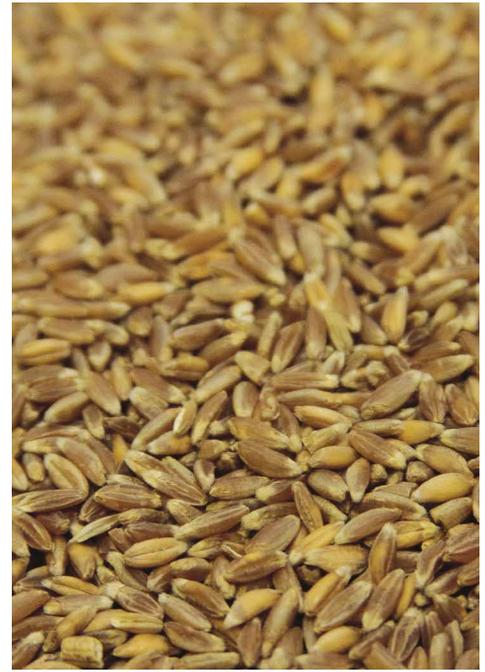
THE STEIGMAN FAMILY FARM IS situated about 25 miles north of Harrisburg, PA, in a locality known as Small Valley, which has a gentle topography and silt loam soils suitable for grain production. Since the 1970s, they have been raising crops (predominantly hay and corn) and livestock on land that has gradually expanded from 80 to 350 acres. However, for many years, Joel and Elaine provided the bulk of family income by working off farm. Joel used his welding and mechanical skills in a variety of jobs from truck driving to carpentry to contracting while Elaine worked as a registered nurse.

When Joel decided to devote himself to farming full-time in the 1990s, he realized they were going to

have to take a different approach if the farm was to survive and thrive. Instead of competing in the commodity market, which favors large-scale production, the Steigmans undertook a series of steps to add value to their farm products, including converting to organic production, growing grains with high market potential, processing the grains on farm, and marketing their grain products themselves.

This value-added approach required a team effort. In 2009, after 36 years of nursing, Elaine retired to help Joel with the farm business. Around that time, their son Eric, who found his work in "corporate ag" unfulfilling, came back to the farm to work with his parents.





Above left Vigorous spring growth of fall-planted spelt.

Above center An immature emmer seed head.

Above right Dehulled emmer.

THE STEIGMANS' APPROACH TO ADDING VALUE TO GRAINS

Converting to organic farming

The Steigmans consider the most critical step in their quest for sustainability their transition in 1997 to organic farming. According to Joel, the conversion to organic has had several benefits: providing a price premium for their grains and hay; farming in a more healthful way both for themselves and the environment; and joining a community of farms, businesses, and organizations in which information on production and marketing is readily shared.

Growing high-value specialty crops

In the late 1990s, the Steigmans, who had grown wheat in the past, switched to spelt as a valued-added grain. Spelt, which is closely related to common wheat (they are both subspecies of *Triticum aestivum*), is in demand by consumers as a grain that is more easily digested than common wheat. It also has a distinctive flavor, which the Steigmans characterize as “sweeter, nuttier” than wheat. Their customers use spelt flour to make bread, pasta, crackers, and snack foods like pretzels, and also eat it as a whole cooked grain. Spelt also has an agronomic advantage: Joel finds winter spelt to be harder than winter wheat and less susceptible to diseases—thus less risky to raise in the humid growing conditions in the Northeast. The Steigmans currently grow between 60 and 80 acres of the spelt variety Maverick in rotation with hay and corn.

The market for emmer started building when American chefs discovered its distinctive flavor when prepared as a cooked grain or as pasta. Often referred to

as farro, emmer also has market appeal as an “ancient” grain. Domesticated around 10,000 years ago, it is a precursor of both common and durum wheat. Because emmer is typically planted in the spring, in contrast to fall-planted spelt, the Steigmans saw it as an opportunity to diversify and strengthen the farm’s rotation. By 2013, the Steigmans had expanded emmer production to 30 acres. They grow Lucille, a variety of emmer developed from landraces brought to the Northern Plains region by German and Russian emigrants in the late nineteenth century.

Contracting with growers

The Steigmans soon discovered the market for spelt was greater than their capacity to produce it and began to buy grain from other organic farmers. To keep quality high and maintain a consistent product, they source seed of the Maverick variety for growers and provide them with information on spelt management—from planting through harvest. They inspect all incoming spelt seed lots, checking to make sure the grain is clean and of high quality. They also test for vomitoxin, a toxic substance that can be present in spelt and other grains infected by the fungal pathogen *Fusarium graminearum*. Currently the Steigmans are working with 15 farmers to produce spelt. Now that the market for emmer products is also growing, they are sourcing additional emmer from one farmer.



Photo: J Russell/GrowNYC

Above The roller mill under construction.

Developing dehulling capacity

A peculiarity of spelt led directly to one of the Steigmans' processing enterprises. Spelt, unlike common wheat, is a hulled grain (as is emmer). With hulled grains, the kernel does not thresh free of its hull in the combine. An additional step, involving specialized equipment, is required to separate the spelt kernel from its hull, which is essential if spelt is to be used for human consumption. Dehulling enterprises are rare in the U.S., and were nonexistent in their region when the Steigmans began growing spelt. Instead of shipping their spelt to the Midwest (where the closest available facility was located) to be dehulled, the Steigmans set up their own dehulling facility in 2001.

The Steigmans started going to farm sales and auctions in search of dehulling equipment. About 90% of their equipment has been purchased at going-out-of-business sales. For example, they picked up several key pieces of equipment, including a Roskamp oat dehuller and a destoner, at the auction following the close of the grain-processing facility of the original Walnut Acres company. Additional critical components of their dehulling system include a vintage wooden air-screen grain

cleaner (to clean debris from the spelt before it enters the dehuller), an aspirator (which uses an airstream to separate the light, empty hulls from the heavier grain as these materials exit the dehuller), and a paddy table (used to separate dehulled grain from that which is still in the hull). Both the cleaner and the paddy table were purchased as used equipment.

The family also built a structure to hold the dehulling operation, relying primarily on their own labor and welding and construction skills. The original building footprint was 1,200 square feet with ceilings as high as 23 feet. (Later a second story and an additional structure were built to accommodate the milling facility and other upgrades.)

Once the processing operation was up and running, the business steadily grew. After dehulling with the Roskamp dehuller for six years, the Steigmans upgraded to a Codema impact dehuller—one of the few new pieces of equipment they've purchased. The Codema increased their dehulling capacity from about 500 to 3,000 pounds of grain per hour. (They still recommend the Roskamp dehuller for small-scale, general-purpose use.) They now dehull approximately 30,000 bushels of grain a year.



Milling: From stone milling to roller milling

The Steigmans began milling flour in 2001, the same year they purchased a Lee 12-inch stone mill from the Walnut Acres auction. They had been producing small batches of whole stone-ground flour but noticed a growing demand for white spelt flour. White flour is made with a roller mill rather than a stone mill, because roller milling produces a better extraction rate of white flour from the grain and results in fewer large particles. The rising demand was driven by bakeries seeking white flour for making bread, pastries and crackers, and to a large extent by customers in New York and New Jersey who wanted white spelt flour to make matzoh for the kosher market.

It was an opportunity the Steigmans would not let pass. Lacking their own roller mill, they outsourced the processing to a nearby mill, which milled and packaged their white spelt flour with the Small Valley Milling label. The arrangement worked well for 13 years, a crucial time of market growth during which they built the Small Valley brand. Eventually the Steigmans couldn't justify the cost and time of hauling grain to the mill and then returning to pick up the flour. After closely examining the numbers, Eric confirmed they would save time and money by setting up a roller mill and milling their own grains.

In 2005, the Steigmans began building and assembling the infrastructure and equipment needed for a

roller mill. Facing a capital investment this large and an engineering project this complex, they decided to work with an engineer rather than design it themselves, as they had the dehulling facility. They again purchased mainly used equipment to assemble the roller mill, substantially reducing costs. For example, they bought four used Allis-Chalmers roll stands—which cost around \$100,000 each new—for a total of \$32,000.

In the final stage of mill construction, the Steigmans hired outside help, primarily for the complex electrical work needed. The facility was built with three-phase wiring and a 220-volt feed. For the scale of equipment that they are using, this leads to greater energy efficiency. They honed their roller-milling skills with the help of a retired miller who used to be employed at one of the now-defunct, large-scale mills in their region.

Small Valley Milling began production and sale of whole and white spelt and emmer flour in 2013. They still use their Lee mill for orders of whole wheat and rye flour that are 200 pounds or less. This gives them flexibility with their customers, allowing them to produce small orders with a quick turnaround, as well as larger orders that are shipped out by the pallet load. Elaine says for customers who want to try small bags of 5 to 20 pounds, she can grind and ship the flour to them in two days.

Below, clockwise from left Joel Steigman with the Codema impact dehuller; the impact mechanism; grain from the dehuller before aspiration and separation.



Photos: J Russell/CrowNYC





Photos: J. Russell/GrowNYC

Above top Joel Steigman with his daughter, selling Small Valley products at a trade show.

Above bottom Joel and Elaine Steigman handing out Small Valley samples at the 2012 Pennsylvania Association for Sustainable Agriculture Conference.

Acquiring other essential equipment for grain processing

The Steigmans purchased a Perten grain quality analyzer to conduct NIRS (Near Infrared Spectroscopy) tests on protein, ash and moisture content. The NIRS data allows them to monitor the consistency and quality of their products. Other pieces of equipment were installed for safety and to improve quality. Dust collection is an important investment as scale increases. Eric fabricated rare earth magnets to collect metal at various points in the process. Purchased from a commercial source, the magnets retail for approximately \$4,000. Custom fabricated, they cost about \$1,000. As the business has grown, the Steigmans have added grain bins as needed. They now have 10 storage bins with a total capacity of 30,000 bushels of grain, and recently bought an 11th bin that can hold an additional 30,000 bushels.

The Steigmans continue to closely monitor farm journals and websites for used grain equipment. Despite how far they have come, Joel says there is always more that can be done.

Marketing strategy

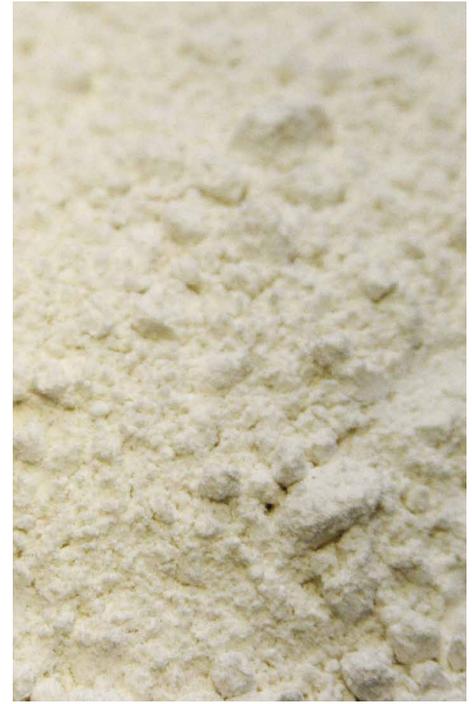
Small Valley's business model relies on moving large volumes wholesale; their only retail outlet is their website and an occasional pop-up stand at conferences and other events. About 95 percent of their products are sold wholesale—both directly to large customers such as bakeries, millers and other food processors, and through distributors who deliver to supermarkets, food coops, buying clubs, and CSAs. The Steigmans have also worked with rabbis to sell to the kosher market. Some of these customers package and sell the Steigmans' spelt and emmer products under their own brands.

The Steigmans say they prefer to market directly, rather than through distributors, to avoid price mark-ups to consumers and to capture the full value of their products. Additionally, they worry about loss of control over product quality since whole grains, and especially whole flour, have limited shelf life.

Through smallvalleymilling.com, customers can buy spelt and emmer berries, or spelt and emmer flour, in bags of 2, 5, 25 or 50 pounds. Retail pricing includes the costs of organic production, processing, and packaging, and reflects the value consumers place on spelt and emmer as rare specialty grains. Current retail prices can be found on the Small Valley Milling website.

The Steigmans find customers through diverse means, but a primary strategy has been to cultivate the connections they've made as long-time farmers and members of the organic/sustainable community. They collaborate extensively with state and regional educational and research organizations, presenting at field days, workshops, and consumer preference tastings. Through these channels they not only disseminate information on organic production and grain processing, but they gain exposure for their business and products. They also exhibit at food fairs, festivals, and expos geared towards businesses and consumers interested in health foods, specialty products and local foods. In addition to the website, which has earned them customers within and beyond the Northeast region, Elaine Steigman maintains an active Facebook page filled with spelt and emmer recipes.





Photos: J Russell/GrowNYC (left); S. Blondin/Sheri Blondin Photography

Above left Two of the four Allis-Chalmers roll stands.

Above right White spelt flour.

KEY FACTORS IN THE ENTERPRISE'S SUCCESS

AS WITH ANY ENTERPRISE, THERE are multiple reasons for the successful development of Small Valley Milling, including the Steigmans' work ethic and drive. However, certain factors appear to have been critical in the development of their business:

- **Well-balanced skills and strong working relationships among family members** The family works as a team, each contributing unique strengths. Joel has an affinity for mechanics and construction; Eric has a mind for numbers and is also very skilled at mechanics and construction; Elaine focuses on the packaging, marketing, quality control, and customer service.
- **A sound, diversified farming system** Their rotation is based on an orchard grass/alfalfa hay crop that helps maintain soil fertility, reduces the risk of disease, helps suppress weeds—and is sold as a cash crop. Corn and beef cattle production further diversify the farm's products and contribute to farm income.
- **Low-input specialty crops** The Steigmans have chosen specialty grain crops, spelt and emmer, which require fewer inputs than wheat or corn, thus decreasing production costs and increasing profitability.
- **Low start-up and development costs** The Steigmans have kept development costs low by doing the bulk of needed infrastructure construction themselves, buying used equipment, and reconditioning and adapting that equipment as needed.
- **A step-wise approach to enterprise development** The family has grown their business in stages, which has allowed them to self-finance much of their enterprise development. Once the dehulling facility was up and running, they had product to sell. They then plowed the revenue back into construction and assembly of the mill.
- **Off-farm sources used to meet demand and capture markets as needed** Buying from other growers has allowed them to keep pace with demand for spelt without overburdening their rotation. Moreover, the Steigmans didn't wait to start selling flour until their mill facility was completed. By contracting out the milling of their grain and selling flour under their label, the Steigmans developed a strong customer base among bakers and food processors. That customer base then gave them the funds and incentive to build their own mill. In every instance of outsourcing the family maintains full control over production quality.
- **Filling a market niche** The Steigmans developed the first, and so far only, commercial-scale dehulling operation in Pennsylvania, allowing them to capture a significant portion of the growing market for spelt and emmer products in the Northeast.



Emphasize quality

When the Steigmans discuss their operation, a recurring theme is the importance of product quality. They have added value to their products in multiple ways: by growing organically, raising specialty crops that appeal to health- and taste-conscious consumers, and processing and marketing these crops themselves. Eric Steigman stresses that all this value can be lost—and the market for locally/regionally grown grain severely damaged—if they don't maintain high quality at every step, from planting and harvesting the grain through storage, grain cleaning and processing. This is why the Steigmans do the following:

- Source high-quality seed to plant despite its expense.
- Prioritize farming (rather than processing and marketing) during the growing season to ensure timely field operations.
- Practice strict hygiene and use nontoxic, organic pest control measures to maintain good storage conditions.
- Ensure clean, sound product by sending grain through multiple pieces of cleaning equipment, including an air-screen cleaner, aspirator, separator, and magnets.

The Steigmans have also begun experimenting with methods of preserving product quality even after it has left their facility, e.g., through vacuum packaging and the use of inert gas in packaging.

Below Spelt ready for harvest.

Be prepared to invest time and capital

The Steigmans point out that a commitment to high quality requires “skin in the game”—an investment in good farming practices, equipment, and infrastructure—whatever the scale of the enterprise. Those without a farm background who want to raise and process grain will need to get experience in grain farming before entering the market. Commercial grain production will require some level of mechanization, at minimum adequate seeding, harvesting, and cleaning equipment. Infrastructure, including storage and processing facilities, will need to be located and refurbished or built from scratch, keeping in mind state and federal regulations. Buying used rather than new equipment saves money, but such equipment takes time and effort to source and usually must be repaired or adapted before it can do the job required.

The Steigmans believe great opportunities exist for on-farm grain processing enterprises, but they stress that it is hard work—and requires a financial commitment—to get such an enterprise up and running, make it profitable, and provide consumers with consistently high-quality products. Elaine also strongly advises creating long-term goals and growth projections at the initial stage of business development, explaining that the Steigmans' somewhat unplanned and improvised development has now put them in a difficult position of having to reconcile their faster-than-expected growth with their goals and present capacity.

SMALL VALLEY MILLING AS A MODEL FOR ON-FARM GRAIN PROCESSING

THE STEIGMANS ARE MODEST ABOUT their success. Joel, Elaine, and Eric wryly recall mistakes made and point out the many years it has taken for them to get where they are today. They also stress that the scale at which they are working and high degree of mechanization they use will not be suited to everyone. Nevertheless, the Steigmans' adherence to sound farming practices, “do-it-ourselves” approach, incremental development of their enterprise, and commitment to product quality are principles that can help guide Northeastern farmers in developing successful grain-processing enterprises.



Photo: J. Russell/CrowNYC.

Small Valley Milling

Facts and Figures

Start-up Costs*

The Steigmans built their dehulling and milling facility gradually over a period of 20 years, for an estimated total of \$550,000—a fraction of what it would have cost had they not done much of the design, construction and equipment maintenance themselves. To capture the different phases of business development, the costs are divided into \$150,000 for the dehulling operation and \$400,000 for the milling facility. The costs include new and used equipment, electrical installation, consultation from a milling engineer, and building construction.

• Dehulling

- **Total:** \$150,000
- Initial small-scale investment: \$15,000-\$30,000
- Subsequent large-scale investment: \$135,000

• Milling

- **Total:** \$400,000
- Initial small-scale investment in stone mill: \$15,000
- Subsequent large-scale investment in roller mill: \$385,000

Equipment & Costs*

• Dehulling

- Initial investment
 - Oat dehuller (Roskamp): \$5,000 used
 - Aspirator: \$5,000 used
 - Air-screen cleaner: \$300
- Upgrade to greater dehulling capacity
 - Impact dehuller (Codema): \$20,000 new
 - Aspirator: \$6,000-\$16,000 used, depending on condition and features
 - Paddy table: \$15,000 used

• Milling

- Initial investment in stone mill
 - 12-inch Lee stone mill: \$15,300 used
 - Box sifter: \$1,000 used
- Upgrade to roller mill
 - 4 Allis-Chalmers roll stands: \$32,000 used
 - Sifter: \$35,000 used
 - Pneumatic belt system for moving the grain: \$100,000

• Additional Equipment

- **Total:** \$50,000
- Perten Grain Analyzing equipment
- Bagging machine
- Weigh scales
- Label Maker
- Custom magnets for cleaning
- Storage bins

Products

- Organic Emmer Flour
- Organic Emmer Kernels
- Organic Pastry Flour
- Organic Spelt Kernels
- Organic White Spelt Flour
- Organic Whole Spelt Flour
- Organic Whole Wheat Flour
- Organic Purple Corn Kernels

Prices

See smallvalleymilling.com

Production Volume

2013:

- De-hulling 30,000 bushels of grain per year.
- Roller milling 22,500 bushels per year
- Stone milling 7,500 bushels per year

Buildings

- **Main facility:**
 - Original structure 1,120 square feet with ceiling heights ranging from 17 to 23 feet.
 - Building additions to accommodate roller mill and other upgrades, started in 2011
 - Two-story structure: lower level of 1,320 square feet and upper level of 1,000 square feet, each with 17-foot ceilings.
 - Additional 100 square feet for office and testing lab.
- **Storage:** 11 bins with total capacity of 60,000 bushels of grain.

Utilities

- **Type:** Three-phase with a 220-volt feed
- **Usage:** 6,500-7,000 kWh monthly

Staff

- 3 full-time
- 1 part-time

Licenses

- Registered as a food processor with the Federal Food and Drug Administration
- Registered as a food processor with the Pennsylvania Dept. of Agriculture.
- Certified Organic with Pennsylvania Certified Organic

Insurance

\$25,000 annually for farm, truck, house, mill, liability

Markets Accessed

- Wholesale, direct to customer, approx. 95% of sales:
 - Bakeries
 - Other millers
 - Other food processors
 - Kosher market for matzoh
- Wholesale, through distributors
 - Bakeries
 - Food co-ops
 - Buying clubs
 - CSAs
- Online retail sales direct to customer

*All figures are estimates due to price fluctuations for new and used equipment. In addition, equipment must comply with OSHA guidelines, found at osha.gov, and current food safety regulations, which were under revision at the time of publication and can be found at fda.gov.

For more resources, please visit ogrin.org and grownyc.org/grains.



GREENMARKET'S REGIONAL GRAINS PROJECT



OGRIN

GrowNYC is a hands-on environmental nonprofit whose goal is to help you make New York City the most sustainable and livable city in the world. More gardens, greenmarkets, more recycling, and education for all.

A GrowNYC initiative, the Greenmarket Regional Grains Project fosters a thriving regional grain economy within the local food system, beginning with our network of growers and customers and extending to any farmer, entrepreneur or retailer contributing to its growth throughout the Northeast.

Visit grownyc.org/grains to learn more.

The Organic Growers' Research and Information-Sharing Network (OGRIN) generates practical information for organic farmers and gardeners through farmer participatory research, review articles and fact sheets on issues critical to organic farming, and by providing forums for information-exchange between growers.

Visit ogrin.org to learn more.



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