

# Local Heritage Flours for Bakeries in Central Virginia

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## 1 Introduction

People all over the world are rediscovering the benefits of local heritage food. Local food is more nutritious and tastes better because of its freshness, compared with that undergoing long travel distances from the origin of production to supermarket shelves and long shelf life. Purchasing local food supports local economy and local farmers, because it removes unnecessary middlemen and a larger portion of the food dollars goes directly to farmers. It establishes a bond with local farmers based on understanding and trust, the foundation of strong communities. Buying locally grown also reduces fuel consumption and global warming pollution associated with food transportation, and requires less packaging, thus it is environmentally sustainable in the long run [Local Harvest, Inc., DoSomething.org, FoodRoutes.org]. Besides, it enhances biodiversity, which "may hold the technical and cultural keys for resilience - resilience that will enable us to feed ourselves, to heal ourselves, and as our planet is increasingly resource-stressed to survive" [Denckla Cobb, 2011. pp. 171]. It is not surprising that more and more farmers and food purchasing public are joining Community Supported Agriculture (CSA), and selling/buying in local

farmers' markets, as well as through various other direct marketing channels.

However, heritage food processing, as an integral component of a local food system, has not been given sufficient attention. One example is Virginia peanuts grown in the Tidewater region of Virginia, instead of being processed locally, are shipped to Florida for further processing and canning, which is unsustainable from both an economic point of view and an environmental perspective. Local food processing is important, because value is added to a food product, thus food dollars are kept circulating in local communities, enabling the farmers to capture a larger share of the value of their products; it generates local employment opportunities and leads to enlargement of the local tax base and economic development. Again, through local food processing, the environmental impact involved in transporting food raw materials thousands of miles for processing is reduced. Furthermore, with specialized and differentiated food processing, small farms and small processing firms gain competitive advantages over large, industrial-style processing facilities [Danielson and Park, 2001].

This paper concerns the use of local heritage flours for bakeries in central Virginia. In Section 2, two case studies are described: *Wheatberry Bakery & Café* in Amherst, Massachusetts and *the North Carolina Organic Bread Wheat Flour Project*. They provide success models that may be copied and implemented in Central Virginia. In Section 3, the existing conditions and challenges facing the use of local heritage flours for baking purposes are identified. Policy recommendations are proposed in Section 4 for its implementation in the Thomas Jefferson Planning District.

## 2 Case Studies

### 2.1 Wheatberry Bakery & Café in Amherst, Massachusetts

*Wheatberry Bakery & Café*, located in Amherst, Massachusetts, is a family owned and operated organic bakery store, specialized in baking organic artisan bread, scones and muffins, and serving soups, salads, and sandwiches [Wheatberry Bakery & Café]. Founders of Wheatberry, Ben and Adrie Lester, are committed to sustainable resource usage and are enthusiastic supporters of local heritage food. They are selling bread they have baked and vegetables they have grown. Other foods they do not grow but served in the store are made with organic raw ingredients, such as cheese, honey, eggs, herbal teas and coffee, from community-supported agriculture programs and other locals. In fact, more than 90 percent of the vegetables are certified organic, and 100 percent of the meats and cheeses served are organic [Bush, 2011]. Even their mugs are made with local materials in the glaze.

The store was established in 2005 when the Lesters shifted their Wheatberry business from farmers' markets and wholesale to street-front retail store [Mayer, 2008]. It became a quick success, and they were awarded "The Young Entrepreneurs of the Year" award by the Small Business Administration in 2008 [Wheatberry Bakery & Café].

Wheatberry specializes in grain growing, milling, and bakery. In the first few years of Wheatberry, the key ingredient of its bakery products, flour, was produced in the Midwest thousands of miles away. Skyrocketing commodity crop prices during 2007 and in early

2008 triggered the surge in the cost of flour. And the Lesters started the search for grains that are locally grown. They began by partnering with the New England Small Farm Institute to experiment growing grains in the area at their own 4.5-acre Wheatberry Farm in Shutesbury, MA. In addition, grains are purchased from Lazy Acres Farm in Hadley, MA and Uppingill Farm in Gill, MA, both local grain growers. It was estimated that 10 percent of the grains used for bakery in Wheatberry were locally grown in 2010, and the number is expected to rise due to high demand and increasing local supply [Koenig, 2010], [Wheatberry Bakery & Café].

A distinguishing feature of *Wheatberry Bakery & Café* from most organic local bakeries is the on-site self-service grain milling in the café's kitchen, where an electric mill was installed in 2010. Besides milling grains for their own bakery products, the Lesters have encouraged community residents to bring in their own grains to mill in the bakery.

In 2009, the Lesters created the *Pioneer Valley Heritage Grain Community Supported Agriculture* program (in collaboration with three other local grain growers), which is the region's first grain CSA. Compared with vegetable and meat CSA programs, which have become very popular over the past few years nationwide, the grain CSA program "offers the community a rare chance to get in touch with its own grain" [Bush, 2011]. There were 119 members in 2009, and the number of the grain CSA members has been increasing each year. CSA participants pick up their entire share once a year in December, including two bushels made up of 8-10 different locally grown organic heritage grain crops. A full share in 2012 costs \$375 and a half share \$225. The heritage grains include heirloom wheats, corns, beans, rye, spelt, emmer, and barley. They are provided unmilled

for keeping quality. CSA members can then choose to mill their grains at Wheatberry Bakery or to purchase home sized mills. *Wheatberry Bakery & Café* provides milling services to its CSA members for free, and brand name mills are also available for sale at the store [Pioneer Valley Heritage Grain CSA].

The Wheatberry business has created local jobs. There are now four employees, but once there were eleven in 2007, due to the growth of demand in both wholesale and retail. New bakers were trained and the backing procedures were streamlined to maximize efficiency. However, the couple downsized their wholesale business because they do not want to turn their business into an industrial-style factory [Mayer, 2008].

The driving force behind the establishment of *Wheatberry Bakery & Café* and the Wheatberry Farm in Shutesbury, MA, as well as the creation of *the Pioneer Valley Heritage Grain CSA* is a sustainability perspective in community development, which has also been the momentum driving the local food movement for the past decade. With such a perspective, business decision-making is not solely based on financial considerations. Although it is still less expensive to purchase wheat from large, mechanized Midwestern wheat-producing states, the increasing consumer demand and strong support from community members for local food have kept businesses like Wheatberry alive and thriving. Local heritage food as a means to community development has led to the creation of local jobs, buying locally grown, and better stewardship of farmland. It also keeps the community strong and creative, e.g., the implementation of a heritage grain CSA.

## 2.2 North Carolina Organic Bread Flour Project

The skyrocketing price of wheat from the Great Plains states in 2008 motivated the formation of *the North Carolina Organic Bread Flour Project* [Bread Flour Project]. The organizers of the project include coordinator Jennifer Lapidus and seven other local bakeries. The project "aims to link the farmer, the baker, and the miller in North Carolina with the goal of providing a viable market for organic hard and soft wheat and other small grains" [Bread Flour Project]. It is an initiative of the Carolina Farm Stewardship Association, and has been supported financially by several foundations (the North Carolina Tobacco Trust Fund, Santa Fe Natural Tobacco, and the Golden Leaf Foundation).

In collaborations with NC State University, the North Carolina Organic Grain Project, and USDA/ARS, the project participants receive testing samples of local wheat. A small-scale mill was set up at one of the bakeries' location to produce fresh, stone ground whole grain and sifted flours. The participating bakeries would then evaluate and provide feedback on the baking performance and taste of the milled flour to the farmers such that they can plant wheat of great interest to bakeries. They also meet regularly to exchange ideas and thoughts, sponsor bread festivals and local wheat workshops, and for fund raising.

To secure a viable market for local grain growers, the project participants also forged relationships with other grain users, including miso companies, brewers, malthouses, and distilleries. They also help farms to obtain grants supporting on-site seed-cleaners, which will increase the farmers' product values and enlarge their client pool.

The project brought many benefits including wheat price control, availability of locally

sourced organic wheat for bakers, and a viable, higher-yield rotation crop for farmers, as well as local food security [NC Organic Bread Flour Project].

## **3 Existing Conditions and Challenges**

### **3.1 Wheat Classes**

Wheat is classified according to the type of wheat grown and its intended end-use (bread, cakes, cookies, etc.). Wheat classes are also determined by hardness, color, and shape of the kernel. Each class shares similar family characteristics in terms of milling, baking, and food-use qualities [Thomason *et al.*, 2009]. Major wheat classes include hard red winter wheat (HRWW), soft red winter wheat (SRWW), hard red spring wheat, durum, hard white wheat, and soft white wheat [Wheat classes]. Generally speaking, hard wheat (bread wheat) has a higher protein content, and is suitable for baking bread. Soft wheat has high yield with low protein content, and makes good cakes, pastries, etc.

HRWW is the dominant class of wheat produced each year in the United States. It is mainly produced in the semi-arid Great Plains states, extending from the Mississippi River west to the Rocky Mountains and from Canada to Mexico. It has a wide range of protein content, and good milling and baking characteristics. HRWW is mainly used to produce bread, rolls and, and all-purpose flour. SRWW is grown primarily east of the Mississippi River with high yielding but relatively low protein content. It is used for flat breads, cakes, pastries, and crackers. Hard red spring wheat is grown in Montana, North

Dakota, South Dakota and Minnesota. It contains the highest percentage of protein, and is thus an excellent bread wheat with superior milling and baking characteristics. Hard white wheat has a milder, sweeter flavor, equal fiber and similar milling and baking properties as HRWW, and is used mainly in yeast breads, hard rolls, bulgur, tortillas and oriental noodles. Soft white wheat, similar to SRWW, is used for bakery products other than bread, such as cakes, crackers, muffins, cookies). It is grown mainly in the Pacific Northwest, California, Michigan, Wisconsin and New York [Thomason *et al.*, 2009], [Wheat classes].

### **3.2 Existing Conditions in Central Virginia**

Bread is one of the oldest and commonly prepared foods, and almost everyone eats it on a daily basis. There is always a need for processed grain foods such as bread, made from hard wheat (bread wheat). However, the climate in the mid-Atlantic region, including Virginia, is characterized by high humidity and moderate temperatures. Such a climate is suitable for planting soft red winter wheat (SRWW), which contains low to medium protein content, used for bakery products other than bread. In fact, SRWW is the dominant wheat class grown in Virginia [Wheat growing regions]. Therefore, the demand for bread wheat used for bakeries are currently not met by local wheat growers, but met mainly by regional mills through importing almost exclusively from the Great Plains states.

The market of bread wheat exists and will continue to expand with the demand for more food from an increasing population. Regional grain growers are interested in bread wheat because it usually has a higher value than soft wheat. Millers are interested in



locally-grown bread wheat, for the reason that costs associated with fuel and transportation would be greatly reduced if it can be purchased locally for milling. Local bakeries are also interested in bread wheat (local heritage flours) because of a surge in customers' demand for local food. A bread is not called locally made simply because it is baked by a local bakery. All of the ingredients have to be grown locally or purchased from local growers, e.g., *Wheatberry Bakery & Café*. And the flour used is the most essential ingredient.

Furthermore, there is a concern with regard to food security and sustainability. Currently the overdependence of bread wheat in Central Virginia on import from Midwestern states (the Great Plains states, as well as Montana, North Dakota, and South Dakota) is not sustainable. Increasing global food demands, volatile fuel prices, and the shift from grain to corn production for ethanol all have significant impact on the price of wheat and that of flour [Bread Flour Project]. The skyrocketing wheat price in 2008 had already taught us a lesson on this. The loss of biodiversity and possible crop failures in these bread wheat growing regions, as well as speculations in global wheat market, pose other serious issues on food security in Central Virginia.

Building a regional bread wheat economy, separate from the highly-speculative and uncertain wheat market is an option to address these issues.

### **3.3 Challenges**

Using local wheat for bakeries in Central Virginia faces several challenges.

First, the climate conditions of high humidity and medium temperature in Central Vir-

ginia are not favoring bread wheat growing. To address this issue, new cultivars need to be developed or existing cultivars need to be adapted to local conditions in order to produce wheat for bread baking. The new cultivars should have the desired properties of high protein content, high yield, and good bread baking performance, along with others specified in terms of disease/insect resistance, height, and weight. The North Carolina Organic Bread Flour Project [Bread Flour Project] and *the Little Red Hen's Wheat Patch Project* sponsored by Hungry Ghost Bread in Northhampton, MA [Hungry Ghost Bread] have set good examples in finding varieties of wheat and other grains that grow well locally. In particular, participants of the Wheat Patch Project are Hungry Ghost Bread's customers who have a small amount of garden space. They receive a specific variety of wheat seed with simple instructions and advice to grow the seeds in their garden plots of different conditions and soils. Local college students would collect scientific data on the progress of the growing wheat. The kinds of wheat best adapted to local conditions are identified, and larger local farms are then enlisted to begin growing locally sustainable wheat. The risk a farmer takes in developing a new crop is greatly reduced by this means.

Second, even with locally adapted bread wheat cultivars available, farmers may not want to grow them unless there is a strong and consistent demand. Although more and more individual customers are demanding local, a market for local wheat need to be created to sustain the locally grown. The North Carolina Organic Bread Flour Project offers a good example in this regard. In addition, grain CSA projects have emerged as a creative approach to secure a market for local wheat. The *Wheatberry Bakery & Café* case study with its *Pioneer Valley Organic Grain CSA* [Pioneer Valley Heritage Grain CSA] provides

good reference on this.

Third, local facilities are in general not available for grain cleaning, storage, and milling into flours. There are historical reasons for this [Milling]. Stone milling and locally grown wheat were once popular throughout America. In 1880's, the wheat grown in Great Plains states achieved great economic success in sheer volume produced as well as in the transformation of milling technology from stone milling to roller milling. Germ was completely removed in the roller milled product, resulting in refined endosperm flour that was whiter and had an appealing texture. The East and West could not compete with the Great Plains in production level, and the softer wheat did not mill as well with roller mills, leading to the instant abandonment of stone mills all over the Western world and the centralization of the milling and growing of wheat in the Great Plains.

Fourth, existing millers may not want to mill local wheat due to financial considerations. It is expected that local wheat initiatives, at least in the first a few years, will yield wheat at a substantially higher price than import. The wheat grown at the Wheatberry Farm in Shutesbury, MA costs as much as twice that of the import. How to mitigate this cost, and whether individual customers are willing to pay extra for local bread are to be investigated.

Last but not least, the color and taste of bread baked from local wheat may be different from the currently available. Will customers be willing to buy local bread? In the Organic Bread Flour Project, bakers, millers, and farmers are working together closely to identify wheat cultivars that are not only suited to local conditions but also taste well, by evaluating their baking performance and providing feedback whenever sample wheat is available.

## 4 Policy Recommendations

A number of recommendations for policy makers in the Thomas Jefferson Planning District (including Albemarle County, Greene County, Louisa County, Nelson County, Fluvanna County, and City of Charlottesville) are proposed as follows, which upon adoption and implementation are expected to promote the use of local heritage flours for bakeries in this area.

- 1. To promote local grain growing in this district, the five-county and city governments should encourage research & development to identify local heritage cultivars (both SRWW and HRWW), establish local grain production guidelines, and offer tax benefits to grain growers.**

Technical and financial assistance may be sought from federal and state government agencies, such as USDA Agricultural Research Services, Virginia Department of Agriculture and Customer Services, research institutions, such as the University of Virginia, Virginia Tech, Virginia Cooperative Extension, and other research foundations. The developed grain cultivars should be adapted to local climate conditions with desired characteristics such as disease resistance, good baking performance after milled to flours, etc. In fact, in as early as 2002, the USDA/ARS launched a program to identify and breed wheat having bread wheat quality for production in the humid environments of the eastern U.S.. Varieties and advanced breeding lines were obtained from breeders in the Great Plains and tested in Eastern states including Virginia.

A grain production guideline tailored to the planning district should be developed and distributed to interested local grain growers, providing detailed instructions on production management (seeding, fertilization, harvesting, storage), soil and weed management, and disease/insect control. In this regard, the *North Carolina Organic Grain Production Guide* provides a good reference [Grain Production Guide], and the publication [Thomason *et al.*, 2009] by Virginia Cooperative Extension may be used as a starting point. The tax benefits offered to grain growers may mitigate the initial high cost associated with their development of local grains. Furthermore, a project similar to the Wheat Patch Project [Hungry Ghost Bread] may be implemented to help identify suitable local wheat cultivars and reduce the risk taken by large grain growers in developing new cultivars.

- 2. To secure a stable and consistent local grain market, the five-county and city governments should initialize and/or support local food programs, such as grain CSA, local food hub, farmers' markets, etc. and track existing food programs to identify weak points for potential improvement regarding local wheat and bakery.**

Such an effort will close the loop among local grain growers, millers, bakers and individual customers. A grain CSA program currently does not exist in this district, but exists elsewhere nationwide, e.g. [Pioneer Valley Heritage Grain CSA]. It contributes to sustainable community development and local food security. Grain growers should be encouraged to initialize grain CSA or integrate local wheat to their

existing CSA lists.

- 3. For local grain marketing, the five-county and city governments should consider developing educational and flour sample testing programs targeting millers, bakers, and the general public focusing on local wheat benefits and local/home baking guides.**

Educational materials regarding nutritional, economic, and environmental benefits of local wheat and wheat products may be developed and distributed at major local grocery retail stores, farmers' market, food festivals, etc., to raise the awareness of local wheat in the general public. Sample flours milled from local wheat may be provided for bakeries and interested individuals for testing and collecting feedback. Recipes and instructions on preparing local wheat products may be prepared in collaboration with millers and bakers, and improved upon receipt of feedback from customers.

- 4. To improve local infrastructure for grain cleaning, storage, and milling, business owners' access to capital should be increased through low interest/interest-free loans, tax reductions, and free training, etc.**

The various benefits of local grains cannot be realized unless local facilities for cleaning, storage, and milling are readily available. As the price of local wheat may not be able to compete with the imports, at least in the near future, millers may not be willing to purchase local wheat for milling. The five-county and city governments should make arrangements to provide incentives in the form of loans, tax reductions, etc., for millers who choose to mill local wheats. On the other hand, on-site grain clean-

ing and storage facilities will add values to the grain growers' products. Hence, the governments should support increased access to capital by the farmers. Milling services may also be provided by bakeries and grain CSA organizers [Pioneer Valley Heritage Grain CSA].

- 5. To facilitate the production of local wheat bakery products, the five-county and city governments should consider collaborations with local community colleges in developing degree/certificate programs, workshops, credit/non-credit courses in bakery, and in the creation of entrepreneurial projects in local food processing. Small bakery businesses should be encouraged to use ingredients from local sources**

Educational programs are essential in generating skilled workforce, in establishing entrepreneurial networks, in aiding in success/efficiency of existing food processing facilities, and in providing knowledge base in initial small business start-ups. Local community colleges play an important role in developing local food systems [IGEN, 2009]. And degree and certificate programs in bakery and other food processing techniques have been developed elsewhere in the country [Alfred State College, Southern State Community College]. In the planning district, workforce development may be implemented in collaboration with PVCC's workforce services customized training, CATEC's high school program in culinary arts, and Virginia Cooperative Extension.

- 6. To facilitate the sales of local wheat bakery products, the five-county and city**

**governments should build connections and promote cooperations between local retailers, restaurants, and bakeries, and provide tax benefits for retailers and restaurants carrying bakery products made from local ingredients.**

## **5 Conclusions**

This paper focuses on the topic of local heritage flours for bakeries in Central Virginia. The benefits of local heritage food system and food processing techniques are reviewed. Two case studies, i.e., *Wheatberry Bakery & Café* and *the North Carolina Organic Bread Flour Project* are described. Existing conditions in Central Virginia in terms of the local climate characteristics, current wheat classes, and the challenges facing the planning district in creating a local grain economy are discussed. Drawing on the successful experience from the two case studies, several policy recommendations are proposed in the hope of promoting the use of local heritage flours for bakeries in this area.



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