The way of wheat

Although wheat farming in Eastern Washington started in earnest in the 1880s, it wasn’t until 1958 that the state’s farmers saw the need for individuals to pool their resources to support the industry. That year, farmers created the Washington Grain Commission and voted to tax themselves on each bushel of wheat produced in the state. In the last five years, the WGC has devoted more than $26 million to wheat research, marketing and education.

The importance of wheat

There is more land planted to wheat in the world than any other crop. It provides 20 percent of the world’s caloric consumption, and for the world’s poorest 50 percent, 20 percent of their protein consumption too.

In Washington, for every dollar of income generated by wheat farming, 51 cents is earned by businesses that support farmers. Match that with the value of off-farm purchases by farmers and their employees and each wheat farming dollar generates an additional 98 cents of economic activity, much of it in rural areas where agriculture serves as a crucial anchor of small towns and regional economies. Eastern Washington’s 3,715 wheat farmers support another 3,406 off-farm jobs through the businesses that serve them. An additional 4,013 jobs are sustained by the personal spending of farmers, their families and employees for a total of 11,133 jobs that depend upon the state’s wheat crop.

Top Five Farm Products

1. Apples ....................... $2.2 Billion
2. Milk ........................... $1.3 Billion
3. Wheat .......................... $1.0 Billion
4. Potatoes ....................... $792 Million
5. Cattle & Calves ............... $702 Million
The civilizing influence of wheat

Trade, money, engineering and biotechnology—all the ingredients needed to produce civilization started from the desire to grow grain. There's archeological evidence our ancestors were farming as early as 10,000 years ago in an area that is now Turkey. Even earlier than that, perhaps 20,000 years ago during periods of scarce game, we began eating the seeds out of the heads of wild wheat relatives. Grinding wheat between two rocks to produce flour began about 6,000 years ago. Thanks to wheat, hunter-gatherers were able to cease their endless roaming for food and created villages, towns and the first nation-states.

The evolution of wheat

One of the earliest cultivated forms of wheat, Einkorn has 14 chromosomes. Emmer wheat, a later relative, has 28 chromosomes. Scientists believe emmer wheat crossed with a weed—jointed goatgrass—to create modern wheat's 42 chromosome structure, including its unique gluten genes.

Biotechnology and wheat

There are no GMO (Genetically Modified Organisms) wheat varieties today, but an array of university researchers and private companies are working to develop the next generation of seed to feed the future. The vanguard of this effort could be on the market in less than a decade, which is important because in the next 30 years, two billion people will be added to the planet along with the need to feed them. Norman Borlaug, father of the Green Revolution and winner of the 1970 Nobel Peace Prize said, “If the naysayers do manage to stop agricultural biotechnology, they might actually precipitate the famines and the crisis of global biodiversity they have been predicting for nearly 40 years.”

Wheat goes to boot camp

It takes upwards of 10 years for a wheat variety to move through the gauntlet of obstacles between the first cross to commercial production. During that time breeders observe and evaluate the performance of the variety in the field and test its quality in the lab. Because environment plays such a large role in wheat performance, it is important to measure each potential variety, called a line, across a number of years and a wide geographical region. In Eastern Washington wheat country precipitation can vary from as little as 8 inches to as much as 25 inches annually. When a breeder feels his line has met the challenges arrayed against it, he enters it into Washington State University’s Variety Testing Trials. There, the line spends three more years proving itself against dozens of other lines, hoping to make it across the finish line and become a “named” variety.
Putting the \textbf{eat} in wheat

There are many specialized blends of flour on the market. In general terms, however, flour comes in two types: refined and whole grain. Refined flour is made up of the wheat kernel’s \textit{endosperm} and does not include the \textit{bran} or \textit{germ}. Whole wheat flour includes the endosperm, bran and the germ. In research studies, whole wheat is associated with: \textbf{reduced risk of chronic diseases like diabetes and cancer, reduced risk of obesity, and better weight control.}

About 1 in 141 people—less than 1 percent of the U.S. population—suffers from Celiac disease, an autoimmune disease caused by a reaction to gluten protein found in wheat. Another 0.5 percent of the population suffers from non-celiac gluten sensitivity and about the same percentage have a wheat allergy. For those few, eating wheat is unsafe. But for 98 percent of the U.S. population, products made from wheat flour are a nutritious and healthy food choice. What’s more, according to \textit{Consumer Reports}, switching to a gluten-free diet may actually be harmful due to the extra fat, sugar and sodium added to products to compensate for their lack of taste and texture. Not to mention, many gluten-free foods are not enriched or fortified with essential nutrients such as folic acid and iron. The National Foundation for Celiac Awareness says, “eliminating gluten when people do not have a medical necessity for doing so is unwarranted.” Gluten-free products are definitely damaging to consumers’ pocketbooks, costing upwards of three times more than traditional wheat-based alternatives.

\textbf{A week of wheat}

To inform future consumers about the benefits of wheat, the Washington Grain Commission funds Wheat Week, an educational program taught in elementary schools across Washington. The week long program teaches fourth and fifth graders the parts of the wheat kernel: bran, germ and endosperm, and the nutritious value of each while emphasizing the role of whole grain wheat in a well-balanced diet.

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\textbf{ONE BUSHEL:}

—Weighs about 60 pounds and yields about 42 pounds of white flour, or around 60 pounds of whole wheat flour
—Makes 90 one-pound loaves of whole wheat bread
—Fills 53 boxes of cereal
—Makes 72 pounds of flour tortillas
—Bakes into 200 sponge cakes
—Makes 5,000 four-inch cookies
—Rolls into 420 three-ounce cinnamon buns
—Earned US farmers an average of $7.77 in 2013

---

\textbf{Dear Washington Wheat Farmers,}
Thank you so much for the wheat that goes into lots of food I eat. At school we did a thing called “Wheat Week” at Wheat Week I learned about conservation to conserve you hill rows,

\textit{Sincere,}
\textit{Son} \\
\textit{Savannah, WA}

---

\textbf{Dear Washington Wheat Farmers,}
During Wheat Week I got to learn about the parts of a wheat kernel. I would like to make and learn more about wheat. Thank you so much for your wheat and I really enjoy eating it. 

\textit{Sincerely,}
\textit{Son} \\
\textit{Savannah, WA}

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\textbf{Dear Washington Wheat Farmers,}
This Wheat Week I liked how we got to see how wheat grows. I also learned how you guys plant wheat. My favorite Wheat food is bread. Thank you for your wheat!

\textit{Sincerely,}
\textit{Son} \\
\textit{Savannah, WA}
The six types of wheat

There are six market classes of wheat in the U.S., each with properties that millers and bakers use for specific products. **Hard wheat**, like hard red winter grown predominantly in the Midwest, is recognized as a bread wheat. **Soft white wheat**, grown in the Northwest with a smattering of production in Michigan and New York, is recognized for its superior cookie and cracker performance in this country and steam breads, sponge cakes and noodles overseas. **Durum wheat**, grown mostly in North Dakota, is used to make pastas.

**Home of soft white wheat**

Although wheat is also grown on the west side of the state, the majority of farms are concentrated east of the Cascade mountains. Eastern Washington farmers predominantly grow two kinds of soft white wheat. **Common** varieties have elongated heads. About 80 percent of Washington’s soft white crop in any year is planted to common varieties.

**Club** wheat migrated to the Northwest from South America and before that, Spain. It is even softer than soft white and has a unique compact head shape. Certain countries, especially Japan, buy club wheat in a 10 to 20 percent blend with common varieties creating the Western White wheat blend.

Wheat is a type of grass and Eastern Washington’s cool nights and warm days are ideal for its production. Kansas is known as the wheat state with farmers there normally producing more wheat than any other state. Measured on a per acre basis, however, **Washington’s 10-year average of 60.8 bushels** is nearly double Kansas’ per acre production.
A river of wheat

Farmers in wheat growing areas of the country served only by the railroad are called “captive shippers” because they have no other way to get their wheat to market and transportation prices are correspondingly high. Washington farmers aren’t captive because of the 360-mile long Snake/Columbia River system between Lewiston, Idaho and Portland, Oregon. Barge traffic on the river is the most efficient—and cleanest—form of transportation available. A tug pushing barges can haul a ton of wheat 524 miles on a single gallon of fuel, compared to 202 miles by rail and 59 miles by truck. And tugs have one-third the emissions of rail and one-twentieth the emissions of truck, per ton-mile. An average of 60 percent of Washington wheat moves by barge to Portland. Two companies, Tidewater and Shaver, compete for farmers’ barging business.

Top Ten Wheat-Producing Countries 2014/15

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<tr>
<td>10</td>
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*Projected

Wheat that makes waves

In 2013/2014 the United States exported nearly 1.2 billion bushels of wheat to 67 countries around the world. That’s almost 50 percent of the wheat produced in America. About 40 percent of U.S. wheat is exported from seven ports located in Washington and Oregon. Cargo ships known as bulk freighters transport 2.4 million bushels of wheat at a time to quality conscious customers in Asia, Latin America and North Africa. Smaller shipments of wheat leave the country in containers, those steel boxes used to transport goods around the world. Although a container only holds about 750 bushels of wheat, some buyers prefer smaller quantities of the highest quality wheat for specialized uses. Other millers in remote locations use containers because they also serve as convenient storage facilities.

Bells, whistles and wheat

BNSF, which dominates the rail shipping needs of Washington wheat farmers, has turned to shuttle train loading facilities as a more efficient method to move grain as inexpensively as possible. These facilities are set up to load 110 cars in 15 hours or less, and they move to market as a unit. Washington has two shuttle loading facilities with another currently under construction. BNSF boasts a network of 233 shuttle loaders across the U.S., a 200 percent increase since 2000. Union Pacific, the other Class I railroad operating in Washington, does not have access to a shuttle train loading facility.
Dryland farms—Farms that depend on rain or snow for moisture. Most wheat farms in Washington are dryland.

Summer fallow—Land in the intermediate to dryer areas that is rested for a year to allow moisture to accumulate before planting.

Annual cropping—Land in higher precipitation regions planted yearly, usually in a rotation with other crops.

Lodging—The word farmers and researchers use to describe wheat that has fallen over due to root disease or weather or both.

Soft or hard—Refers to the density of the wheat kernel.

Bran—The fiber rich outer layer of the kernel included in whole wheat products.

Endosperm—The part of a seed that serves as the food source for the developing plant embryo, contains starch with protein and other vitamins and minerals.

Germ—The part of the seed that will germinate.

Refined flour—Flour made up of the wheat kernel's endosperm.

All-purpose flour—A combination of hard and soft wheat with the strength and tenderness that can be used to make everything from quick breads to delicate cakes.

Bleached flour—Any refined flour with a whitening/aging agent added.

Whole wheat flour—Includes all parts of the wheat kernel—bran, germ and endosperm—shown to be particularly healthful.

Enriched flour—Flour with specific nutrients returned to it that were lost while being milled. Restored nutrients include folic acid, riboflavin, niacin, thiamine and iron.

Gluten—A protein in wheat, barley and rye that is formed from two proteins—gliadin and glutenin—when water is added. Provides elasticity to dough and is essential for allowing bread to rise.

Head—The top portion of the wheat plant where seeds develop. Other portions of the plant: stem, leaves, crown and roots.

Washington Grain Commission (WGC) www.wawg/wgc.com
WGC is a Spokane-based state agency created by wheat farmers in 1958 as the Washington Wheat Commission. The name was changed to the WGC when barley was brought under the organization’s auspices in 2009. Ten members (seven farmers, two industry representatives and a WSDA official, sit on the board.

Washington Association of Wheat Growers (WAWG) www.wawg/wgc.com
WAWG is an association of the state’s wheat farmers working to improve Washington’s wheat industry. WAWG is active in legislative efforts on the state and national level and helps to administer wheat industry programs funded by the WGC.

Wheat Life www.WheatLife.org
Wheat Life is a monthly magazine of the Washington Association of Wheat Growers which chronicles the agricultural, political and cultural life of farmers, their landlords, agricultural businesses and other links in the grain chain. Past issues can be found online at WheatLife.org.

National Association of Wheat Growers (NAWG) www.wheatworld.org
A grassroots organization representing wheat farmers in 25 wheat producing states, including Washington, NAWG is active in lobbying for strong U.S. wheat and agricultural policies.

Washington State University (WSU) www.wsu.edu
A land grant institution established under the Morrill Act of 1862 and signed by Abraham Lincoln, WSU was founded in Pullman in 1890. It is responsible for much of the state’s wheat research and breeding.

Agricultural Research Service (ARS) www.ars.usda.gov
The ARS is an agency of the U.S. Department of Agriculture. In the Northwest, the ARS is based on WSU’s Pullman campus. In addition to breeding club wheat, ARS scientists research regional disease and pest issues of wheat.

Wheat Marketing Center, Inc. (WMC) www.wmcinc.org
Through on-site research working hand-in-hand with international cooperators, the Portland-based WMC aims to increase U.S. wheat in foods around the world.

U.S. Wheat Associates (USW) www.uswheat.org
The export arm of the American wheat farmer, USW promotes U.S. wheat through funding provided by wheat farmers across the nation, including Washington, and federal funding through the Market Access Program and Foreign Market Development program.

Washington Wheat Foundation (WWF) www.wawheat.org
The WWF advances the small grain industry by building support through programs, activities and research that advances the industry and increases public awareness.

Wheat Foods Council (WFC) www.wheatfoods.org
The WFC is a partnership of wheat farmers, millers, bakers and end use manufacturers dedicated to increasing domestic consumption of wheat-based foods through information, education and promotion programs. Gluten facts can be found on the WFC website.

Washington State Department of Agriculture (WSDA) http://agr.wa.gov
The WSDA is a state agency headquartered in Olympia. It has employees in every county in the state carrying out activities that support farmers, distributors and consumers of Washington’s food and agricultural products. The federal government has authorized the WSDA to inspect grains for export through its Grain Inspection Program.

Home Baking Association (HBA) www.homebaking.org
HBA is a non-profit organization with the mission of growing the practice of home baking by sharing tools and knowledge with current bakers as well as future generations.