



CHALLENGES AND OPPORTUNITIES FOR THE U.S. WHEAT INDUSTRY

WORLD PERSPECTIVES, INC.

Presented to:

Jim Palmer, CEO
National Association of Wheat Growers
Tel: (202) 547-7800 x1
Email: jpalmer@wheatworld.org

Presented by:

Gary Blumenthal
President and CEO
World Perspectives, Inc.
1301 Pennsylvania Ave., NW
Suite 501
Washington, DC 20004
Tel: (202) 785-3345
Email: gblumenthal@agrilink.com

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Executive Summary

The core objective of this synoptic evaluation is to ascertain the challenges currently facing the U.S. wheat industry, and then counter those challenges with industry examples and background information that highlights potential opportunities for further strengthening wheat's competitive position. The intent is to initiate and facilitate a more complete discussion about the needs and potential benefits of increasing investments on behalf of the U.S. wheat industry.

This report highlights several challenges confronting the industry. These include:

- **Production:** Harvested acreage and production of wheat have been in relative decline.
- **Competition:** By contrast, there is new competition in the global wheat market from the Black Sea region, and production is expanding in countries that have not been major wheat suppliers.
- **Consumption:** Meanwhile, after being hammered by the Atkins diet, the so-called “Wheat Belly” and now the gluten craze, U.S. per capita wheat flour consumption has been declining for over two decades.
- **Alternatives:** The gluten-free trend has been growing for a decade, and while it may be reaching its peak, it has sparked consumer interest in alternatives to wheat in their baked goods including amaranth, buckwheat, chia, quinoa, sorghum, millet, flax, rye, spelt and teff, plus pulses such as pea flour.
- **Profitability:** All of the above constrain the profitability of wheat farmers when compared to other crop options. Comparing net returns per acre for wheat, corn and soybeans over the two previous production seasons (see table below), in no part of the country was wheat the most profitable crop to grow. Moreover, 80 percent of the times when a crop was grown at a financial loss, it involved wheat.

Net Returns by Crop and Production Region														
	United States		Northern Great Plains (NE, ND, SD, MT, WY)		Prairie Gateway (OK, KS, TX, CO, NE)		Basin and Range (NM, CO, UT, NV)		Fruitful Rim (WA, OR, ID, CA)		Northern Crescent (New England, NY, MI, WI)		Heartland (IL, IN, MO, OH, IA)	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Wheat	40.7	-25.4	18.8	-1.2	46.2	-60.6	47.4	22.4	63.3	7.0	129.2	58.6	40.0	-0.9
Corn	149.0	46.7	129.3	53.1	271.2	49.3	129.3	-65.2	163.6	70.0	74.6	111.3	359.1	61.2
Soybeans	159.2	72.6	159.6	129.7	220.1	118.5	143.6	29.2	47.1	141.3	226.2	85.6	178.5	56.6
	Key:		Most profitable		Second most profitable		Least profitable		Produced at a loss					

Source: USDA

- **Trade Policy:** Over half of U.S. wheat is exported, and yet the global market is increasingly complex and requires all industries to expend more resources to stay ahead of it.
- **Free Riders:** Unequal sharing of the financial burden of advancing the industry's goals.

- **Political Stature:** Less importance in the policymaking sphere compared to commodities that have national programs overseen by USDA.

There are also identified opportunities for the wheat sector to improve its position in the marketplace. These include:

- **Productivity:** Wheat has had lower yield gains than other commodities, but raising research expenditures can help wheat catch up.
- **Demand:** World wheat demand and trade are forecast to grow as once-poor parts of the globe grow both more populous and richer.
- **Marketing:** Taking advantage of growing consumer interest in healthfulness, natural, non-GMO and non-traditional baked goods (flat breads, wraps, etc.) through improved marketing. Product marketers advise that the image of wheat in the U.S. may be turned around with the expenditure of \$30 to \$40 million a year for two to three years.
- **Positive ROI:** Commodity groups spend on research and promotion because they deliver back to farmers a very positive return on investment. The wheat growers' effort via the U.S. Wheat Associates is amongst the most rewarded of any commodity effort. Increased export promotion expenditures and work on trade policy challenges would likely improve the producers' bottom line.
- **Perfect Competition:** After adjusting for quality and location, price is about the same for all wheat but more can be done with marketing to differentiate U.S. wheat quality (class, grade, uses).
- **Proof:** Commodities as disparate as almonds, pork, cotton, peanuts and avocados have proven that when a commodity group pools its resources and hones a strategy, it can overcome the challenges.

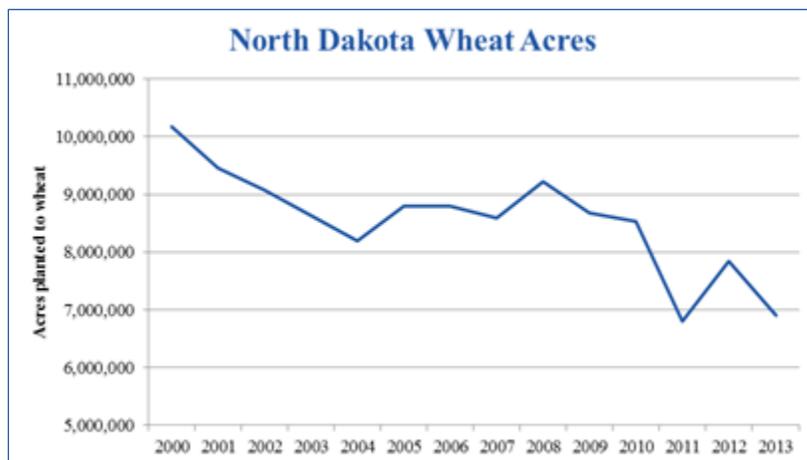
Challenges Facing the U.S. Wheat Industry

The U.S. wheat industry currently confronts a myriad of challenges. These include the following:

1. Lower profitability (net return per acre) than competing crops.
2. Lack of significant productivity gains (yields, reduced inputs, etc.).
3. Attacks on the healthfulness of wheat-based products (e.g. the gluten issue).
4. Global competition that is capturing increased market share.
5. Impending opportunity cost as world demand grows but U.S. production stalls.
6. Free riders, as growers in some states pay more money and growers in others states pay nothing to support the research and promotion that is needed to enhance the industry's competitive position.
7. Loss and lack of stature in Washington, DC versus other crops that have expanded production and introduced federally-administered programs.

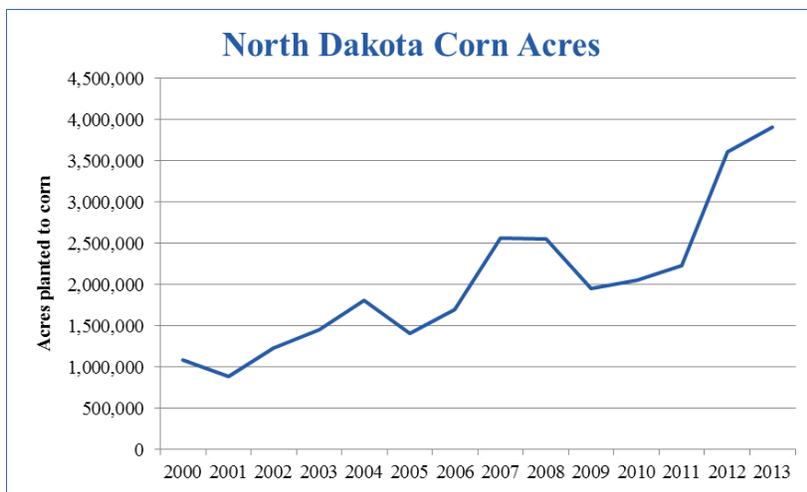
Unfortunate Forecast

The most glaring challenge to U.S. wheat farmers, and the one quite visible at the farmer level, is the loss of acreage to competing crops. An example is found in North Dakota, a major wheat-producing state. Note the decrease in wheat acres over the past decade-plus:

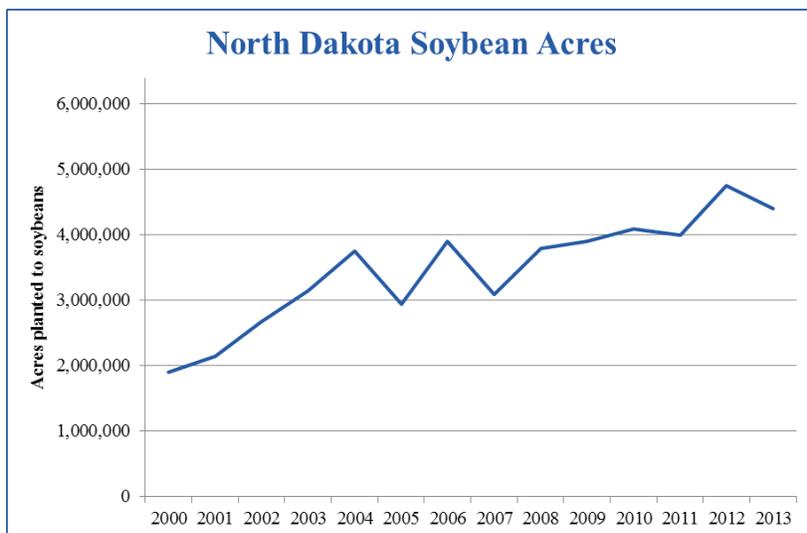


Source: USDA/NASS

Now compare the above chart and its steadily downward trend with the following two charts depicting corn and soybean acres in North Dakota over the same time series.

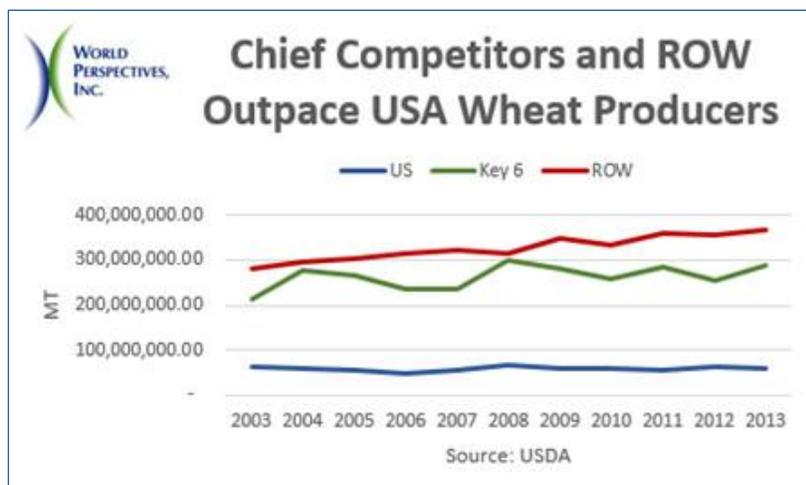


Source: USDA/NASS



Source: USDA/NASS

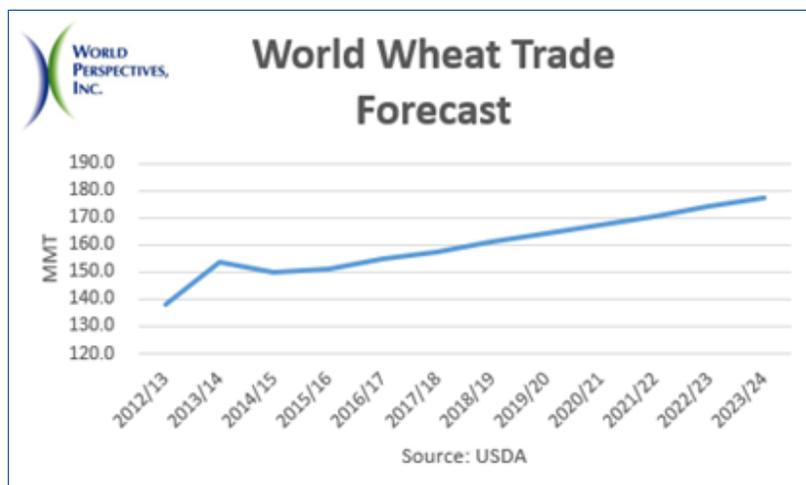
The situation is clear – wheat is losing ground to corn and soybeans in North Dakota. This scenario is repeating itself throughout major wheat producing states in the U.S. Further, U.S. wheat producers are not just losing ground to American soybeans and corn. They are failing to keep up with wheat producers around the world. As the graph below depicts, U.S. wheat production over the past decade has been flat at best. By contrast, production in six key producing countries (Argentina, Australia, Canada, EU, Russia and Ukraine) plus production in the rest of the world has all been trending higher.



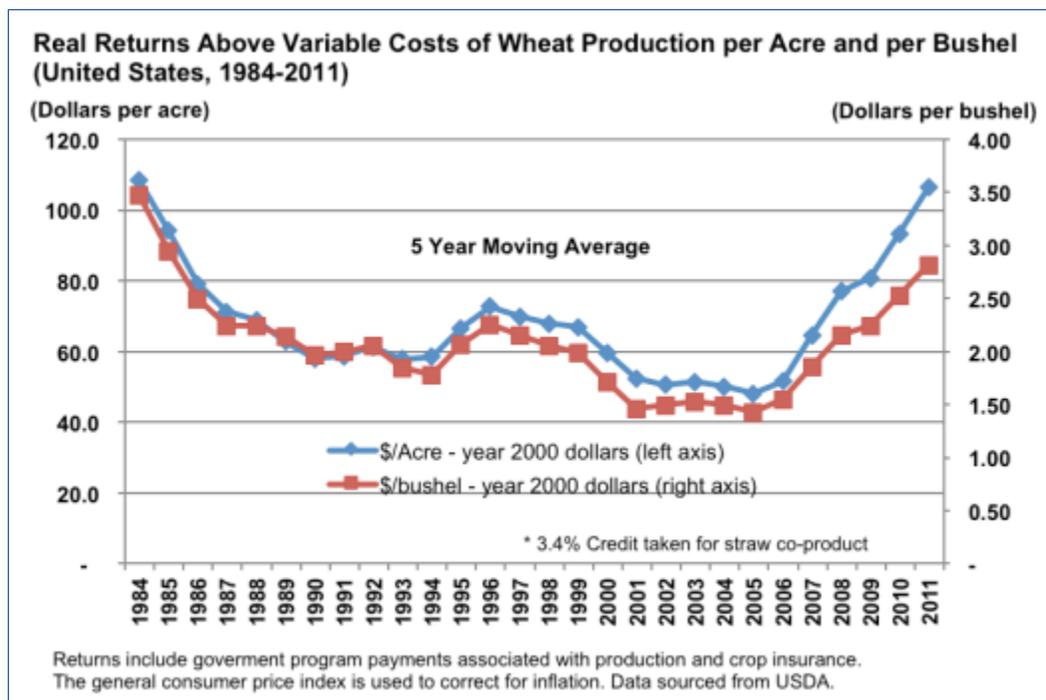
The result of these trends has been a loss in world market share by American wheat producers. As the graph below shows, U.S. share of global wheat production fell from 11.39 percent in 2003 to 8.11 percent in 2013. By contrast, the share produced by six key competitors increased from 38.17 percent to 40.18 percent, and that produced by the rest of the world increased from 50.41 percent to 51.68 percent.



This decline is occurring at the same time that world demand is forecast to expand (see graph below).



Some might argue that global market share is not that important. However, it should be noted that U.S. growers are dependent on the export market for consumption of *half* of their production. And while net returns have been good for some U.S. wheat production areas, especially the Northern Crescent (MN, WI, MI), they can run negative in the Prairie Gateway (KS, NE, CO, TX, OK) and Northern Great Plains (ND, SD, WY, MT). Moreover, even those areas that have done well through the recent bull market run must be on guard; markets are cyclical and FAPRI has just forecast an impending bear market for grains.



Source: FAPRI

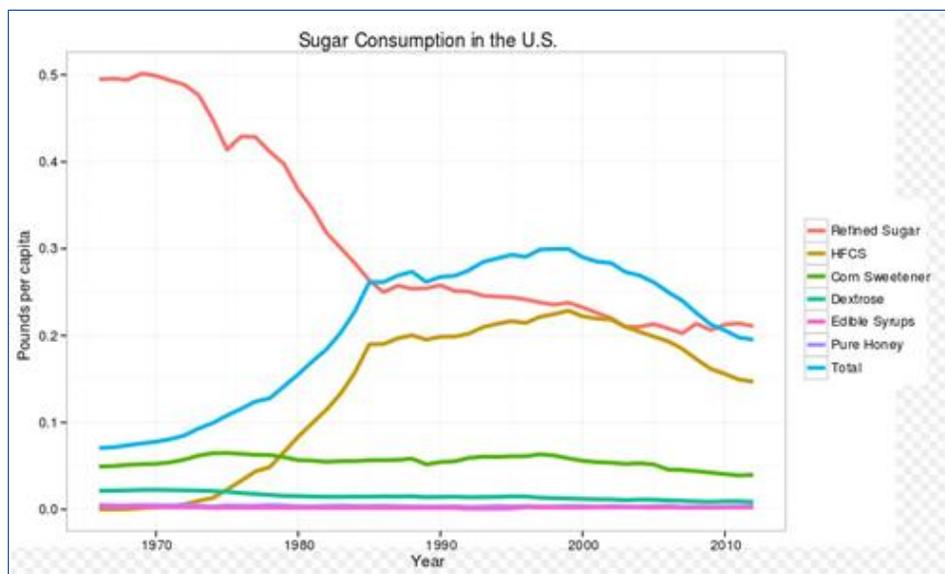
The Gluten Issue: Driven by Misinformed Consumers

It is worth delving into another very clear challenge to the wheat industry that is not centered on supply, demand, crop prices, etc. The anti-gluten movement that has arisen in recent years is not based on sound science. This is clear when analyzing data regarding legitimate gluten intolerance conditions among U.S. consumers: according to health industry experts, approximately one percent of Americans suffer from celiac disease. Nonetheless, Arlon Capital reports that nearly one in five Americans now buys gluten-free products. Unfortunately, the countless benefits of wheat consumption are being overlooked as the newest fad in diet awareness takes off.

It is misinformation that has led an increasingly loud cohort of consumers to claim that gluten should be avoided. Unsurprisingly, wheat is not the first agricultural product to suffer in the marketplace due to misinformation about its healthfulness. Indeed, the entire agriculture sector is currently under attack from anti-technology, anti-Big Ag, etc. Frustratingly, farmers cannot rely on consumer product companies to join them in correcting inaccuracies because in a tight margin business, they are often trying to capitalize on shifts in consumer attitudes.

To get a sense of the scale of resources required to improve consumer attitudes, wheat growers can look at high fructose corn syrup (HFCS) as a proxy. Since the attack on HFCS began, domestic consumption has fallen by 40 percent per capita (see graph below). According to professionals with experience in these issues, mounting a public relations campaign targeted at U.S. mothers (no policymaker outreach), and relying predominantly on internet resources would require a minimum of \$10 million per year.

There is skepticism that such a low expenditure would move the numbers very quickly. Instead, it requires \$30-40 million minimum for two to three years in a row to have a reasonable chance of altering consumer attitudes. This would allow some television to reinforce online efforts. The strategy would also have to include some business-to-business (B2B) initiatives. To put that amount of money in perspective, U.S. wheat production is worth about \$16 billion under normal carryout conditions. However, the loss to U.S. wheat producers based on inaction will be much greater than the cost of better informing consumers.



Source: USDA/ERS

Certainly, the challenges facing the wheat industry are real – and they require attention. The following sections provide some direction in addressing those challenges, including the potential for increased investments and potential ROI for the industry.

Can the U.S. Wheat Industry Capitalize on Opportunities?

Opportunities for the U.S. Wheat Industry

Positive Impact on Demand: GroupM, considered the world's largest advertising media company, estimates total global advertising expenditures at \$500 billion, and that doesn't count commercial spending on promotion and other services. Industries expend tremendous resources on advertising and promotion for only one reason – because their analysis and experience shows that it increases consumer demand.

Moreover, consumer demand evolves over time and can influence this evolution. Promotion spending can increase demand above what would exist without a program but it cannot solve structural problems. Thus, demand may decline under a program but still be above where it would be in the absence of a program. By increasing overall demand, even if the effect is slowing a downward trend in demand, these investments improve the income of all producers.

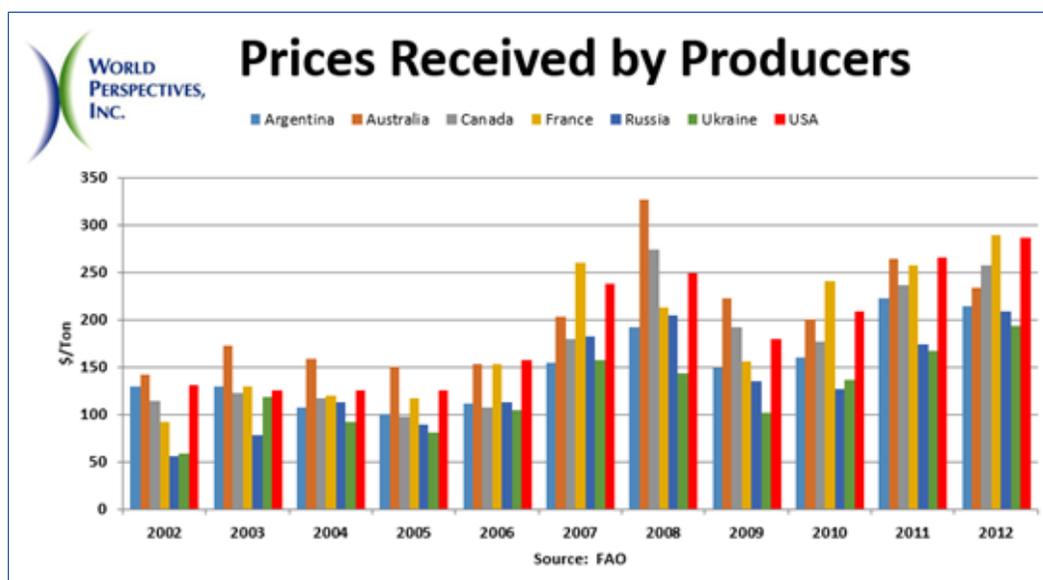
Negative Net Cost: As stated elsewhere in this report, the producer perceives a fixed amount of money taken directly out of his/her pocket but in many cases there will be a net positive realized gain. Farmers generally will not produce a crop at a loss. As a result, and depending on the supply demand balance but particularly when there is adequate demand relative to supply, the cost of the producer's investments are actually passed along to the consumer in the form of higher prices.

Free-Riders: While wheat is grown in 44 states, only around half have checkoffs and they have disparate rates and regulations. A more concerted effort may end the free-rider problem that currently exists whereby wheat producers paying less or nothing benefit from the activities funded by farmers in the states paying fees or higher rates.

National Stature: An unquantified benefit of more broadly-based investment is the addition to efficiency and economies of scale, along with the fact that it invokes "national" stature and thus increases its relative importance and funding stability within the U.S. policy sphere.

National Problems: A national investment effort can efficiently coordinate issues with states and regional to more broadly confront an industry, such as the current anti-gluten craze.

High-Priced Supplier: As noted elsewhere in this report, one of the purposes of promotion spending is to compel a buyer to pay more in a market where there is otherwise limited perceived difference between competing suppliers. Between 2002 and 2012, U.S. wheat farmers consistently received higher prices for their wheat than most of their major competitors (see graph below). Only Australia more consistently reported higher producer prices and those were often induced by domestic drought.



Source: FAO/WPI

In essence, farmer investments supported promotion matched by USDA export promotion funds compels buyers to pay more for the various classes and grades of U.S. produced wheat. Promotional spending has successfully been used to differentiate U.S. wheat classes as specialty baking ingredients deserving of a price premium instead of just another commodity.

Supply/Demand Dynamics: The positives for wheat producers include the fact that most of the population growth occurring between now and 2050 will be in the mid-latitude region where wheat is not grown, and that wheat demand is correlated to population growth. As a result, world trade in wheat is expected to double. On the downside, over 37 countries produce wheat in the grain producing belts to the north and south of that mid-latitude zone and many will be seeking to compete with the U.S. for a share of that growing demand.

International Marketing: Foreign buyer knowledge about U.S. wheat is inherently more limited than for indigenous products. The degree of competition and the types of government intervention greatly affects the amount of benefit producers receive when impacted around the globe. In essence, pro-active intervention where there are policy and/or marketing challenges can dampen adverse effects to U.S. wheat farmers.

Part of the funds currently collected from state-level wheat producer checkoffs goes to support export market development efforts around the world. This is a critical function for wheat growers considering that roughly 50 percent of their production is exported each year. A review of U.S. wheat producer support for export market development indicates that it has increased through the years, but not significantly when calculated in inflation adjusted dollars.

As noted elsewhere, half of U.S. wheat moves into international trade, and while state commissioners provide support for the global promotion and trade servicing work of U.S. Wheat Associates, the world is growing increasingly complex and broader in-depth analysis and support are needed. Not too many years ago most wheat was traded through a handful of state buying agencies. The Uruguay Round trade agreement and the fall of the Soviet Union de-monopolized

trade and U.S. Wheat Associates must now work with hundreds of individual companies around the world. Following are some of the complex regional dynamics requiring additional support and effort from the entire U.S. wheat industry:

- *Middle East, East and North Africa:* One-third of the world wheat trade occurs in the Middle East and the East and North African markets and yet the U.S. is largely uncompetitive in this region due to freight advantages and lower cost, middle protein wheat being supplied by Europe and the Black Sea region. With additional market development funding, it may be possible to develop sales of lower protein soft wheat and high protein wheat from the U.S. to the industrial baking segment that is emerging in this region.
- *Latin America:* Approximately 40 percent of U.S. wheat is sold in the Latin American region where marketing requires the ability to navigate a complex maze of tariff and nontariff measures. It has also become a more diverse market where Brazil, for example, used to demand just three different types of flour but now consumes 50 different versions. This complexity favors the diversity of U.S. wheat classes but also requires constant attention to trade servicing.
- *Asia:* Another 40 percent of U.S. wheat is sold in the Asia-Pacific region where a diverse range of high quality wheat based products are consumed. Promotion and trade servicing work has been important in differentiating the diverse utility of different U.S. wheat classes versus competitors such as Australia and Canada.

Trade Policy: Another area that has grown in complexity and importance is trade policy. The world's trading rules have become what Colombia University Professor Jagdish Bhagwati calls a "spaghetti bowl." There has also been an increase in the number of technical barriers to trade, which have replaced the more traditional and simpler tariff based barriers. Following is a brief summary of some of the areas requiring increasing attention by the U.S. wheat industry:

- *Trade Agreements:* A new global agreement on agricultural trade via the so-called "Doha Development Agenda" appears increasingly unlikely. Consequently, bilateral and plurilateral agreements have become the fallback strategy for nations interested in increasing international commerce. The U.S. is presently engaged in two major trade negotiations, the TransPacific Partnership (TPP), involving 12 nations where some are major markets and some are competitors for U.S. wheat growers; and the Transatlantic Trade and Investment Partnership (TTIP) presently involving the U.S. and EU. The U.S. industry is also pondering a wheat specific plurilateral approach to ensure smoother trade.
- *Competitors' Practices:* As consumers get richer they improve their diets and when countries get richer they tend to direct more resources toward perceived food security. As a result, advanced developing countries like China, Brazil and Turkey (the world's second largest wheat flour exporter) have increased their domestic agricultural subsidies, likely in excess of their commitments under the WTO. This stimulates production in competition with American farmers. Many concurrently maintain or increase their historical border protections against imports. India, which already produces 50 percent

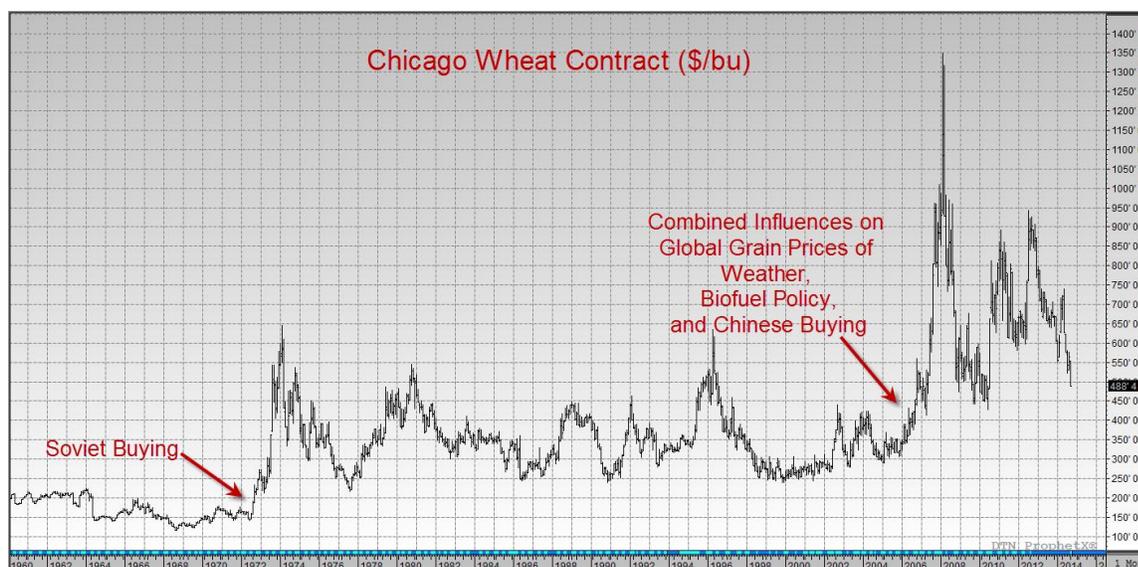
more wheat than the U.S., has initiated a food security policy that appears destined to result in over-production and ultimately the dumping of excess stocks onto world markets. All of this inevitably requires a great deal of time and attention by the U.S. wheat industry, and consequently sufficient funding to ensure fair and equitable markets.

- *Technical Barriers:* The U.S. wheat industry must still work hard to overcome foreign market restrictions. Another impending area that will require attention is biotechnology. Scientists are now half way through mapping the wheat genome and the International Wheat Genome Sequencing Consortium predicts that it will be complete in three years. The industry has agreed on the “responsible introduction” of biotech wheat and adhering to that discipline will require more resources.

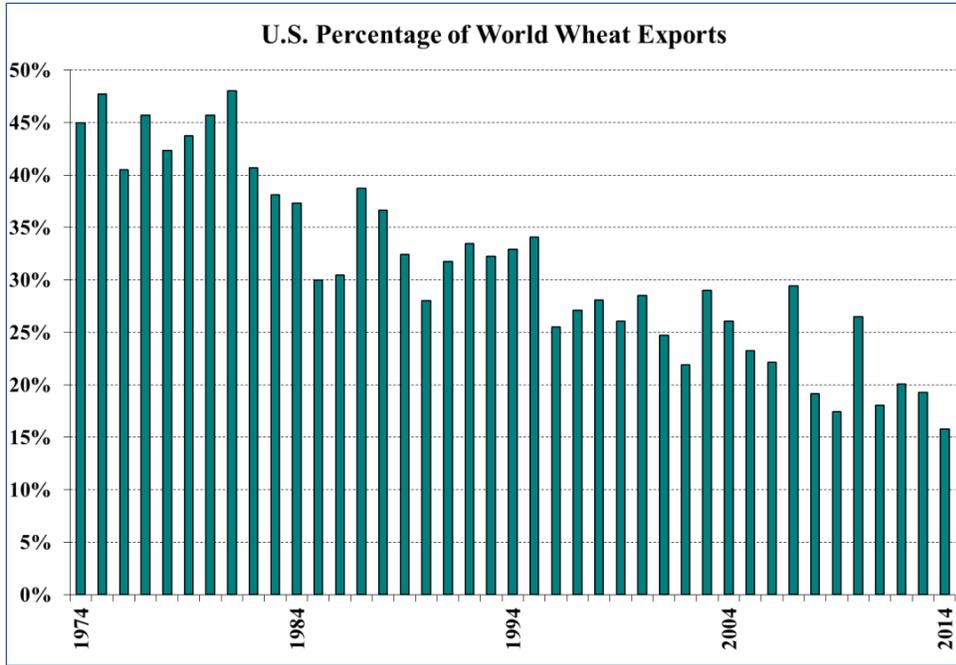
The above section has detailed opportunities for the wheat industry that may be capitalized on in an effort to improve the industry’s competitive position. All of them require increased investments of a coordinated, coherent, industry-wide nature. The following two sections delve more specifically into two intertwined opportunities: global opportunities and increased investments in research.

Opportunity Developments within the Global Wheat Markets

The Soviet Union quietly entered the United States wheat market in early November of 1971. Wheat prices exploded upward as the word leaked out that the United States government had signed a three-year agreement with the Soviets in July 1972. This was the initial catalyst for causing world wheat prices to permanently shift upward to a higher and wider trader range. Prices never return to the prior sedate levels but instead remained within the trading range that lasted for 30 years. During that time period, various nations perceived the opportunity to become competitive participants in the global wheat market. As a result, the United States’ percentage of global wheat exports steady declined.

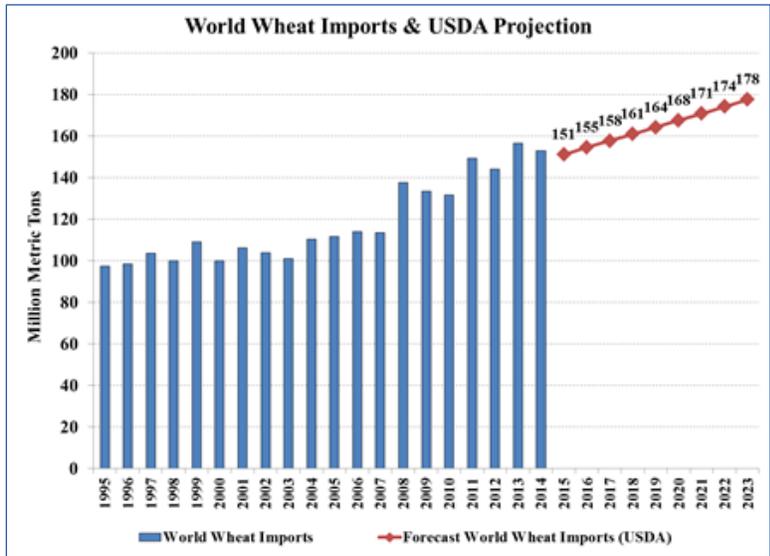


Source: DTN, WPI



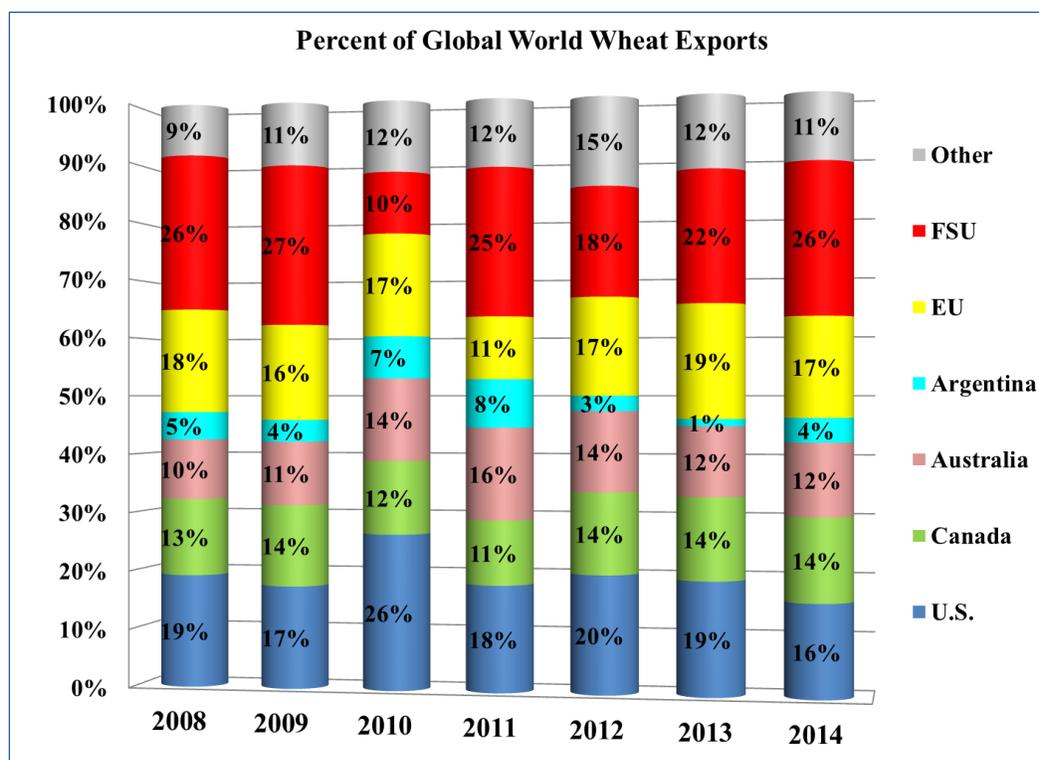
Source: WPI

Note that even while U.S. wheat producers lost global market share, global wheat imports were increasing on average by approximately 1.73 million metric tons (MMT) per year. USDA forecasts that the future pace of wheat imports will increase to approximately 3.3 MMT.



Source: USDA, WPI

Where they have the agronomic choice, U.S. farmers are picking other crops to produce. Canada and Australia each presently assume about 10 to 15 percent of the global wheat export market.



Source: WPI

The U.S. and European Union both maintain less than 20 percent of global wheat exports. The dominant wheat export position has been relegated to states of the Former Soviet Union (FSU). However, the length of time that composite of nations maintain this position may be limited by increasing interest in developing a domestic means to feed growing poultry and livestock sectors. Corn and soymeal better meet such needs, particularly if there is eventual acceptance of biotech crops.

Subsidized support of high-yielding wheat production on small farms in the European Union is a costly endeavor. China maintains similar intensive wheat farming practices to also obtain substantial yields (see the following table) but this requires significant inputs and utilization of limited water resources.

Argentine wheat farmers continue to struggle against their own government's policies that restrict wheat exports in order to keep a cap on domestic prices. This can act as a major disincentive against increasing Argentine wheat production. The limited amount of excess Argentine wheat that is eventually exported is normally consumed by neighboring Brazil. Such a lack of sound market structure has created the pathway for other nations to assume 10 to 15 percent of the global wheat export market, depicted in the prior graph above.

Global Wheat Yields (bushels per acre)													
Year	US	China	Canada	Australia	Argentina	EU	Brazil	Ukraine	Russia	Kazakhstan	Pakistan	India	N. Africa
2000	42.0	55.6	36.4	27.1	37.1	73.9	16.8	29.4	24.1	13.4	37.0	41.3	16.7
2001	40.2	56.7	28.9	31.2	33.3	70.6	28.0	46.1	30.7	17.5	34.6	40.3	14.6
2002	35.0	56.2	27.2	13.6	30.3	74.5	21.3	45.4	30.8	16.2	33.6	41.8	18.9
2003	44.2	58.5	33.6	29.7	37.7	67.6	35.3	21.9	25.3	15.2	35.5	39.3	15.9
2004	43.2	63.2	39.3	24.3	39.1	83.9	31.5	47.1	29.5	12.5	35.2	40.3	17.7
2005	42.0	63.6	40.7	30.1	37.5	76.1	30.7	42.4	28.8	14.1	38.5	38.5	19.3
2006	38.6	68.3	38.8	13.6	39.0	75.8	18.9	37.6	29.1	16.9	37.5	39.1	22.2
2007	40.2	68.5	34.7	16.0	42.0	72.2	31.3	34.8	31.3	19.3	40.4	40.3	20.0
2008	44.9	70.8	42.5	23.5	31.2	84.2	36.4	54.6	36.3	14.4	36.4	41.5	25.5
2009	44.5	70.5	41.5	23.4	44.6	79.9	30.8	45.9	34.4	17.8	39.4	43.2	23.5
2010	46.3	70.6	41.8	30.2	52.8	78.1	40.8	39.9	28.4	10.9	39.4	42.2	23.9
2011	43.7	71.9	44.0	32.0	44.6	79.5	39.7	49.8	33.7	24.7	41.8	44.4	30.1
2012	46.3	74.2	42.6	26.2	38.4	76.7	34.3	41.6	26.3	11.8	40.0	47.2	23.6
2013	47.2	75.2	53.4	29.7	44.6	82.6	35.8	75.4	33.1	16.0	41.3	46.3	23.0
2014	43.9	77.7	44.8	28.0	44.3	82.8	36.0	51.9	36.9	15.8	41.2	46.6	30.0
Avg	42.8	66.8	39.3	25.2	39.8	77.2	31.2	42.6	30.6	15.8	38.1	42.2	21.7
Stdev	3.2	7.3	6.6	6.2	5.9	5.0	7.2	8.8	3.8	3.4	2.6	2.8	4.7
Stdev %	8%	11%	17%	25%	15%	6%	23%	21%	13%	21%	7%	7%	22%
Slope	0.47	1.60	1.20	0.30	0.83	0.68	1.11	0.99	0.47	0.08	0.50	0.49	0.91

Data Source: USDA

The key takeaway here is that global marketing of wheat should occur in relation to comparative advantage, and the table above indicates that the U.S. should be the dominant global wheat exporter. Consider a few details: The 15-year average U.S. wheat yields are only surpassed by the intensive farming practices in the EU and China. Yet, even with irrigation and intensive farm practices the Chinese are unable to maintain the stability of U.S. yields, which is indicated by the standard deviation (StDev%) on the table above.¹

The slope of average U.S. wheat yields (indicating an average annual increase of 0.47 bushels per year) is less than the annual average increase of some of the other competitive producers. However, the overall average of yields, with the exception of the EU and China, are lower for all other producers. In other words, the United States has a comparative advantage in being a stable wheat producer.

U.S. farmers may question the viability of considering wheat as an actual alternative to corn and soybeans rather than simply a rotation crop. After all, corn and soybeans have been the primary drivers of higher grain prices during the past decade. Furthermore, biotech characteristic of corn and soybeans have enhanced the convenience and net returns from producing these other crops. However, the next table shows that it would be incorrect to assume that U.S. wheat yields are stagnating.

Yield Comparison of Select U.S. Crops					
Commodity	Decade 1 Avg. Yield 2/ (1985-1194)	Decade 2 Avg. Yield (1995-2004)	Decade 3 Avg. Yield (2005-2014)	Change from Decade 1 to Decade 2	Change from Decade 2 to Decade 3
Corn	115.6	134.2	151.6	16%	13%
Sorghum	65.1	62.3	63.2	-4%	2%
Soybeans	33.5	38.5	42.5	15%	10%
Cotton	642.1	673.4	824.7	5%	22%
Peanuts	2405.3	2464.7	3449.0	2%	40%

¹ StDev/Avg is a simple way to compare volatility of different samples.

All Wheat	36.5	40.2	43.8	10%	9%
<i>Winter Wheat</i>	38.1	43.1	45.0	13%	4%
<i>HRW</i>	33.3	36.6	37.3	10%	2%
<i>SRW</i>	44.4	52.5	59.3	18%	13%
<i>White</i>	59.0	64.2	64.9	9%	1%
<i>Spring Wheat</i>	32.7	35.2	41.5	7%	18%
<i>HRS</i>	31.3	33.9	40.4	8%	19%
<i>Durum</i>	31.6	31.7	38.3	1%	21%

Note: All grain yields are bushels per acre; cotton and peanuts are pounds per acre.

2/ Data begins in 1986 for the wheat subcategories such as HRW, SRW, etc.

Global millers, bakers and consumers have demonstrated a willingness to pay premiums for wheat that meets their specifications and are consistent. U.S. wheat producer have the ability to receive much large per bushel premiums than are available for corn or soybeans.

Corn and soybeans have become increasingly attractive crops for producers in South America and the Black Sea region because of their recent price action. Naturally, the increased global production of these crops has resulted in the present price setback, which is similar to what occurred to wheat in the mid-1970s. In that similar fashion, corn and soybean prices are expected to plateau into trading ranges that extend into the future. Just as occurred with wheat, the new global producers of corn and soybeans are not expected to go away.

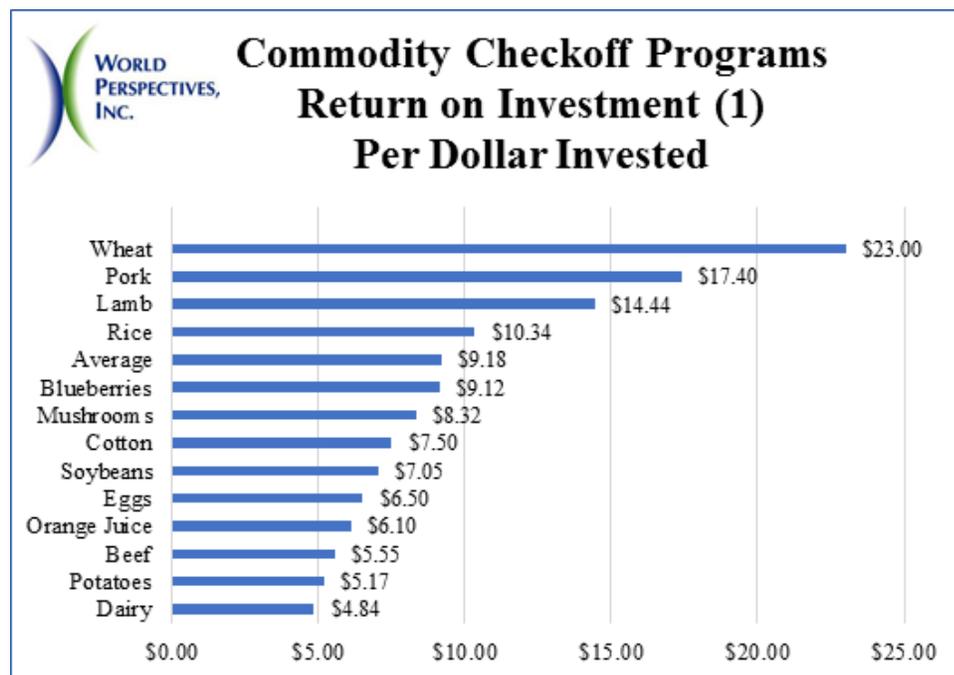
U.S. market share of global wheat exports declined from about 45 percent in the 1970s to less than 20 percent today. Likewise, the U.S. portion of global corn exports averaged approximately 65 percent prior to 2008 and has presently fallen to below 40 percent. The total amount of U.S. soybeans exports has grown recently, but the U.S. market share of global soybean exports has declined from about 50 percent in the decade prior to 2008 to just over 40 percent. Prospects seem remote that the new competition in global corn and soybean export markets will throw in the towel because abundant world production has resulted in recent price weakness. On the opposite side of the coin, there is a developing opportunity for wheat that is comparable to more recent events in the global soybean and corn markets due to increased demand.

China recently gave up all attempts to be entirely self-sufficient in soybeans and corn. Chinese imports of soybeans and soy products have grown exponentially since the mid-1990s, and Chinese corn imports have followed suite since the mid-2000s. These two developments have already laid the track for different varieties and grades of U.S. wheat to enter China. It does not seem at all presumptuous to perceive an opportunity for the United States to become the wheat supplier of choice as global demand grows. This expansion could be substantially larger than USDA is presently predicting if the Chinese wheat market follows the established pattern of corn and soybeans.

Comparing Crops: Investments in Research

How do major crops in the U.S. bolster their competitive position? One answer is increased investment, often in the form of research outlays. A review of 23 return on investment (ROI) studies covering 18 different commodities and performed by numerous different researchers

consistently shows a net positive benefit to producers from state and national checkoff programs (see graph below).



Source: USDA/AMS

(1) Average or midpoints from various studies.

Wheat likely receives the largest calculated benefit for two reasons:

1. It is a near perfect competition product in that, after adjusting for quality (class and grade) and location, the price is about the same. As a result, promotion via investment more clearly creates a preference.
2. Wheat is more export dependent than any of the other commodities analyzed. The econometric models frequently employed tend to compound the economic benefit of removing residual supply.

The ROI for U.S. wheat at \$23 for every \$1 spent (Kaiser, Harry M.) is consistent with a University of Saskatchewan study finding an ROI of \$20.40 for every \$1 spent on wheat and barley under the new Canadian programs. An earlier evaluation (HCI International Marketing Consultants) of U.S. wheat export promotion found that each \$1 spent on promotion and technical service in Latin America preserved about one-half ton of sales (value more than \$50).

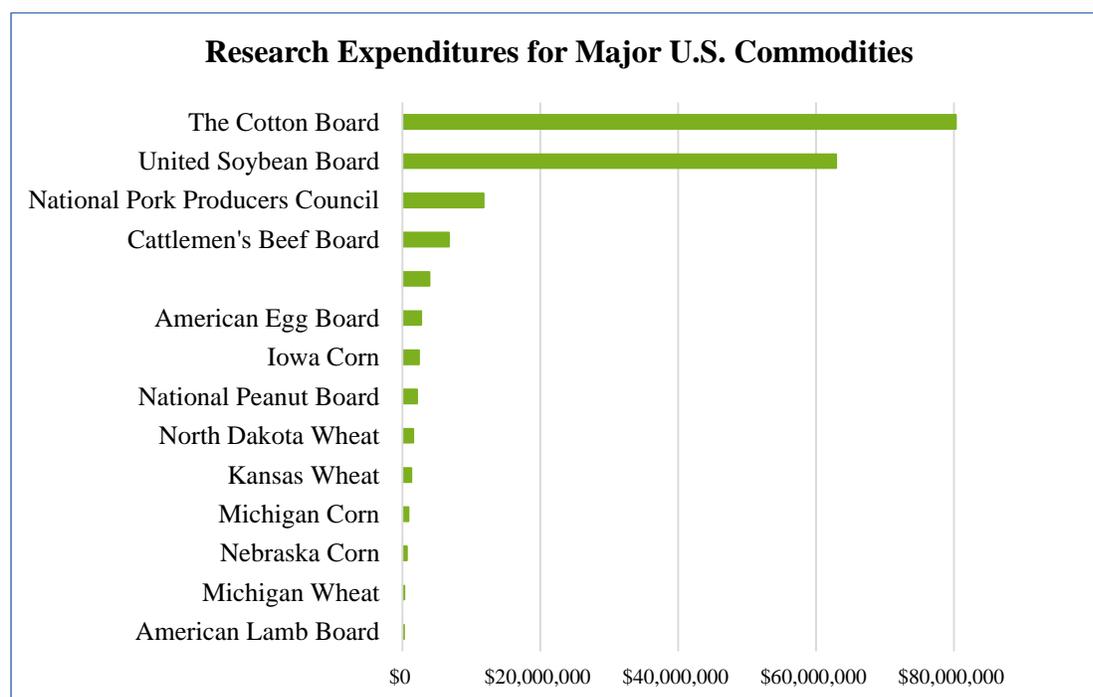
It should be noted that modelers take different approaches in their methodologies, particularly with regard to lag functions, and these can create some differences in outcome between commodities and between separate studies on the same commodity.

The following chart details research outlays by major commodities in the U.S.

Organization and Commodity	Research Expenditure	Percent of Total Expenditure	Most Recent Year Available
American Lamb Board	\$217,985	95.40%	2012
Michigan Wheat	\$249,249	67%	2012
Nebraska Corn	\$659,152	14%	2013
Michigan Corn	\$855,600	16%	2013
Kansas Wheat	\$1,292,313	49%	2013
North Dakota Wheat	\$1,543,745	13%	2013
National Peanut Board	\$2,132,695	18%	2012
Iowa Corn	\$2,404,014	26%	2014
American Egg Board	\$2,700,000	35%	2014
Sorghum Promotion, Research and Information Program	\$3,939,790	28%	2011
Cattlemen's Beef Board	\$6,756,482	23%	2012
National Pork Producers Council	\$11,798,000	9%	2013
United Soybean Board	\$62,899,900	52%	2013
The Cotton Board	\$80,292,021	10%	2013

Note: the Cotton Board combines research and promotion funding into one figure.

The following graph provides visual representation of research allocations by checkoff organizations.



Source: WPI

One question that arises is whether checkoff programs and the funds they contribute to research benefit the producer? To answer that question, further analysis is necessary. Recall the chart in the preceding section that detailed a yield comparison of select U.S. crops. All of the crops in that table have either national or state level checkoff programs that have contributed to research – whether for genetics, better farming practices, etc. It should be noted that while wheat yields are not stagnating, they have registered the smallest increase compared to other crops. The abbreviated table below provides comparison of overall slope change in yields throughout the past three decades, and wheat registers the smallest increase.

Slope (Change) in Yields of Select U.S. Crops: Past Three Decades	
Commodity	Slope (change)
Peanuts	79.4
Cotton	20.4
Corn	2.9
Sorghum	1.4
Soybeans	0.6
All Wheat	0.4
<i>Durum</i>	<i>0.9</i>
<i>Spring Wheat</i>	<i>0.7</i>
<i>HRS</i>	<i>0.7</i>
<i>HRW</i>	<i>0.3</i>
<i>SRW</i>	<i>0.3</i>
<i>Winter Wheat</i>	<i>0.2</i>
<i>White</i>	<i>-0.3</i>

Source: USDA

1/ All grain yields in bushels per acre; cotton and peanuts in pounds per acre.

2/ Data begins in 1986 for the wheat subcategories such as HRW, SRW, etc.

3/ 20-year data series

In the interest of facilitating discussion consider the following examples drawn from the table above:

- Note the sizable growth in average corn yields from 115.6 to 134.2 to 151.6 bushels per acre during the past decades; these increases are larger percentage-wise than the increases for soybeans during the same period. Corn involves a larger volume of private company research work.

- If soybean yields were analyzed in a key state such as Iowa, rather than nationally, then the data would present evidence of a consistent improvement in yields from one decade to another.

To build on the above analysis, the following section details proxies that might be compared to the U.S. wheat industry. Specifically, other U.S. crops are reviewed, and specifically how they overcame pressing challenges to improve their respective competitive position.

Proxies

Cotton

Competitive Threat: By the mid-1960s, cotton had lost tremendous market share to new "easy-care" synthetic fibers.

Industry Action: Passage of the Cotton Research & Promotion Act of 1966 brought upland cotton producers together to re-establish the market for cotton. The program was expanded in 1990 to include the cotton content of imported apparel and other products.

Result: Today cotton is the best-selling textile fiber in the U.S., plus one of the top selling fibers in the world. Recent technological advances – such as biotechnology, variety improvements, and the success of the boll weevil eradication program – have increased cotton productivity across the United States.

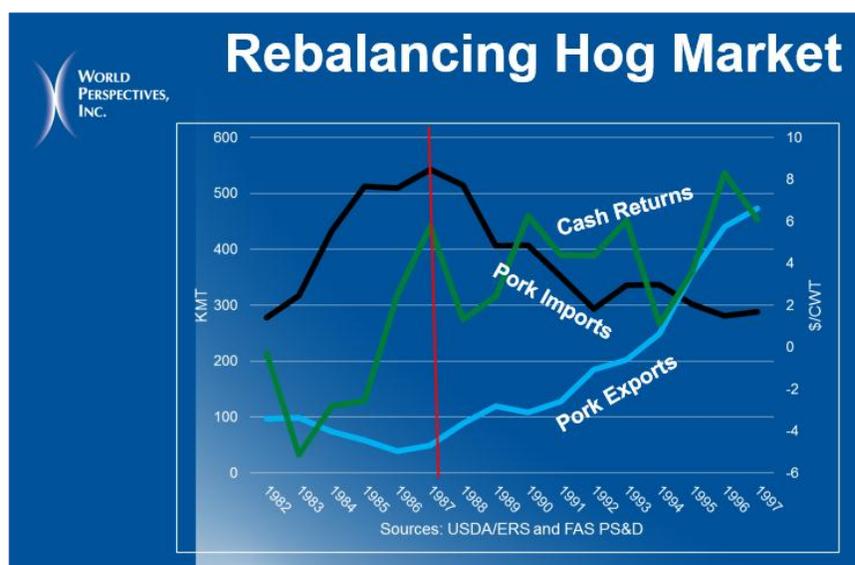
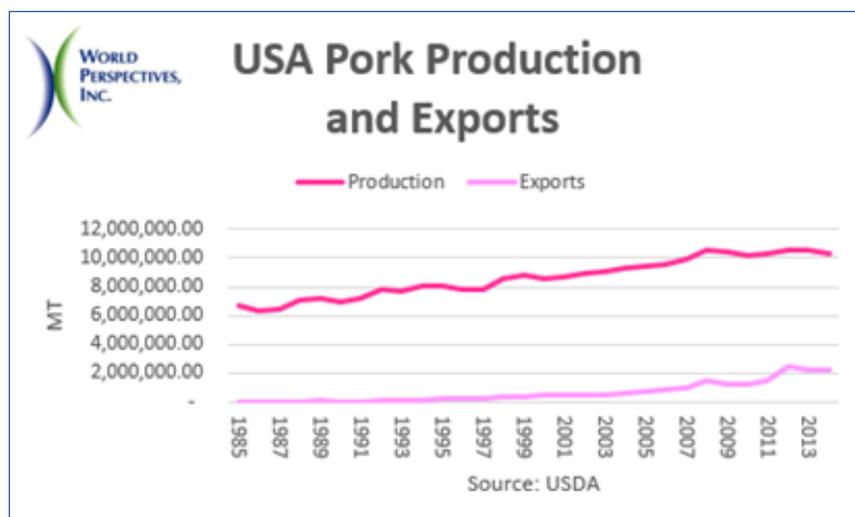


Pork

Competitive Threat: U.S. pork producers were suffering multiple problems that discouraged domestic consumers and provoked imports. These problems included poor genetics that resulted in disparate sized animals that were more costly to process, plus a product that was fatty at a time when nutritional guidance suggested low fat consumption. Prices bounced around \$50/cwt with many producers struggling to stay profitable.

Industry Action: Creation of the Pork Promotion, Research, and Consumer Information Order in the late 1980's led to numerous changes including leaner genetics, total factor productivity growth of over 6 percent per year, and a focus on specific marketing areas such as hotels, restaurants and institutional (HRI) venues.

Result: The U.S. pork industry went from being a net importer to a net exporter of pork within a decade. It now exports a full quarter of its production and fulfills a third of all globally traded demand. Cash returns have consistently trended upward.

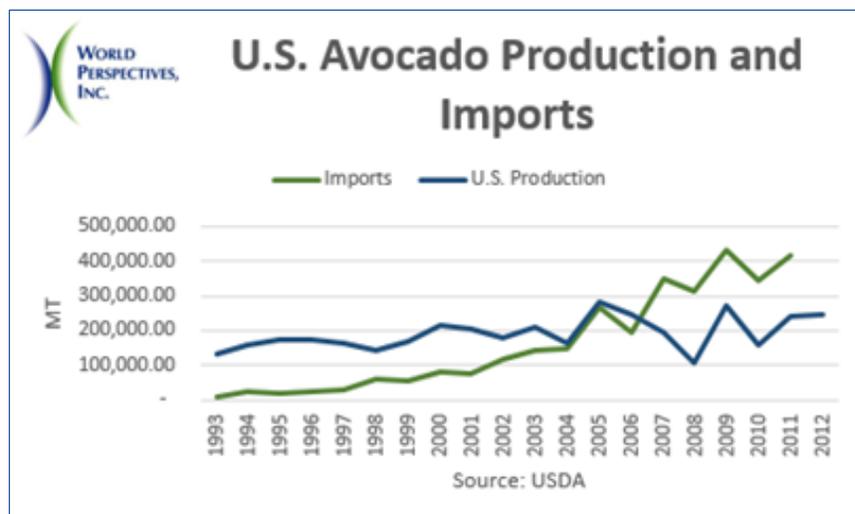


Avocados

Competitive Threat: Imports from Mexico had been prohibited since 1914, but following the terms of NAFTA, USDA began performing a pest risk analysis in 1997 and gave final approval for avocado imports in 2001.

Industry Action: The U.S. Federal Hass Avocado Promotion, Research and Information Order was established in 2002. The Order has a rebate function so that approximately \$42 million is collected but only around 15 percent of that is retained to assist the \$1.4 billion industry. The funds are spent on nutrition marketing, research and other functions.

Result: The Order has not slowed the import of avocados (see graph below) but checkoff funds collected at Customs pays 70 percent of the cost of its operations. Wholesale prices have held up because consumer perceptions about the nutritional quality of the fruit have enabled per capita consumption to quadruple.



Almonds

Competitive Threat: Almonds were a relatively minor crop with the perception that the tree nut was undesirable for consumption due to its high fat content.

Industry Action: The Almond Board of California created the Nutrition Research Council in 1995 and began promoting consumption of the tree nut.

Result: U.S. almonds were approved by the FDA in 2003 to carry a qualified health claim. In 1995, the U.S. produced 64 percent of the world's almonds. Today, despite increased production by China, Australia and Europe, American production has expanded five-fold to become 82 percent of global output. Exports have climbed three-fold over the past 20 years.



Peanuts

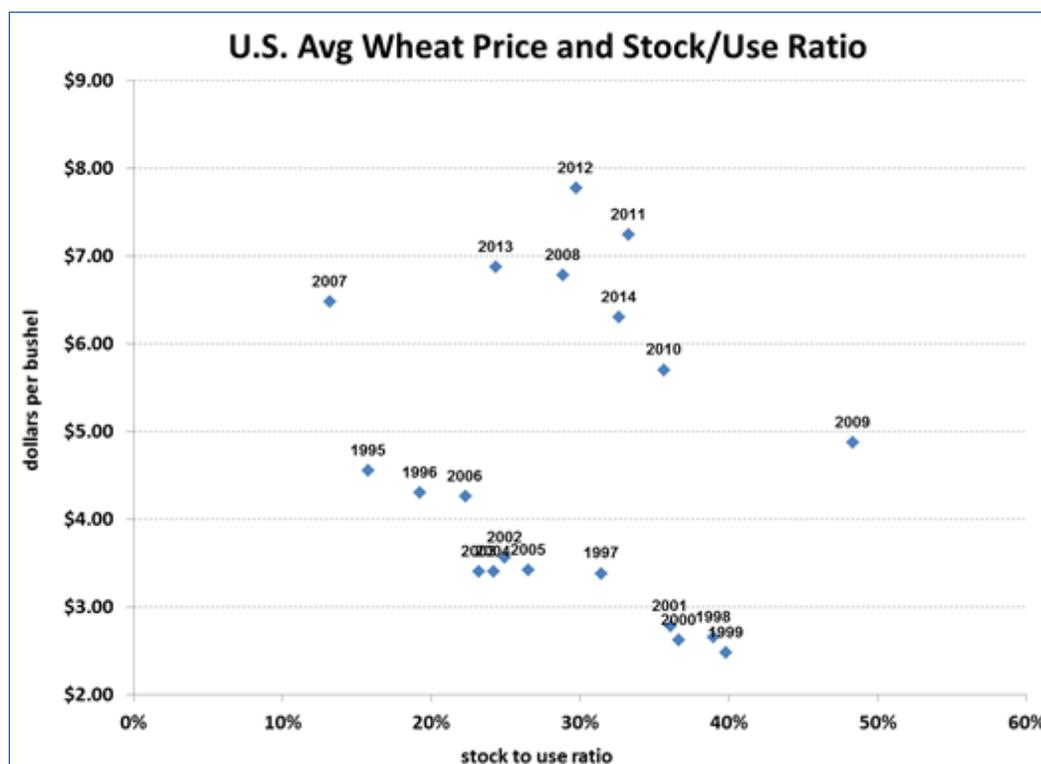
The story of the U.S. peanut industry is worth noting briefly here as well. Thanks in large part to increased investments into research American peanut farmers have boosted their yields by 40 percent over the past decade. Newly introduced high-oleic varieties promise even great gains. Amid a period of strong global demand, the industry has went from being the world's most expensive producer to the cheapest due in large part because of yield improvements.

Direct Benefits to the Wheat Industry of Increased Investments

The following sections have detailed the challenges the wheat industry faces, opportunities that can be capitalized on by the industry to improve wheat's competitive position, and examples of other commodity groups that have overcome pressing challenges by increasing organized, coherent investments. The following section provides a snapshot of potential direct benefits to the farm community – wheat producers across the U.S. – should additional investments be made.

Farmers are heavily influenced by the topic of price as the key variable for investment choices – that is, what they plant and the equipment they invest in to harvest their preferred crops.² One effective story to communicate to farmers is the topic of price as it relates to future opportunities, rather than a discussion about past expenditures and correlating successes.

Consequently, it makes sense to highlight the recent transitions that have occurred to the average farm price of U.S. wheat. Wheat farmers recognize that this is the primary influence for competing crops that has caused an upward shift in demand on the chart below.



The chart above shows the transition that occurred in the demand curve before and after the implementation of U.S. biofuel policies in 2007 and growing global demand for corn and soybeans – primarily from China. Exports are a key variable in determining if the stocks to use

² That fact is made evident by a study relating to CAP reforms in the EU. See the study at http://www.academia.edu/1358046/Farm_investment_behaviour_under_the_cap_reform_process.

ratio of wheat is closer to 20 percent and priced at \$7.00 per bushel, or above 30 percent and priced below \$6.00 per bushel.

A recent report published by Dr. Harry M. Kaiser “*An Economic Analysis of U.S. Wheat Export Promotions*,” shows that a 50 percent reduction in export promotion spending between 2000 and 2007 would have resulted in a 17 percent decline in exports.

A 17 percent reduction in exports would cause the stocks to use ratio for U.S. wheat to increase on average by 10 percent during the 2008 to the current 2014 time period, which would have been from 34 to 44 percent. Using a regression equation for the 2008 to 2014 time period, $y = 9.915 - 10.252x$, indicates that a 10 percent change in the stocks to use ratio would cause the average farm price of U.S. wheat to decline by \$1.03 per bushel (\$6.43 at 34 percent to \$5.40 at 44 percent).

U.S. wheat has one of the highest payoffs for each dollar that is directed into promotion and research: the benefit-to-cost ratio is 11.5 to 1 for each dollar invested in U.S. wheat. When the matching USDA support is brought into consideration, then the value of each farm dollar contribution doubles to \$23 (recall the chart on page 27 that depicts this value).

A cost-benefit analysis of USDA’s international market development programs by IHS Global Insight indicates that when funding is appropriated annually, promotion planning tends to be short-term in nature. This is not necessarily the most efficient use of resources because the effect of market development is an ongoing process that lasts over many years.³ Indeed, a consistent marketing effort is necessary to maintain sufficient critical mass to deal with the development of obstacles.

Matching the financial contributions of farmers with Federal funds stems from the fact that a strong promotional program does more than just increase returns for U.S. wheat producers, but also benefits the entire local economy and eventually generates higher tax revenue.

The IHS study also notes that the loss in economic benefits from cutting international market development programs is 13.5 times greater than any potential savings taxpayers would see from not funding the program. Additionally, foreign consumers would experience a decline in economic welfare due to marginally higher food prices.

It should be noted that U.S. wheat remains a bastion of stable production in comparison to uncertainties tied to political turmoil in the Black Sea region, economic issues in South America and weather in Australia – all issues noted above. The value of the U.S. dollar is an important factor in determining the level of demand for U.S. wheat exports. The influence of the dollar can be even more pronounced if U.S. wheat is purchased as a secondary market rather than as a primary source under a developed purchasing agreement.

³ See the complete report at http://www.fas.usda.gov/sites/development/files/2013-09/market_development_eval-2010.pdf.

Both global and domestic millers are willing to pay substantial premiums for quality. Political differences can sometimes hamper the exports that make a positive financial difference to wheat producers.

In conclusion, there is a strong link between investing in agricultural research and productivity growth. A series of studies conducted between 1965 and 2005 have indicated that agricultural research has delivered improved yields and that each dollar spent on agricultural research had a return of around \$10 in benefits to the agricultural economy. This is important considering that Harvard's Peter Huybers has found wheat yield improvement has stagnated, particularly in the western U.S. Overall, yield growth has fallen behind competing crops – furthering the argument for increased investment.⁴

⁴ One caution is that there is a long lead time (10-20 years) between the research stage of a new technology and the point at which that technology is adopted and begins to affect productivity.

Concluding Remarks

In conclusion, the U.S. wheat industry has two choices to make:

1. **The first is to continue the status quo.** The caution associated with this choice is the old adage that doing the same thing again and again may not change the end result, which on present trend means the continued decline of the U.S. wheat industry.
2. **The second is to strategize on how to improve the production, marketing and thus profitability of the industry.** As shown in the section of this report that highlights proxies, other commodities have faced similar circumstances, took decisive action, invested, and brought about positive change for their industry.

If the U.S. wheat industry seeks a strategy for change, there are several options from which to choose:

- a. Retain the current organizational structure but commit to increased investment in the research and promotion currently carried out by the industry's national organizations (NAWG, NWF, USW and WFC).
- b. Compel those states currently lacking a checkoff program to contribute to the national effort.
- c. Initiate a national checkoff program that inherently collects investment resources from all wheat growers.

Finally, it should be note that federal resources are limited. However, the recent experience of the aquaculture sector was as follows: when it committed to finding a way to improve its competitiveness, there was a sympathetic and helpful reaction from Washington, DC.