

Contributions from Corn Refining:

*Creating Jobs, Improving the Environment,
and Strengthening Communities*



Corn Refiners Association 2009 Annual Report



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Foreword

Audrae Erickson, President, Corn Refiners Association



Corn refiners make a positive impact in their communities through environmental stewardship, economic growth, energy efficiency, and waste minimization. The corn wet milling industry is a leader in environmental stewardship, while producing hundreds of products and ingredients that Americans rely on every day. From corn starch, to sweeteners, to bio-degradable plastics, to renewable fuels, corn refiners are building a brighter future.

Our member companies are active in their communities and continuously strive to enrich the neighborhoods where they do business. Their efforts involve community improvement and outreach projects, donations to local charities, support of learning institutions, and assurance of safe and rewarding places to work.

We are pleased to welcome The Honorable Frank D. Lucas (OK-3rd) as our featured guest author. As the Ranking Member of the House Committee on Agriculture, Representative Lucas is an avid supporter of rural farming communities. His contribution explores the need for continued investment in research to help agriculture keep pace with the demands of a changing world while maintaining farmers' ability to preserve our natural resources.

J. Patrick Mohan, Chairman, Corn Refiners Association, contributes the *Year In Review* to the 2009 *Corn Annual* providing a perceptive assessment of the challenges that face the corn refining industry, as well as the positive impact of our industry on local communities, our nation, and the world. His insight on the issues reflects his extensive experience in the corn refining industry.

We also value our long-standing partnerships with our member organizations, customers, academic institutions, Members of Congress, federal agencies, and ally groups. Working with them, we have made significant strides in the past year.

The corn refining industry plays an important role in our country's rural landscape through responsible environmental stewardship and thoughtful community outreach. In times of economic downturn, this role is increasingly important. We look forward to remaining a valuable contributor to local communities and the American economy.

U.S. CORN REFINING INDUSTRY AT A GLANCE — 2008

Corn Refining Plants	27
Location	12 states
Corn Grind	1.4 billion bushels
Value of Corn Purchased	\$6.6 billion
Number of Corn Suppliers	41,000
Employment by CRA Member Companies	65,300*
Capital Investment (<i>replacement value</i>)	\$14.4 billion
Major Products (<i>estimated</i>)	
Sweeteners (<i>dry weight</i>)	23.1 billion pounds
Starches	6.6 billion pounds
Ethanol	1.2 billion gallons
Co-products	26.1 billion pounds
Value Added by Manufacture	\$6.6 billion

*Includes employees that provide services in non-corn refining areas.
Compiled by the Corn Refiners Association based on 2008 data from the U.S. Department of Agriculture, LMC Commodity Studies, Renewable Fuels Association and industry data compiled for CRA by Veris Consulting, LLC.

Research is Key to Agriculture's Ability to Meet Demands of a Changing World

Representative Frank Lucas, Ranking Member, House Committee on Agriculture



America's farmers and ranchers have long been the source for our most basic needs, including food, fiber, feed, and fuel. For them, farming is a way of life that has been passed down from generation to generation. At the same time, they have also been mindful of preserving our natural resources. Our farmers know that their legacy and livelihood depend on fertile soils, clean water, and fresh air. They have spent generations protecting millions of acres and miles of riverfronts in order to continue to produce the safest, most abundant, most wholesome, and most affordable food supply this world has ever known.

Agriculture is a major component of our economy. The food and agriculture sectors and their related industries provide more than 20 million jobs in the U.S., and account for nearly \$1 trillion of gross national product. Agriculture exports average more than \$50 billion annually, compared to \$38 billion in imports, contributing some \$12 billion to reduce the \$350 billion trade deficit in the nonagricultural sector.

Many factors play a role in the unparalleled success of American agriculture. Hard work and dedication of farm families, favorable soils and climate, better herbicides, free enterprise, transportation, and communication to name a few. But, one factor that has made a significant impact on the success of this industry is agricultural research. Science-based advances in food and agriculture have enabled the expansion of food production. At the same time, it has helped farmers use less land to produce higher yields, which is beneficial to society from both a consumer and an

environmental standpoint. For example, with corn production the yield per acre has increased by 114 percent over the last four decades. In 1970, the U.S. produced 72 bushels of corn per acre compared to 154 bushels per acre in 2008.

The contribution of agricultural research to advance food production and productivity is well documented. These improvements in agricultural productivity, generated by research, are of great importance to the American farmer, but even greater importance to society as a whole. These improvements have helped create an efficient production system that is competitive in the global environment. They have contributed to providing a safe and secure food and fiber supply, a healthy, well-nourished population, and a growing economy. New technologies have ultimately saved over a billion lives from starvation and countless millions more from the ravages of disease and sickness due to malnutrition.

Despite these successes, there are still many challenges that remain. One of those challenges involves increasing food production to meet the needs of an ever demanding global population. If we are to produce enough food and fiber to meet those needs and to make more efficient use of land already in cultivation, then we must put all the tools that science and research have to offer to work.

Additionally, there is a need to further explore options in the renewable fuels market because the potential for converting a wide variety of agricultural products to clean energy is promising. Increased research is needed to develop new technologies that will facilitate this trend. This will encourage new markets

for agricultural waste products such as corn stover, animal waste, and forest-based biomass.

We also need to continue to find ways to cut the cost of producing food and fiber in our country, so that our farmers will have an economically viable future. Agricultural research plays a vital role in finding ways to increase production and lower input costs.

One recent technological advance is precision agriculture. That is, using satellites and global positioning systems (GPS) to distribute seed and fertilizer in a precise way so that a farmer can maximize crop yields at the lowest cost. This technology encourages the reduction of waste and maintains the integrity of the environment. However, more research is needed in this area so that farmers can capitalize on a more efficient operation.

Research in new seed varieties that require less water and fertilizer to harvest holds great promise for the future of agriculture. Seed varieties make it possible to raise yields in crops, increase nutritional values, reduce pesticide and fertilizer use, as well as conserve land and water. We must continue to explore more methods for greater efficiency in crop production that still result in producing a quality crop.

The continued success of the American farmer is dependent on new and expanded market opportunities that increase the stability of American agriculture. Although farmers naturally find new and innovative ways to increase production and reduce costs, agricultural research is crucial in keeping our farmers in business, which ensures that both the U.S. and the world can enjoy a safe, abundant, and affordable food, fiber, and fuel supply.

EXPORTS OF PRODUCTS FROM CORN—2008

Product	Volume	Units	Value
Corn meal	312,148,682	Kilograms	\$114,249,659
Corn starch	112,179,267	Kilograms	\$67,062,172
Corn oil, crude	153,370,872	Kilograms	\$223,859,455
Corn oil, once refined	13,274,747	Kilograms	\$17,191,732
Corn oil, fully refined	182,567,734	Kilograms	\$294,048,753
Glucose (dextrose)	113,491,328	Kilograms	\$ 63,011,769
Glucose syrup not containing fructose or containing in the dry state less than 20% fructose	305,088,953	Kilograms	\$113,586,615
Glucose syrup with 20–50% fructose	162,218,031	Kilograms	\$48,094,905
Chemically pure fructose	92,863,097	Kilograms	\$78,037,858
Fructose syrup with 50%+ fructose	533,656,175	Kilograms	\$182,125,200
Fructose solids containing more than 50% fructose	4,930,384	Kilograms	\$23,465,917
Bran, sharps, and other residues	198,850	Metric tons	\$30,725,209
Corn gluten feed	1,265,509	Metric tons	\$272,616,290
Corn gluten meal	1,044,974	Metric tons	\$470,848,695
Other residues of starch manufacturing	225,204	Metric tons	\$34,738,212
Corn oil cake	25,910,223	Kilograms	\$6,137,219
Dextrins	37,061,858	Kilograms	\$31,168,138
Modified starches derived from corn starch	256,933,901	Kilograms	\$208,433,187

Source: U.S. Department of Commerce

Year in Review

*J. Patrick Mohan, Chairman, Corn Refiners Association
Tate & Lyle Americas*



CRA Soon to Celebrate 100 Years of Service

In just four years, the Corn Refiners Association will celebrate its one-hundredth anniversary. During this time, engineering

developments have improved plant efficiency, product quality, and consumer choice. Today, refined corn ingredients offer significant functional characteristics enabling a wide range of products that enrich consumers' lives in a myriad of ways, including through food, pharmaceutical, and industrial applications.

During my tenure as Chairman of the Corn Refiners Association, I feel privileged to have been part of an industry team that is dedicated to finding solutions and raising the bar, while facing challenges on domestic and global levels. It is an industry that realizes the importance and the long-term benefits of its role in providing jobs and innovative products for consumers, while helping maintain our environment and bolstering the national economy. It is an industry with a rewarding past and a bright future.

Prioritizing Safety

CRA Safety Awards Program Implemented

The CRA has always recognized the vital importance of safety in its plants, products, and manufacturing processes. In recognition of our industry's commitment to safety, a new awards program was implemented to further underscore its importance. We are pleased to recognize and honor the award recipients for their dedication and commitment to a safe working environment.

Public Relations and Advertising Efforts

The CRA multimedia public relations and advertising campaign on high fructose corn syrup that began in 2008 has resulted in

measurable progress. Because of the campaign's comprehensive approach – grounded in fact-based, peer-reviewed, scientific research – numerous dietitians, health professionals, and other influencers that shape consumer opinions now recognize the science-based facts about high fructose corn syrup and sugar: that they are nutritionally the same.

SAFETY PROGRAM AWARD WINNERS

Outstanding Safety Award

- Corn Products International, Inc.
 - Bedford Park, IL
- National Starch LLC
 - Indianapolis, IN
 - North Kansas City, MO

Distinguished Safety Award

- Archer Daniels Midland Company
 - Clinton, IA
 - Columbus, NE
- Cargill, Incorporated
 - Memphis, TN
- Corn Products International, Inc.
 - Bedford Park, IL
- National Starch LLC
 - Indianapolis, IN
- Tate & Lyle Americas
 - Loudon, TN

Award for Safety Achievement

- Archer Daniels Midland Company
 - Clinton, IA
 - Columbus, NE
- Cargill, Incorporated
 - Cedar Rapids, IA
 - Decatur, AL
 - Hammond, IN
 - Memphis, TN
 - Wahpeton, ND
- Corn Products International, Inc.
 - Bedford Park, IL
 - Stockton, CA
- National Starch LLC
 - Indianapolis, IN
 - North Kansas City, MO
- Tate & Lyle Americas
 - Loudon, TN

Notably, when consumers are presented with the facts, their views about high fructose corn syrup often change, resulting in a greater understanding of its important role in our nation's food and beverage supply and its metabolic equivalence to sugar. High fructose corn syrup is more economical than sugar, equally sweet, has the same number of calories, and is handled similarly by the body. Like sugar, it should be enjoyed in moderation as a part of a healthy lifestyle. High fructose corn syrup remains the most economical, functionally superior caloric sweetener on the market. It makes many foods and beverages possible at affordable prices; an important attribute in today's economical environment.

Outreach Efforts

In 2009, the CRA secured sponsorships, speaking opportunities, and exhibited at professional conferences hosted by numerous organizations reflecting a wide variety of interests in the dietetic, food and beverage technology, health, nutrition, wellness, and weight management arenas. These opportunities enabled us to reach multiple audiences through presentations from independent scientific experts and to provide factual information based on credible science.

Sweetened Beverage Tax

This year, our industry joined the Americans Against Food Taxes coalition working with

hundreds of national and state groups, to oppose taxes on sweetened beverages to pay for health care reform. No single food or beverage is responsible for obesity in America. All calories count and that is why taxing a single component of the nation's complex food and beverage supply will not make Americans healthier.

Climate Change

The corn wet milling industry takes seriously its responsibility to minimize greenhouse gas emissions and has a long history of working proactively and voluntarily with the U.S. Environmental Protection Agency. Our industry is a strong advocate of a greenhouse gas emission reduction program that results in cleaner air, while accommodating the public's need for affordable energy and protecting American jobs and rural communities.

The efficient use of resources is essential for corn refiners to stay competitive, whether it is water re-use, waste minimization or air emission reductions – all areas in which the corn wet milling industry has excelled. Because of the economic effects of high energy prices, it is vital that our manufacturing facilities continue to seek new ways of finding sustainable uses of energy and water resources.

The positive strides made on environmental

SHIPMENTS OF PRODUCTS OF THE CORN REFINING INDUSTRY – 2008

Starch Products <i>(includes corn starch, modified starch and dextrins)</i>	6,081,486,000
Refinery Products <i>(includes glucose syrup, high fructose corn syrup, dextrose, corn syrup solids, maltodextrins)</i>	31,168,715,000
High Fructose Corn Syrup 42%	9,247,027,000
High Fructose Corn Syrup 55% and Above	12,246,642,000
Total High Fructose Corn Syrup	21,493,669,000
Total — Domestic Basic Products	37,250,201,000
Total — Export Basic Products	2,961,755,000
Corn Oil — Crude and Refined	1,195,664,000
Corn Gluten Feed and Corn Oil Meal	10,399,186,000
Corn Gluten Meal	2,252,675,000
Steepwater	1,491,511,000

Compiled for the Corn Refiners Association by VERIS Consulting, LLC. Statistics represent shipments by members of the Association. Shipments are in pounds, commercial weights, and do not include co-products derived from ethanol production.

controls and energy efficiency underscores a strong and continued industry commitment to operating in responsible, effective, and beneficial ways.

Biotechnology

Our industry has a long-standing commitment to advances in agricultural technology. Increased crop yields make food more affordable for consumers around the globe and biotechnology achieves higher yields with less impact on the environment.

Regulatory control of new technologies is an important component in maintaining consumer confidence in biotechnology and keeping export markets open for U.S. food and agricultural commodities, while maintaining jobs from value-added technology.

For these reasons, our industry has voiced serious concerns about the potential deregulation of Syngenta Seeds Corn Event alpha-amylase (Event 3272) which breaks down starch and, if misdirected into corn wet milling operations, could jeopardize the ability of corn refiners to deliver high-end starches for food and industrial applications. We have urged government officials to first

ensure that all appropriate safeguards are instituted to prevent serious degradation of high quality starches from this trait.

On the international front, corn gluten feed exports to Europe remain flat due to the European approval process which lacks scientific merit. We support U.S. government efforts to work with its European partners in a timely manner that leads to a science-based, speedy return of normal trade flows of U.S. high-quality, high-protein corn gluten feed to Europe.

International Trade

Our industry strongly supports new market access for refined corn products and believes that trade offers consumers around the globe increased product choices at affordable prices. Congress should ratify the proposed bilateral agreements with Korea, Colombia, and Panama. All three agreements, if passed, would reduce tariffs to zero on corn wet milled products over the life of these agreements. The CRA also supports the timely conclusion of the World Trade Organization negotiations in a manner that results in new market opportunities for our industry.

CORN: SUPPLY AND DISAPPEARANCE

Year Beginning September 1	Supply				Disappearance						Ending Stocks
	Beginning Stocks	Production	Imports	Total	Food, Alcohol, and Industrial	Seed	Feed and Residual	Total Domestic Disappearance	Exports	Total Disappearance	
2000	1,717.5	9,915.1	6.8	11,689.4	1,937.6	19.3	5,824.1	7,799.0	1,941.3	9,740.3	1,899.1
2001	1,899.1	9,502.6	10.1	11,411.8	2,026.3	20.1	5,864.2	7,910.63	1,904.8	9,815.4	1,596.4
2002	1,596.4	8,966.8	14.5	10,577.7	2,320.2	20.0	5,562.9	7,903.10	1,587.9	9,491.0	1,086.7
2003	1,086.7	10,087.3	14.1	11,188.0	2,516.6	20.6	5,793.0	8,330.13	1,899.8	10,230.0	958.1
2004	958.1	11,805.6	10.8	12,774.5	2,666.2	20.8	6,155.5	8,842.47	1,818.1	10,660.5	2,114.0
2005	2,114.0	11,112.2	8.8	13,235.0	2,961.8	19.9	6,152.3	9,133.99	2,133.8	11,269.7	1,967.2
2006	1,967.2	10,531.1	12.0	12,510.0	3,467.0	23.8	5,591.0	9,081.25	2,125.4	11,206.6	1,303.7
2007	1,303.7	13,038.0	20.0	14,362.0	4,365.0	22.0	5,913.0	10,299.99	2,437.0	12,737.4	1,624.2
2008*	1,624.0	12,101.0	15.0	13,740.0	4,898.0	22.0	5,250.0	10,170.00	1,850.0	12,020.0	1,720.4
2009**	1,720.4	12,761.0	15.0	14,496.4	5,425.3	22.7	5,300.0	10,775.00	2,100.0	12,875.0	1,621.4

Source: USDA—Economic Research Service. Latest data may be preliminary or projected. Totals may not add due to rounding. * Preliminary **Projected (in million bushels)

Corn Refiners Making a Positive Impact in Their Communities

The corn refining industry plays an important part in strengthening the economy of rural America by supporting the local communities where they do business. Corn refiners make a significant contribution to the health of our national economy and the local markets where refining plants are located serving as a cornerstone of employment. Commitment to community does not end with sustainable jobs; corn refiners also build strong bonds through charitable donations, educational support, community development, and provide their employees with a safe and rewarding workplace.

Economic Impact

The member companies of the corn refining industry collectively provide well-paying jobs to over 65,000 employees across the country. In Illinois, almost 11,000 individuals work in the industry. The national payroll for our

specific sector exceeds \$3.3 billion. Nearly 41,000 farmers benefit from the sale of their corn to corn wet millers, more than a quarter of which supply corn to the industry from Indiana alone.

Corn refiners also contribute to the economy through purchases of material inputs such as utilities, fuels, shipping materials, transportation and manufacturing equipment, processing chemicals/enzymes, and other items necessary for plant operations. Nationwide, corn refiners spend more than \$23 billion annually on these types of expenditures, which have further multiplier effects in our nation's rural areas.

Another important economic contribution from the corn refining industry is property taxes. Corn refiners add nearly \$8.8 billion annually to local economies through payment of property taxes, which in turn provides American citizens important public services.

CORN: FOOD AND INDUSTRIAL USES

Year	High Fructose Corn Syrup	Glucose & Dextrose	Starch	Fuel Alcohol	Beverage Alcohol	Cereals & Other Products	Total
1990	379	200	219	349	135	124	1,406
1995	473	227	226	396	125	161	1,608
2000	530	218	247	628	130	185	1,938
2001	541	217	246	706	131	186	2,027
2002	532	219	256	996	131	187	2,321
2003	530	228	271	1,168	132	187	2,516
2004	521	222	277	1,323	133	189	2,567
2005	529	229	275	1,603	135	190	2,961
2006	510	239	272	2,119	136	190	3,466
2007	490	236	262	3,026	135	192	4,341
2008	465	227	230	3,650	134	192	4,898
2009*	465	230	230	4,200	134	193	5,452

Source: USDA—Economic Research Service. Year Beginning Sept. 1. *Estimated (In million bushels)

Community Development

Corn wet milling plants represent a significant capital investment and, as such, represent a stable entity in the communities where they are located. But the investment goes far beyond the boundaries of the plant location. Many corn refiners enrich their communities through a wide variety of efforts. Community involvement benefits residents, and offers plant employees opportunities for personal development and a sense of pride from their contributions to society.

There are several methods through which corn refiners support community development including project funding, human resources, and donation of products and equipment.

Doing business in an engaged community is positive for corn refiners. Many companies support community leadership development by sponsoring or organizing opportunities for citizens to connect, learn, and generate ideas for community improvement. Fostering future community leaders through sponsorship of youth employment opportunities is another way corn refiners support their neighborhoods.

Local residents can often enjoy outdoor activities such as biking a linear path, playing baseball on a groomed field or playing on a safe, clean playground due to support from the corn wet milling industry via project funds or employee volunteer efforts. Corn refiners also support development of active communities through sporting events and field days.

Support of the arts include efforts such as sponsoring exhibits at local museums, commissioning works of art for city beautification projects, and organizing programs to expand cultural experiences of students.

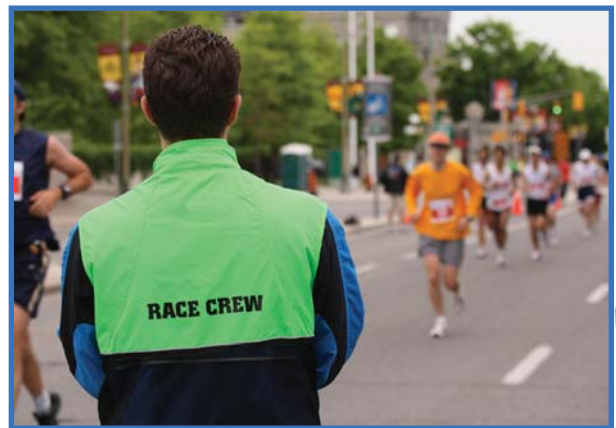
Fostering pride in community is another way corn refiners make a positive impact. Community cleanup and recycling programs are frequently supported through employee volunteers. Residents can often find corn refiners listed in the sponsors of city-wide festivals and celebrations.

Charitable Donations

Numerous corn refining plants actively participate in raising funds for local charities. Their support takes several forms, including direct contributions and grants, matching gifts, and employee volunteers. Local organizations benefit from activities such as sponsored walks, food drives, and clothing donations. Charities that benefit from these efforts range from well-established organizations such as the United Way, Salvation Army, and Habitat for Humanity to local community organizations.



Corn refiners frequently fund community improvement projects.



Corn refiners often contribute financially to charity sporting events.



Helping young minds flourish through volunteer activities is another way corn refiners commonly support local communities.

Education

A strong educational system helps build vibrant communities. Corn refiners are avid supporters of educational initiatives for children and young adults.

Children in primary and secondary schools benefit from employee volunteers who share their knowledge of agriculture, science, and other areas of expertise. Corn refiners sponsor special events and programs that help students learn about the farming industry and agricultural business. Educational support also comes from monetary donations that help fund field trips, purchase supplies and equipment, and fund teacher training.

Students in secondary schools are likely to encounter volunteers from local plants at career fairs where students learn about careers in corn refining, and how corn-wet milled products enhance their lives. Scholarships

and award programs sponsored by corn refiners fosters academic excellence and encourages students to pursue careers in engineering, computer programming, science, and business management.

Corn refiners support colleges and universities by supporting key research initiatives. Financial contributions take the form of donations for general academic support, scholarships for work/study programs, grants to develop specific areas of study, and as endowments.

Licensing technologies developed by universities is another way that corn refiners support higher education, which can be fiscally and academically rewarding.

Safe and Rewarding Workplace

Part of being a responsible member of the community involves creating and maintaining

U.S. PER CAPITA SWEETENER DELIVERIES FOR FOOD AND BEVERAGE USE*

Year	Refined Sugar	High Fructose Corn Syrup	Glucose	Dextrose	Total	Honey and Edible Syrups	Total Caloric Sweeteners
		CORN SWEETENERS (DRY BASIS)					
1966	97.3	0.0	9.7	4.2	13.9	1.7	112.9
1970	101.8	0.5	10.7	4.6	15.9	1.5	119.1
1980	83.6	19.0	12.9	3.5	35.3	1.3	120.2
1990	64.4	49.6	13.6	3.6	66.8	1.2	132.4
2000	65.5	62.7	15.8	3.4	81.8	1.5	148.9
2001	64.5	62.6	15.5	3.3	81.4	1.4	147.3
2002	63.3	62.9	15.5	3.3	81.6	1.5	146.5
2003	61.0	61.0	15.2	3.1	79.3	1.4	141.7
2004	61.7	59.9	15.6	3.3	78.9	1.3	141.9
2005	63.2	59.2	15.3	3.3	77.8	1.5	142.5
2006	62.5	58.3	13.8	3.1	75.2	1.6	139.3
2007	62.1	56.3	13.7	3.0	73.0	1.4	136.5
2008	66.3	53.2	13.4	2.8	69.3	1.4	137.1

Source: USDA—Economic Research Service
Units measured in pounds

* Per capita deliveries of sweeteners by U.S. processors and refiners and other end users represent the per capita supply of caloric sweeteners. Actual human intake of caloric sweeteners is lower because of uneaten food, spoilage, and other losses. Figures do not include deliveries to alcohol manufacturers.

a workplace where employees thrive in a safe, rewarding environment.

Corn refiners are committed to providing a safe work environment. Following Occupational Safety & Health Administration regulations and engaging employees to design and implement outstanding safety programs that “go the extra mile” are examples of how corn refiners demonstrate their responsibility to employees’ safety. Many plants also collaborate with local fire departments and emergency response teams to conduct drills for emergency preparedness.

Encouraging employees to adopt healthy lifestyles contributes to a safe and enriching work environment. Many plants offer exercise facilities or company-sponsored fitness programs. Other activities to promote health and fitness include health fairs, flu vaccinations, exercise programs, and educational sessions on health-related topics. Additionally, corn refiners provide donations to local hospitals for equipment or special programs that benefit employees and members of the community alike.

Providing access to a variety of continuing education and development opportunities contributes to a gratifying workplace. It also benefits the local community through support of higher education institutions. Corn refiners support employee education and development through continuing education assistance as well as in-house training on topics ranging from ingredient development to effective people management.

Corn refiners also help employees thrive by providing opportunities to make valuable contributions to the company. Employees are often encouraged to utilize their skills and knowledge to collaborate with colleagues to find ways to improve operations.

The support and commitment of corn refiners to their neighbors extends beyond these illustrative examples. It is an industry that is committed to enriching local communities and its employees, and making invaluable contributions to American lives.

WORLD CORN PRODUCTION, CONSUMPTION, AND STOCKS

	2007/08	2008/09
	<i>(thousand metric tons)</i>	
Production		
Argentina	22,000	12,600
Brazil	58,600	50,000
Canada	11,649	10,600
China	152,300	165,900
Egypt	6,174	6,217
EU-27	47,554	62,688
India	18,960	18,480
Indonesia	8,500	8,700
Mexico	23,600	25,000
Nigeria	6,500	7,900
Philippines	7,277	6,846
Russian Federation	3,950	6,600
Serbia	4,054	5,900
South Africa	13,164	12,000
Ukraine	7,400	11,400
Others	69,018	71,210
United States	331,177	307,386
World Total	791,877	789,427
Total Consumption		
Argentina	7,000	6,400
Brazil	42,500	44,500
Canada	13,769	12,500
China	149,000	152,000
Egypt	10,400	10,300
EU-27	63,900	61,000
India	14,200	17,600
Indonesia	8,500	8,800
Japan	16,600	16,400
Republic of Korea	8,633	7,600
Mexico	32,000	32,600
Nigeria	6,550	7,800
Philippines	7,150	7,300
South Africa	9,200	9,800
Vietnam	5,200	5,200
Others	114,090	116,245
United States	261,632	258,965
World Total	770,601	775,056
Ending Stocks		
Brazil	12,579	11,379
China	39,394	53,094
EU-27	4,461	6,899
Iran	2,137	2,137
Republic of Korea	2,084	1,578
Mexico	4,131	3,831
South Africa	3,490	3,290
Others	20,783	19,412
United States	41,255	43,065
World Total	130,314	144,685

Source: USDA—Foreign Agricultural Service. Based on local marketing years in thousand metric tons.

Increasing Value While Reducing Impact: Corn Refiners' Commitment to the Environment

The production and utilization of corn in American society has long played a role in serving the needs of our country. That commitment has never been stronger than it is today. Whether it is the need to provide jobs to rural America, create ingredients that contribute to the daily lives of Americans, or working to address the growing environmental and energy priorities of the U.S. economy, the corn refining industry is leading the way.

Advances in environmentally-beneficial practices in the corn refining industry start at the corn production stage. Farmers have initiated a green revolution by using new technologies and innovative practices that allow them to produce more corn with less energy and fewer resources. They have adopted sound practices in managing the land, reduced pesticide and fertilizer use, improved soil structure, and dramatically reduced topsoil erosion.

Increasing Efficiency in Plant Operations

Commitment to the environment is a social responsibility that the corn refining industry takes seriously. Resource-efficiency helps reduce the industry's environmental impact and provides financial incentives. Many corn refining companies have established notable sustainability goals for reduction of energy and water consumption, greenhouse gas and other emissions, as well as liquid and solid waste.

Corn refiners are leaders in waste minimization and are currently able to use approximately 99 percent of the corn kernel in their products. Much of what is collected in air pollution control and water pollution control equipment is recycled into product streams.

Cogeneration energy production systems provide electricity and heat for process operations. These systems are more efficient than separate generation of electricity and heat, resulting in reductions in emissions and energy required to run the plant. Many of the facilities generate biogas from the responsible treatment

of waste products that is captured and used to replace natural gas in animal feed dryers.

Corn refiners have had a century to refine, improve, and optimize ways to use the water necessary for the corn refining process. From a processing aid to a cooling mechanism, water serves a vital role in the manufacture of the many ingredients derived from the corn refining process.

As a result, multiple re-use of water is essential and is the primary means the industry uses to protect this valuable resource. In some corn refining processes, water is re-used up to 10 times. For example, at the initial stage of the wet milling process, the corn is steeped in water that has already been used many times in latter parts of the milling process (counter-current water flow) to better expand and separate the kernels into their component parts.

Products Provide Value and Reduce Impact

Starch is one of the paper industry's most important ingredients and provides numerous benefits that may not be obvious. For instance, more than 85 percent of starch used in the U.S. paper making process is corn starch. Starch is added to replace the natural binding agents the wood pulp loses during processing.

Starch is even more important in making recycled paper products. Recycled fiber is weak and needs the bonding strength that starch provides. Specifically, cationic starch serves as a strengthening agent and has allowed paper manufacturers to use recycled fibers more effectively. Not only does the ability to transform more recycled content into quality papers benefit the environment, the starch increases fiber retention, so the end product performs better; and the manufacturing process is cleaner and more efficient. Without cationic starches, it is difficult to recycle paper many times.

Highly specialized starches also can be used by other industries as effective and

environmentally superior alternatives to synthetic agents in wastewater treatment.

Recent advances in starch technology show promise in the area of adhesives because they require less water and subsequently less time and energy to dry than more traditional methods. More environmentally-friendly adhesives from starch may be able to replace current petroleum-based acetates and alcohols used to help laminate graphics onto cardboard and latexes used as binders in paper coatings.

Biodegradable and energy efficient caps, cups, paper coatings, fabrics, carpeting, and agricultural mulch films are all possible today because of three types of corn-based polymers. Corn-based plastics can be formed on traditional plastic equipment into bottles, containers, trays, and other packaging.

These products are compostable and play a critical role in the diversion of food scraps from landfills to composting facilities and further reduce greenhouse gas production. Production of these corn-based polymers uses up to 68 percent less fossil fuel than comparable traditional plastics manufacturing and generates up to 55 percent fewer greenhouse gas emissions.

Corn-based products further enable new materials, such as fiber, to be developed from renewable feedstocks that use less energy. The materials have become a superb choice for fabrics and carpeting, since they have excellent stretch, stain resistance, resilience, and hold color well.

Industry/Government Collaboration

Corn refiners have long been proponents of and leaders in environmental responsibility through not only the use of energy efficient technologies and product development, but also conscientious compliance with environmental regulations. In perhaps the first-ever industry-led cooperative effort of its

kind, CRA worked successfully with the U.S. Environmental Protection Agency (EPA) to develop a more accurate way to measure volatile organic compound (VOC) emissions from corn wet milling facilities.

This measurement tool was approved by EPA and became the new official method for the corn wet milling industry. It quantifies total VOC mass emissions on an individual VOC basis and significantly improves scientific understanding of VOC emissions, serving as a prototype for several other industries to better measure emissions.

Corn refiners/wet corn milling companies also participate in Energy Star®, a joint program of the U.S. EPA and the U.S. Department of Energy. Energy Star notes that the program helps us “all save money and protect the environment through energy efficient products and practices. EPA’s Energy Star partnership offers a proven energy management strategy that helps in measuring current energy performance, setting goals, tracking savings, and rewarding improvements.” All members of CRA participate in this innovative program.

In Summary

Extraordinary strides in technological development employed by corn refiners are proactively meeting consumer, societal, and industrial demands. Through these continuous efforts, the industry is building a brighter future by using corn for a multitude of essential ingredients that meet consumers’ needs in a variety of unique and meaningful ways. These developments improve the American economy and remind us how widespread and beneficial corn refining has become.



Corn starch-based alternatives to petroleum-based acetates, alcohols and latexes help the paper industry reduce its environmental footprint.

CORN FOR GRAIN: ACREAGE, YIELD, AND PRODUCTION

State	Area Harvested (thousand acres)			Yield (bushels per acre)			Production (thousand bushels)		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
AL	165	280	235	72	78	104	11,880	21,840	24,440
AZ	18	22	15	170	185	165	3,060	4,070	2,475
AR	180	590	430	146	169	155	26,280	99,710	66,650
CA	110	190	170	165	182	195	18,150	34,580	33,150
CO	860	1,060	1,080	156	140	137	134,160	148,400	147,960
DE	161	185	152	145	99	125	23,345	18,315	19,000
FL	30	35	35	82	90	105	2,460	3,150	3,675
GA	225	450	310	110	127	140	24,750	57,150	43,400
ID	65	105	80	170	170	170	11,050	17,850	13,600
IL	11,150	13,050	11,900	163	175	179	1,817,450	2,283,750	2,130,100
IN	5,380	6,370	5,460	157	154	160	844,660	980,980	873,600
IA	12,350	13,900	12,800	166	171	171	2,050,100	2,376,900	2,188,800
KS	3,000	3,680	3,630	115	138	134	345,000	507,840	486,420
KY	1,040	1,340	1,120	146	128	136	151,840	171,520	152,320
LA	290	730	510	140	163	144	40,600	118,990	73,440
MD	425	465	400	140	101	121	59,500	46,965	48,400
MI	1,950	2,340	2,140	147	123	138	286,650	287,820	295,320
MN	6,850	7,850	7,200	161	146	164	1,102,850	1,146,100	1,180,800
MS	325	910	700	107	148	140	34,775	134,680	98,000
MO	2,630	3,270	2,650	138	140	144	362,940	457,800	381,600
MT	18	38	35	146	140	136	2,628	5,320	4,760
NE	7,750	9,200	8,550	152	160	163	1,178,000	1,472,000	1,393,650
NJ	64	82	74	129	124	116	8,256	10,168	8,584
NM	45	54	55	185	180	180	8,325	9,720	9,900
NY	480	550	640	129	128	144	61,920	70,400	92,160
NC	740	1,010	830	132	100	78	97,680	101,000	64,740
ND	1,400	2,350	2,300	111	116	124	155,400	272,600	285,200
OH	2,960	3,610	3,120	159	150	135	470,640	541,500	421,200
OK	220	270	320	105	145	115	23,100	39,150	36,800
OR	29	35	33	180	200	200	5,220	7,000	6,600
PA	960	980	880	122	124	133	117,120	121,520	117,040
SC	290	370	315	110	97	65	31,900	35,890	20,475
SD	3,220	4,480	4,400	97	121	133	312,340	542,080	585,200
TN	500	790	630	125	106	118	62,500	83,740	74,340
TX	1,450	1,970	2,030	121	148	125	175,450	291,560	253,750
UT	17	22	23	157	150	157	2,669	3,300	3,611
VA	345	405	340	120	86	108	41,400	34,830	36,720
WA	75	115	90	210	210	205	15,750	24,150	18,450
WV	26	27	26	120	111	130	3,120	2,997	3,380
WI	2,800	3,280	2,880	143	135	137	400,400	442,800	394,560
WY	45	60	52	129	129	134	5,805	7,740	6,968
US	70,638	86,520	78,640	149.1	150.7	153.9	10,531,123	13,037,875	12,101,238

Source: USDA—National Agricultural Statistics Service. AK, CT, HI, ME, MA, NV, NH, RI, VT not estimated.

CORN REFINERS ASSOCIATION MEMBER COMPANIES PRODUCTS

	Archer Daniels Midland Company	Cargill, Incorporated	Corn Products International, Inc.	National Starch LLC	Penford Products Co.	Roquette America, Inc.	Tate & Lyle Americas
STARCH PRODUCTS							
Unmodified, food	•	•	•	•	•	•	•
Unmodified, industrial	•	•	•	•	•	•	•
Modified, food		•	•	•	•	•	•
Modified, industrial	•	•	•	•	•	•	•
Dextrins	•	•	•	•	•	•	•
Cyclodextrins						•	
REFINERY PRODUCTS							
Glucose syrups	•	•	•			•	•
Maltodextrins	•	•	•			•	•
Dextrose monohydrate	•	•	•			•	•
Dextrose anhydrous		•	•			•	
High Fructose Corn Syrup-42	•	•	•			•	•
High Fructose Corn Syrup-55	•	•	•			•	•
Crystalline fructose	•						•
CO-PRODUCTS							
Crude oil	•	•	•				
Refined oil	•	•	•				
Corn gluten feed	•	•	•	•	•	•	•
Corn gluten meal	•	•	•	•	•	•	•
Corn germ or corn germ meal	•	•	•	•	•	•	•
Steepwater (CFCE)	•	•	•	•	•	•	•
Carbon dioxide	•						•
Corn fiber food/industrial ingredients		•					•
FERMENTATION AND OTHER CHEMICALS							
Citric acid	•	•					•
Lactic acid	•	•					
Lysine	•						
Threonine	•						
Xanthan gum	•	•					•
Erythritol		•	•				
Sorbitol	•	•	•			•	
Xylitol		•				•	
Mannitol	•	•	•			•	
Maltitol	•	•	•			•	
Hydrogenated starch hydrolysates						•	
Glucose hydrolysates						•	
OTHER							
Ethanol, fuel/industrial	•	•			•		•
Ethanol, beverage	•						

Product lists are accurate as of publication date, but may change with time. Also available online at <http://www.corn.org/memberproductlines.htm>.

Corn Refiners Association Member Companies Domestic and International Plant Locations

Archer Daniels Midland Company

P.O. Box 1470
Decatur, Illinois 62525

Domestic Plants:

Cedar Rapids, Iowa 52404
Clinton, Iowa 52732
Columbus, Nebraska 68601
Decatur, Illinois 62525
Marshall, Minnesota 56258-2744

International Plant:

Guadalajara, Jalisco, Mexico

Cargill, Incorporated

P.O. Box 5662/MS62
Minneapolis, Minnesota
55440-5662

Domestic Plants:

Blair, Nebraska 68008-2649
Cedar Rapids, Iowa 52406-2638
Dayton, Ohio 45413-8001
Eddyville, Iowa 52553-5000
Hammond, Indiana 46320-1094
Memphis, Tennessee 38113-0368
Wahpeton, North Dakota 58075

International Plants:

Uberlandia, Minas Gerais, Brazil
Song Yuan, China
Haubourdin, Pas-de-Calais, France
Krefeld, Nordrhein-Westfalen,
Germany
Castelmassa, Veneto, Italy
Martorell, Barcelona, Spain
Orhangasi, Bursa, Turkey

Corn Products International, Inc.

5 Westbrook Corporate Center
Westchester, Illinois 60154

Domestic Plants:

Bedford Park, Illinois 60501-1933
Stockton, California 95206-0129
Winston-Salem, North Carolina
27107

International Plants:

Cardinal, Ontario, Canada
London, Ontario, Canada
Port Colborne, Ontario, Canada
Guadalajara, Jalisco, Mexico
San Juan del Rio, Queretaro, Mexico
Tlalnepantla, Mexico State, Mexico
Baradero, Buenos Aires, Argentina
Chacabuco, Buenos Aires, Argentina
Balsa Nova, Parana, Brazil
Cabo, Pernambuco, Brazil
Sao Goncalo, Rio de Janeiro, Brazil
Mogi-Guaçu, Sao Paulo, Brazil
Llay-Llay, Valparaiso, Chile
Shouguang, Shandong, China
Cali, Valle del Cauca, Colombia
Lima, Peru
Eldoret, Rift Valley, Kenya
Icheon, Kyunggi-do, South Korea
Incheon, Bupyeong-ku, South Korea
Faisalabad, Punjab, Pakistan
Cornwala, Punjab, Pakistan

National Starch LLC

10 Finderne Avenue
Bridgewater, New Jersey
08807-0500

Domestic Plants:

Indianapolis, Indiana 46221
North Kansas City, Missouri 64116

International Plants:

Trombudo Central, Brazil
Hamburg, Germany
Shanghai, China

Penford Products Co.

(A company of Penford Corporation)

P.O. Box 428
Cedar Rapids, Iowa 52406-0428

Domestic Plant:

Cedar Rapids, Iowa 52404-2175

International Plants:

Lane Cove, Sydney, Australia

Roquette America, Inc.

1417 Exchange Street
P.O. Box 6647
Keokuk, Iowa 52632-6647

Domestic Plant:

Keokuk, Iowa 52632-6647

International Plants:

Lestrem, Pas-de-Calais, France
Beinheim, Bas-Rhin, France
Cassano Spinola, Alessandria, Italy
Benifayo, Valencia, Spain
Calafat, Dolj, Romania

Tate & Lyle Americas

(A subsidiary of Tate & Lyle, PLC)

P.O. Box 151
Decatur, Illinois 62525

Domestic Plants:

Decatur, Illinois 62521
Fort Dodge, Iowa 50501
Lafayette, Indiana 47902
Lafayette, Indiana 47905
Loudon, Tennessee 37774

International Plant:

Guadalajara, Jalisco, Mexico

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