science for a changing world

2011 Minerals Yearbook

NITROGEN

U.S. Department of the Interior
U.S. Geological Survey

December 2013

Nitrogen

By Lori E. Apodaca

The world production table was prepared by Glenn J. Wallace, international data coordinator.

In 2011, U.S. ammonia production contained 9.35 million metric tons (Mt) of nitrogen, about a 13% increase from production in 2010, and apparent consumption increased by about 8% from that in 2010. Exports of ammonia decreased by 26% from those in 2010, and imports were slightly higher than those of 2010. Most of the imports in 2010 were from Canada, Russia, Trinidad and Tobago, and Ukraine. About 87% of the domestically produced ammonia consumed in the United States was used in fertilizer applications. Global ammonia production in 2011, which was estimated to contain 135 Mt of nitrogen, was higher than that in 2010. China, India, Russia, and the United States were the leading producers, together accounting for about 54% of the total.

Legislation and Government Programs

The U.S. Department of Homeland Security (DHS) proposed new regulations for the creation of the Ammonium Nitrate Security Program for the safe handling of ammonium nitrate across the United States. The Ammonium Nitrate Security Act was passed by Congress in 2007; at that time DHS was authorized to develop a program to regulate ammonium nitrate. Since the act was passed, the U.S. industry has followed voluntary standards; however, under the proposed Ammonium Nitrate Security Program these standards would become mandatory. Under the proposed regulations, those engaged in the sale and transfer of ammonium nitrate would be barred from selling or transferring 11 kilograms (25 pounds) or more of ammonium nitrate to anyone who is not registered with DHS. In addition, these individuals would be required to report losses or thefts to federal authorities within 24 hours. All records related to the sale and transfer of ammonium nitrate would have to be maintained for 2 years (Fertilizer Week, 2011i).

In November, the U.S. International Trade Commission determined that revoking the existing antidumping duty orders on solid urea from Russia and Ukraine would lead to continuation or recurrence of material injury to the industry in the United States. As a result, the existing antidumping duty orders would remain in place. Urea from Russia and Ukraine has been subject to dumping duties since 1987 (U.S. International Trade Commission, 2011).

Production

Industry statistics for anhydrous ammonia and derivative products were developed by the U.S. Census Bureau and The Fertilizer Institute and adjusted by the U.S. Geological Survey. A summary of the production of principal inorganic fertilizers through the second quarter was reported in the U.S. Census Bureau's series MQ325B. Inorganic fertilizer data for the third and fourth quarters were available from The Fertilizer Institute. In 2011, production of anhydrous ammonia (82.2% nitrogen) increased by about 13% to 9.35 Mt of contained nitrogen compared with 8.29 Mt in 2010 (table 1). Of the total production, 87% was for use as a fertilizer; the remaining 13% was used in other chemical and industrial sectors (table 2).

The United States was a leading producer and consumer of elemental and fixed types of nitrogen. In declining order, urea, ammonium nitrate, ammonium phosphates [diammonium phosphate (DAP) and monoammonium phosphate (MAP)], nitric acid, and ammonium sulfate were the major downstream products derived from domestic and imported ammonia in the United States. Their combined estimated production was 8.76 Mt of contained nitrogen, with urea accounting for 28%, ammonium nitrate 27%, ammonium phosphates 20%, and nitric acid 18% of the total production (table 3).

Ammonia producers in the United States operated at about 86% of their design capacity in 2011; this percentage included capacities at plants that operated during any part of the year and did not include plants that were idle for all of 2011. Of the total available U.S. ammonia production capacity, more than 61% was concentrated in the States of Louisiana (36%), Oklahoma (19%), and Texas (6%), where there are large reserves of feedstock natural gas. CF Industries Holdings, Inc., Koch Nitrogen Co., LLC, PCS Nitrogen, Inc., and Agrium Inc., in descending order, accounted for 77% of total U.S. ammonia production capacity (table 4).

Potash Corp. of Saskatchewan Inc. (PotashCorp) announced in February that it would begin an 18-month process to restart its anhydrous ammonia plant at Geismar, LA. The plant was idled in 2003, a result of high natural gas prices. PotashCorp planned to invest $158 million to bring the facility back into operation. Ammonia production capacity for the plant was expected to be 1,360 metric tons per day (t/d); most of the ammonia was expected to be consumed in the production of nitric acid and urea ammonium nitrate (UAN) (Green Markets, 2011e).

In May, Egypt's Orascom Construction Industries' (OCI) wholly owned subsidiary OCI Nitrogen, acquired a majority stake in the integrated ammonia-methanol plant in Beaumont, TX, from Eastman Chemical Co. OCI acquired the plant through a joint venture, named Pandora Methanol LLC (Pandora), with Janus Methanol AG (Green Markets, 2011d). The plant has a production capacity of 250,000 metric tons per year (t/yr) of ammonia and 750,000 t/yr of methanol. In November, OCI's Fertilizer Group signed an agreement to acquire minority shares in its Texas-based subsidiary Pandora bringing its stake in the Beaumont plant to 100% and renaming Pandora to OCI Beaumont. Initially OCI had held 50% plus one share in Pandora prior to this acquisition (Fertilizer Week, 2011e).

LSB Industries, Inc. committed $9.4 million to bring three additional plants into operation at its facility in Pryor, OK. This included two anhydrous ammonia plants with an estimated combined capacity of 54,000 t/yr and a nitric acid plant with an estimated capacity of 60,000 t/yr. An engineering evaluation was underway to determine more accurate production capacities (Green Markets, 2011c).

Environment

Hypoxia has become a controversial environmental concern for the fertilizer industry and an issue that spawned significant research efforts to determine its cause. Hypoxia happens where water near the bottom of an affected area in a large body of water, such as the Gulf of Mexico, contains less than 2 parts per million of dissolved oxygen. Hypoxia can cause stress or death in bottom-dwelling organisms that cannot move out of the hypoxic or "dead" zone.

Dead zones in coastal oceans have been reported in more than 400 ecosystems, affecting a total area of more than 245,000 square kilometers (km) worldwide. The number of dead zones has approximately doubled each decade since the 1960s. More recently, dead zones have developed in continental seas, such as the Baltic Sea, the Black Sea, the East China Sea, the Gulf of Mexico, and the Kattegat (Diaz and Rosenberg, 2008).

In December, the Gulf of Mexico regional ecosystem restoration strategy was published by the Gulf Coast Restoration Task Force, a group established in 2010 by Executive Order 13554 to address the persistent and significant decline of the Gulf Coast of the United States. Goals of the Gulf Coast restoration effort are to restore and conserve habitat, to restore water quality, to replenish and protect living coastal and marine resources, and to enhance community resilience. The task force consisted of senior officials from seven Federal cabinet agencies, the Executive Office of the President, and representatives from the five Gulf States of Alabama, Florida, Louisiana, Mississippi, and Texas. In developing a strategy to address the issues in the Gulf Coast, the task force met at least once with each of the five Gulf States. The Gulf of Mexico regional strategy detailed a restoration framework and series of actions that the task force member agencies can take to support each of the restoration goals. Also, the strategy outlined a series of next steps that would better align agency programs and leverage scientific and fiscal resources (Gulf Coast Ecosystem Restoration Task Force, 2011, p. 1–5).

Consumption

In 2011, apparent consumption of ammonia was 14.9 Mt of contained nitrogen, about 8% higher than that in 2010. Apparent consumption is calculated as production plus imports minus exports, adjusted to reflect any changes in stocks. Consumption of nitrogen fertilizers in the United States for the 2011 crop year (ending June 30, 2011) is listed in table 5. Consumption in fertilizers was estimated to be 11.6 Mt of contained nitrogen, which was about 4% higher than that of 2010. Anhydrous ammonia and nitrogen solutions, mostly UAN solutions containing 29.8% to 29.9% nitrogen, were the principal nitrogen fertilizer products, representing 27% and 28% of fertilizer consumption, respectively. Urea (45.9% nitrogen) constituted 20% of fertilizer consumption during the 2011 crop year. Ammonium nitrate (33.9% nitrogen) and ammonium sulfate each constituted 2% of 2011 nitrogen fertilizer consumption. The leading nitrogen-consuming States in the 2011 crop year were California, Iowa, Illinois, Kansas, and Nebraska.

Stocks

Stocks of ammonia at yearend 2011 were estimated to be 178,000 metric tons (t), about 8% higher than comparable stocks at yearend 2010 (table 6).

Transportation

Ammonia was transported by refrigerated barge, rail car, pipeline, and tank truck. Three companies served 11 States with 5,090 km of pipelines and 4,800 km of river barge transport; rail and truck were used primarily for interstate or local delivery.

NuStar Energy L.P. continued to operate the Gulf Central ammonia pipeline. The 3,200-km ammonia pipeline originated in the Louisiana Delta area, where it had access to three marine terminals and three anhydrous ammonia plants on the Mississippi River. The capacity of this pipeline was about 2 million metric tons per year (Mt/yr) of ammonia, with a storage capacity of more than 1 Mt. In 2011, about 1.4 Mt of ammonia was shipped through the Gulf Central ammonia pipeline (NuStar Energy L.P., 2012, p. 13).

Magellan Midstream Partners, L.P. owned a common carrier ammonia pipeline system. The 1,750-km pipeline system, which transported and distributed ammonia from production facilities in Oklahoma and Texas to various distribution plants in the Midwest, had a delivery capacity of about 820,000 t/yr. In 2011, 660,000 t of ammonia was shipped through Magellan's pipeline compared with 419,000 t in 2010 (Magellan Midstream Partners, L.P., 2012, p. 36). Tampa Pipeline Corp. operated the 135-km Tampa Bay Pipeline system, which moved ammonium phosphate and nitrogen compounds for fertilizer producers in Hillsborough and Polk Counties, FL.

Prices

Midyear and yearend prices for nitrogen materials are listed in table 7. The average gulf coast ammonia price began 2011 at $420 per short ton ($463 per metric ton), and in mid-October reached the high for the year of $612 per short ton ($675 per metric ton), where it remained until yearend, a 46% increase in price from the average high for 2010.

The average granular urea price fluctuated throughout 2011, beginning the year at $381 per short ton ($420 per metric ton). The average price reached a high of $515 per short ton ($568 per metric ton) at the end of September. At yearend, the average urea price was $368 per short ton ($406 per metric ton).

The average ammonium nitrate price, which began 2011 at $373 per short ton ($411 per metric ton), increased through most of the year. The average price rose to $405 per short ton ($446 per metric ton) by mid-September and then declined slightly to $398 per short ton ($439 per metric ton) by yearend.

Typically, ammonium sulfate prices do not follow the same trend as other nitrogen products, which correlate to natural gas prices, mainly because a substantial portion of the material is produced as a byproduct of caprolactam production. Caprolactam, an organic compound, is the precursor to Nylon 6, a widely used synthetic polymer. The average price began 2011 at about $283 per short ton ($312 per metric ton) and fluctuated, reaching a high of $375 per short ton ($413 per metric ton) in early May. By yearend, the price averaged $370 per short ton ($408 per metric ton).

In 2011, the annual average price paid index for fertilizers increased by about 30% from the 2010 index (U.S. Department of Agriculture, Economic Research Service, 2012a). Fertilizer prices increased as a result of the available supply versus the demand for fertilizers. In addition, disruption in gas supplies for some of the nitrogen producing areas such as Trinidad and Tobago added to the increased cost.

Foreign Trade

Ammonia exports were 26% lower than those in 2010 (table 8). Canada was the leading destination for U.S. exports of ammonia accounting for 66% of the total.

Ammonia imports were slightly higher than those in 2010 and dwarfed the quantity of exports. The average value of ammonia imports increased to $557 per metric ton from $392 per metric ton in 2010 (table 9). Trinidad and Tobago (55%) continued to be the leading import source. Canada (17%), Ukraine (9%), and Russia (8%) were the remaining significant import sources.

Tables 10 and 11 list trade data for other nitrogen materials and include information on principal destination or source countries. Exports of ammonium nitrate, anhydrous ammonia, and DAP decreased in 2011, while ammonium sulfate, MAP, and urea increased. Import quantities of nitrogen materials were higher than imports in 2010 for most nitrogen compounds. The exceptions were ammonium nitrate and limestone mixtures, ammonium sulfate, and urea. Imports of calcium nitrate were unchanged.

World Review

Anhydrous ammonia and other nitrogen materials were produced in more than 60 countries. Global ammonia production in 2011, estimated to be 135 Mt, was about 3% higher than that of 2010 (table 12). China, with 31% of total production, was the leading world producer of ammonia. Asia contributed 48% of total world ammonia production, and the Commonwealth of Independent States (CIS), Estonia, and Lithuania produced 13% of the global total. North America represented 10% of the total; Middle East, 8%; Western Europe, 7%; Central America and South America together, 6%; and Africa, Eastern Europe, and Oceania together contributed the remaining 7%.

In 2011, world ammonia exports, estimated to be 16.6 Mt of contained nitrogen, were higher than those in 2010. Canada, Indonesia, Russia, Saudi Arabia, Trinidad and Tobago, and Ukraine accounted for about two-thirds of the world export total. North America (primarily the United States) imported about one-third of global ammonia import trade, followed by Asia and Western Europe (International Fertilizer Industry Association, 2012).

Angola.—The Angola Ministry of Geology, Mining and Industry signed an agreement with Japanese firms Mitsubishi Heavy Industries, Ltd., Toyo Engineering Corp., Sojitz Corp., and Sumitomo Corp. to design and engineer an ammonia-urea plant that would be constructed in Soyo in Zaire Province. Planned production capacity for the plant was 2,000 t/d of ammonia and 1,750 t/d of urea. The plant was expected to be completed by the end of 2015 at a cost of $1.3 billion (Nitrogen + Syngas, 2012a).

Azerbaijan.—State Oil Company of the Azerbaijan Republic (SOCAR) planned to build a nitrogen fertilizer plant in Sumgayit. The plant's production capacity would be 1,200 t/d of ammonia and 2,000 t/d of urea using natural gas as a feedstock. Construction was expected to be completed by 2014 (State Oil Company of the Azerbaijan Republic, 2011).

Brazil.—Petróleo Brasiliero S.A. (Petrobras) and Espirito Santa State government signed a letter of intent to define the requirements for implementing a gas-based fertilizer and chemical complex at Linhares. The planned production capacity for the plant was 783,000 t/yr of urea and 1.09 Mt/yr of methanol. Ammonia production capacity was not provided. No timetable for construction was announced (Fertilizer Week, 2011f).

Petrobras signed an agreement with Companhia Energética de Minas Gerais S.A. (Cemig), the Minas Gerais state regional energy distributor, to build a 520,000-t/yr ammonia plant at Uberaba, together with a 256-km gas pipeline to supply gas feedstock to the plant. Petrobras would develop the ammonia plant and Cemig the pipeline at a cost of $1.4 billion (Nitrogen + Syngas, 2011a). Petrobras awarded Technip S.A. the front end engineering and design contract for the ammonia plant at Uberaba. Technip would license technology from Haldor Topsøe A/S to build the ammonia plant. The plant was scheduled to be operational by September 2015 (Nitrogen + Syngas, 2011b).

Brunei.—Brunei National Petroleum Co. partnered with Japan's Mitsui & Co. Ltd. and Mitsui Chemicals Inc. to build an ammonia-urea complex at the Sungai Liang Industrial Park. The plant was expected to produce 850,000 t/yr of ammonia and 600,000 t/yr of urea. Construction was to begin in 2012 and be completed by 2015 (Nitrogen + Syngas, 2011c).

Cameroon.—Cameroon's state-owned National Hydrocarbons Corp. signed a memorandum of understanding with Ferrostal AG to undertake feasibility studies for an ammonia and urea plant. The plant would produce 600,000 t/yr of ammonia and 700,000 t/yr of urea. No timetable for completion of the ammonia plant was announced (Fertilizer Week, 2011c).

Canada.—January marked the completion of the first 2-year mandatory audit cycle of the Canadian fertilizer industry's Ammonia Code of Practice, which began in 2008 to provide uniform standards of handling and storage of anhydrous ammonia at agricultural-retail facilities in Canada. The Canadian Fertilizer Institute (CFI) Fertilizer Safety and Security Council developed the Ammonia Code of Practice in partnership with the Canadian Association of Agri-Retailers, the Ontario Agri-Business Association, and the Quebec Professional Association in Crop Nutrients. CFIs's code went into effect January 1; the code stated that Canadian manufacturers and distributors would supply ammonia only to agri-retailers who have successfully completed an audit in the previous 2 years. In addition, retailers must meet stringent requirements for emergency prevention, preparedness, and response, and they must review these provisions with local emergency responders every year. The Code of Practice is the first initiative of its kind for ammonia, which sets a new global benchmark (Green Markets, 2011a).

China.—Petrochina Ningxia Petrochemical Co. (CNPC) began work on a 450,000-t/yr ammonia and 800,000-t/yr urea project in Yinchuan in the Ningxia Hui Autonomous Region. This was CNPC's first state-of-the-art fertilizer project to be designed and constructed using the company's own technologies. The project was expected to be completed by the first half of 2013 (Fertilizer Week, 2011b).

Hengang Huahe Coal Chemical Industry Ltd. signed an agreement with Stamicarbon to build a 1,860-t/d urea granulation plant in Hegang City, Heilongjiang Province. Start date for the plant was planned for 2014 (Nitrogen + Syngas, 2011d).

In December, the Chinese Government released its 2012 tariff rates for many products, including urea, to reduce overall Chinese fertilizer exports on products not included under the 2011 export tariff system; in addition, the new rates potentially increase exports of urea and DAP/MAP. The surcharge for urea would remain at 110% during the high seasons, which were from January through June and November through December. Exceptions would be bags weighing less than 10 kilograms, which would be taxed at a flat rate of 82% in the high season and at a flat rate of 7% in the low season. Also, a tariff of 7% tax would be added to the benchmark price of urea, effectively setting a higher base price from which the export tariff would be calculated (Fertilizer Week, 2011a).

Egypt.—Tecnimont S.p.A. was awarded the engineering, procurement, construction, and commissioning contract for a new fertilizer complex in Aswan, to be operated by Egyptian Chemical & Fertilizers Industries. The complex would consist of a 1,200-t/d ammonia unit, a 1,575-t/d urea unit, and a 1,575-t/d urea granulation plant. The complex was expected to be completed by July 2014 at a cost of $540 million (Nitrogen + Syngas, 2012b).

Gabon.—Gabon Fertilizers Co. awarded Technip an engineering contract for a large-scale ammonia-urea fertilizer project to be developed at Port Gentil. The plant capacity was expected to be 660,000 t/yr of ammonia and 1.27 Mt/yr of granulated urea. No timetable for completion of the ammonia-urea fertilizer plant was announced (Nitrogen + Syngas, 2011e).

India.—Jaiprakash Associates, Ltd. (JAL) awarded a contract to KBR Inc. to provide license and engineering design services for JAL's 2,200-t/d ammonia plant in Kanpur. In addition, JAL awarded Toyo Engineering a contract to license and develop a basic design for a urea production plant. The urea plant would have two trains each with a production capacity of 1,925 t/d. The new fertilizer complex would be located at Kanpur in the State of Uttar Pradash. No timetable for completion of the ammonia and urea plant was announced (Chemical Engineering, 2011; Green Markets, 2011b).

India's cabinet committee on economic affairs (CCEA) approved the revival of the closed Fertilizer Corporation of India Ltd. (FCIC) ammonia-urea plant at Talcher at a cost of $1.87 billion. The site would be transferred to the ownership of state-owned Rashtriya Chemicals and Fertilizers Ltd., who would oversee the project. The development would include the construction of a $550 million coal gasification unit to provide feedstock for the plant owing to the uncertainty in availability of natural gas. Production capacity for the revamped ammonia-urea unit was expected to be 1.15 Mt/yr of urea. In addition, construction was planned for a 280,000 t/yr nitric acid plant and 300,000 t/yr ammonium nitrate plant. No timetable was announced for the completion of the project. CCEA also approved the revival of four other idled FCIC plants and three units belonging to the Hindustan Fertilize Corporation Ltd. in order to reduce India's growing imports of urea and balance availability throughout the countries (Nitrogen + Syngas, 2011f).

Indonesia.—PT Pupuk Kalimantan Timur (Kaltim) awarded Toyo Engineering a $577 million contract to build a new ammonia-urea plant in Bontag east Kalimantan. Toyo Engineering was to construct the urea unit but awarded a contract to KBR to provide licensing and engineering services for the Kaltim-5 ammonia plant. The production capacity was expected to be 825,000 t/yr of ammonia and 1.15 Mt/yr of urea. The ammonia-urea unit was expected to be operational by 2014 and replace an existing unit on site, which would allow Kaltim to decrease gas consumption and operate more efficiently (Nitrogen +Syngas, 2011g, h).

Iraq.—First Global Co. awarded KBR a contract to revamp the North Fertilizer Plant in Baiji. The plant was part of a fertilizer, petrochemical, and oil refinery complex. KBR would provide a license for its proprietary ammonia process and related engineering services to increase the plant's capacity to 120% of the original design. The plant was originally designed to produce 1,000 t/d of ammonia. No timetable was provided for completion of the revamping of the plant (Fertilizer Week, 2011d).

Malaysia.—Petronas Chemical Fertilizer Sabah (a subsidiary of Petronas Chemicals Group Bhd) awarded an engineering, procurement, and construction contract to Mitsubishi Heavy Industries, Apex Energy of Malaysia, and PT Rekayasa Industri of Indonesia to construct a large-scale ammonia-urea fertilizer plant in Siptang in Sabah State on the island of Borneo. Production capacity was expected to be 690,000 t/yr of ammonia and 1.27 Mt/yr of urea. The plant was expected to begin production in 2015 at a cost of $1.5 billion (Nitrogen + Syngas, 2011i).

Nigeria.—Indorama Corp. planned to build an urea and methanol plant at a cost of $1.8 billion in the city of Port Harcourt. Production capacity of the plant was expected to be 800,000 t/yr of ammonia and 1.33 Mt/yr for a single-train urea plant. In addition, 1.2 Mt/yr of methanol and 120,000 t/yr of polyethylene were to be produced. The plant was expected to begin production in 2014 (Nitrogen + Syngas, 2011j).

Peru.—Nitratos del Peru S.A. planned to begin construction on its nitrate project by late 2012 or early 2013 in the industrial sector of the Paracas District. The project involved the construction of a 2,060-t/d ammonia plant, 925-t/d nitric acid plant, and 1,060-t/d ammonium nitrate plant. The plants were expected to be operational by early 2015 at an estimated cost of

$800 million. Ammonium nitrate production would mainly be for domestic consumption by the industrial and mining sectors (Nitrogen + Syngas, 2012c).

Russia.—JSC Acron signed a contract with Haldor Topsøe to design a 2,060-t/d ammonia plant to be located in Veliky Novgorod. An ammonia plant had been under construction at this location in the late 1980s but had been put on hold as a result of the collapse of the Soviet Union. The new plant would be reconstructed using equipment from the original plant, using a 1,200-t/d ammonia plant that JSC Acron purchased from Manfredonia, Italy, and supplemented with new equipment as needed. The plant was expected to be operational by the end of 2014 (Haldor Topsøe A/S, 2011).

Laguz Management Ltd. planned to add urea capacity and increase ammonia production at the Rossosh plant, located in the Voronezh region close to the Ukraine border. Urea production was expected to be 500,000 t/yr, and ammonia production was expected to increase by 50% to 1.5 Mt/yr. The plant currently has production capacities of 1 Mt/yr of ammonia, 1.1 Mt/yr of nitrogen, phosphorous, and potassium, and 520,000 t/yr of ammonium nitrate. No timetable was given for the completion of the plant upgrades (Fertilizer Week, 2011g).

Saudi Arabia.—Saudi Arabian Fertilizer Company (Safco) awarded a contract to Saipem SpA to design and build an urea plant at Jubail. The plant was expected to have a production capacity of 1.1 Mt/yr of urea. Construction of the plant was expected to take 26 months, with production to begin in the third quarter of 2014 at a cost of $533 million (Nitrogen + Syngas, 2012d).

Trinidad and Tobago.—The Government of Trinidad and Tobago awarded Methanol Holdings Trinidad Ltd. the contract to build an anhydrous ammonia and downstream derivative project complex at an estimated cost of $1.9 billion. The project was expected to produce 1,850 t/d of ammonia to make downstream products such as urea and melamine. No timetable was provided for the completion of the project (Green Markets, 2011f).

Turkmenistan.—Turkmenkhimiya signed a contract with Turkey's Ronesans Turkmen Inshaat Sanayi ve Ticaret to build an ammonia and urea plant at Mary. The plant would have production capacities of 400,000 t/yr of ammonia and 650,000 t/yr of urea. The plant was expected to be completed by June 2014 (Fertilizer Week, 2011h).

Outlook

According to the U.S. Department of Agriculture (USDA), U.S. corn growers intended to plant 38.8 million hectares (Mha) of corn for all purposes in the 2012 crop year, an increase of 4% from that in 2011 and an increase of 9% from that in 2010 (U.S. Department of Agriculture, National Agricultural Statistical Service, 2012a, p. 1). If this takes place, 2012 will represent the highest planted acreage in the United States since 1937 when an estimated 39.3 Mha were planted. Expectations of corn acreage utilization increased in many States because of higher selling prices and expectations of better net returns from corn compared to other commodities. However, despite planting the largest number of acres of corn in the past 75 years, U.S. growers were expected to produce 13% less corn in 2012 than that of 2011 because of the warm spring and drought conditions in the summer (U.S. Department of Agriculture, National Agricultural Statistical Service, 2012b).

According to long-term projections from the USDA, projected plantings for the eight major field crops (barley, corn, oats, rice, sorghum, soybeans, upland cotton, and wheat) in the United States were expected to decrease slightly in the next few years but during the rest of the projection period plantings would remain near 99 Mha (2011–2021) from about 101 Mha in 2011. Increased cropland availability (resulting from the reduction in the allowable acreage enrolled in the Conservation Reserve Program), demand, and sustained high commodity prices were expected to keep projected U.S. cropland use at the same level. Corn, soybeans, and wheat were expected to account for about 89% of acreage utilization for the eight major field crops during the projection period. During the 10-year period, the crop mix was expected to keep corn acreage high. Soybean planting likely would rise during the projection period as growth in domestic and foreign demand keeps prices high, which would result in favorable returns for producers. Wheat plantings probably would decline as a result of weak demand. Continued high levels of domestic corn-based ethanol and gains in exports were projected to keep corn demand high. Most U.S. ethanol production used corn as a feedstock, with nearly one-third of total corn use expected to go to ethanol production through 2021. Smaller gains for corn-based ethanol were projected during the 10-year period than had taken place in recent years. Relatively high prices for crude oil would be favorable for ethanol production, which, when combined with Government programs, would provide economic incentives for ethanol producers.

Feed and residual use of corn is projected to rise as meat production increases, corn supplies increase, and corn prices stabilize. Also, supporting gains in feed use of corn is a slowdown in the growth of production of distillers grains (a coproduct of dry mill ethanol production). Increases in food and industrial uses of corn (other than for ethanol production) are projected to rise during the next decade. Consumer dietary concerns and other changes in tastes and preferences limit increases in the combined use of corn for dextrose, glucose, and high-fructose corn syrup to about one-half the rate of population gain. Other food uses of corn also are projected to rise more slowly than the increase in population. U.S. corn exports rise in response to stronger global demand for feed grains to support growth in meat production; the U.S. share of global corn trade averages slightly less than 50%. Larger corn plantings increase the demand for nitrogen fertilizers (U.S. Department of Agriculture, Economic Research Service, 2012b, p. 56–65).

In 2011, natural gas prices decreased by 12%, resulting in the second lowest annual average price since 2002 as a result of strong gains in domestic natural gas production. Natural gas prices in the United States have typically been higher than those in the rest of the world; however, lower natural gas prices, which are a result of increased shale gas production, makes U.S. ammonia production more competitive with offshore imports. Depending on its price, natural gas can account for approximately 70% to 85% of the U.S. cash cost of producing ammonia. The Middle East, North Africa, and Russia have large supplies of lower-cost natural gas, which is a cost advantage to producing and exporting ammonia. U.S. ammonia production is in a favorable cost position, owing to shale gas developments that have increased domestic supply and lowered prices for natural gas. Western Europe, Ukraine, and China have experienced rising natural gas prices, so producers in these regions are currently higher-cost suppliers (Potash Corp. of Saskatchewan Inc., 2012, p. 59). The U.S. Department of Energy projected that the Henry Hub natural gas spot price in the United States would average $2.55 million British thermal units (Btu) in 2012, an $1.40 decrease from the 2011 average, and $3.23 per million Btu in 2013 (U.S. Energy Information Administration, 2012, p. 9).

In the winter of 2001, natural gas prices began to spike and continued to increase through the third quarter of 2008, and as a result, U.S. ammonia production capacity had declined by 4.1 Mt/yr, or 24% of the 2001 capacity. Low natural gas prices in 2011, have made domestic nitrogen production more competitive with imports from major nitrogen-exporting regions. The future of U.S. ammonia production depends on the variability in natural gas prices. The United States is the world's leading importer of ammonia and the second ranked consumer. The interest that U.S. firms have in constructing new plants outside the United States had favored Trinidad and Tobago where natural gas prices were lower and distance to the United States was less compared to other offshore exporters. However, the recent low prices of natural gas have prompted some companies to upgrade or make plans to upgrade existing plants in the United States and other companies interested in the possibility of constructing new nitrogen projects in North America.

References Cited

Chemical Engineering, 2011, Toyo awarded contract to provide urea production technology in India: Chemical Engineering, June 29, 1 p. (Accessed July 26, 2012, at http://www.che.com/only_on_che/latest_news/8226.html.)

Diaz, R.J., and Rosenberg, Rutger, 2008, Spreading dead zones and consequences for marine ecosystems: Science, v. 321, no. 5891, February 15, p. 926–929.

Fertilizer Week, 2011a, China 2012 export tax policy: Fertilizer Week, v. 25, no. 36, December 16, p. 1–2.

Fertilizer Week, 2011b, CNPC starts work on new urea plant: Fertilizer Week, v. 25, no. 14, July 15, p. 9.

Fertilizer Week, 2011c, Ferrostaal & Cameroon's SNH sign MoU for plant studies: Fertilizer Week, v. 25, no. 28, October 21, p. 6.

Fertilizer Week, 2011d, KBR to revamp Iraqi ammonia plant: Fertilizer Week, v. 25, no. 37, December 23, p. 10.

Fertilizer Week, 2011e, OCI Fertilizer becomes full owner of Beaumont plant: Fertilizer Week, v. 25, no. 33, November 25, p. 3–4.

Fertilizer Week, 2011f, Petrobras signs LoI for Linhares complex: Fertilizer Week, v. 24, no. 43, February 11, p. 6.

Fertilizer Week, 2011g, Rossosh plans to add urea capacity and boost ammonia output: Fertilizer Week, v. 25, no. 26, October 7, p. 1.

Fertilizer Week, 2011h, Turkish firm to construct Mary ammonia, urea plant: Fertilizer Week, v. 24, no. 40, January 21, p. 8.

Fertilizer Week, 2011i, US proposes ammonium nitrate regulations: Fertilizer Week, v. 25, no. 17, August 5, p. 4–5.

Green Markets, 2011a, Canada NH3 code completes two-year audit cycle; enforcement phase underway in 2011: Green Markets, v. 35, no. 8, February 21, p. 14.

Green Markets, 2011b, KBR to assist with new Indian NH3 plant: Green Markets, v. 35, no. 36, September 5, p. 12.

Green Markets, 2011c, LSB commits $9.4 M for additional Pryor capacity: Green Markets, v. 35, no. 20, May 16, p. 1, 9.

Green Markets, 2011d, OCI partners in Texas ammonia/methanol facility: Green Markets, v. 35, no. 21, May 23, p. 1, 13.

Green Markets, 2011e, PotashCorp to restart Geismar plant: Green Markets, v. 35, no. 6, February 7, p. 1, 14.

Green Markets, 2011f, Trinidad to get another nitrogen complex: Green Markets, v. 35, no. 10, March 7, p. 1–16.

Gulf Coast Ecosystem Restoration Task Force, 2011, Gulf of Mexico regional ecosystem restoration strategy: Gulf Coast Ecosystem Restoration Task Force, December, 119 p.

Haldor Topsøe A/S, 2011, Topsoe signs contract with Russian JSC Acron: Haldor Topsøe A/S news release, December 22, 1 p. (Accessed August 14, 2012, at http://www.topsoe.com/news/PressReleases/2011.aspx.)

International Fertilizer Industry Association, 2012, Statistics: Paris, France, International Fertilizer Industry Association. (Accessed August 22, 2012, via http:www.ifa.org.)

Magellan Midstream Partners L.P., 2012, Form 10–K—2011: U.S. Securities and Exchange Commission, 122 p.

Nitrogen + Syngas, 2011a, Brazil—Petrobras & Cemig sign deal for Uberaba ammonia plant: Nitrogen + Syngas, no. 311, May–June, p. 10.

Nitrogen + Syngas, 2011b, Brazil—Technip to build Uberaba ammonia plant: Nitrogen + Syngas, no. 314, November–December, p. 11–12.

Nitrogen + Syngas, 2011c, Brunei—New ammonia/urea project: Nitrogen + Syngas, no. 314, November–December, p. 11.

Nitrogen + Syngas, 2011d, China—Stamicarbon technology licensed to Hengang Huahe: Nitrogen + Syngas, no. 313, September–October, p. 13.

Nitrogen + Syngas, 2011e, Gabon—Technip to develop nitrogen plant: Nitrogen + Syngas, no. 314, November–December, p. 13.

Nitrogen + Syngas, 2011f, India—Talcher fertilizer plant to be converted to coal: Nitrogen + Syngas, no. 313, September–October, p. 12.

Nitrogen + Syngas, 2011g, Indonesia—KBR to license technology to Kaltim: Nitrogen + Syngas, no. 313, September–October, p. 12.

Nitrogen + Syngas, 2011h, Indonesia—Toyo receives EPC contract for new Kaltim plant: Nitrogen + Syngas, no. 311, May–June, p. 9.

Nitrogen + Syngas, 2011i, Malaysia—Petronas to expand ammonia/urea capacity: Nitrogen + Syngas, no. 314, November–December, p. 12.

Nitrogen + Syngas, 2011j, Nigeria—Indorama to build fertilizer and methanol plants: Nitrogen + Syngas, no. 312, July–August, p. 10.

Nitrogen + Syngas, 2012a, Angola—Design engineering to begin on ammonia-urea plant: Nitrogen + Syngas, no. 315, January–February, p. 14.

Nitrogen + Syngas, 2012b, Egypt—Contract awarded for fertilizer project in Egypt: Nitrogen + Syngas, no. 315, January–February, p. 10.

Nitrogen + Syngas, 2012c, Peru—Nitratos del Peru to begin construction in 2012-13: Nitrogen + Syngas, no. 315, January–February, p. 12, 14.

Nitrogen + Syngas, 2012d, Saudi Arabia—Saipem to build new Safco plant: Nitrogen + Syngas, no. 315, January–February, p. 14.

NuStar Energy L.P., 2012, 2011 annual report & 10–K: San Antonio, TX, NuStar Energy L.P., 158 p. (Accessed June 12, 2012, at http://www.nustarenergy.com/Investors/Pages/FinancialReportsAndSECFilings.aspx.)

Potash Corp. of Saskatchewan Inc., 2012, Feeding tomorrow—2011 annual report: Saskatoon, Saskatchewan, Canada, Potash Corp. of Saskatchewan Inc., 158 p.

State Oil Company of the Azerbaijan Republic, 2011, President Ilham Aliyev attends groundbreaking ceremony of urea plant in Sumgayit: State Oil Company of the Azerbaijan Republic news release, December 19. (Accessed August 14, 2012, at http://new.socar.az/socar/en/news-and-media/news-archives/news-archives#news-archives/2011/12?&_suid=362.)

U.S. Department of Agriculture, Economic Research Service, 2012a, Farm sector income & finances—2012 farm sector income forecast: U.S. Department of Agriculture, May 26. (Accessed July 26, 2012, via http://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/2012-farm-sector-income-forecast.aspx.)

U.S. Department of Agriculture, Economic Research Service, 2012b, USDA agricultural projections to 2021: U.S. Department of Agriculture, February 13, 96 p.

U.S. Department of Agriculture, National Agricultural Statistical Service, 2012a, Prospective plantings: U.S. Department of Agriculture, March 30, 36 p. (Accessed June 14, 2012, at http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1136.)

U.S. Department of Agriculture, National Agricultural Statistical Service, 2012b, U.S. growers expect to produce 13 percent less corn than last year news release, August 10, 1 p. (Accessed August 17, 2012, at http://www.nass.usda.gov/Newsroom/2012/08_10_2012.asp.)

U.S. Energy Information Administration, 2012, Short-term energy outlook: U.S. Department of Energy, June 12, 44 p.

U.S. International Trade Commission, 2011, USITC makes determination in five-year (sunset) reviews concerning solid urea from Russia and Ukraine: U.S. International Trade Commission news release 11–144, November 15. (Accessed August, 14, 2012, at http://www.usitc.gov/press_room/news_release/2011/.)

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Evaporites and Brines. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
Fertilizers—Sustaining Global Food Supplies. Fact Sheet 155–99, 1999.
Historical Statistics for Mineral and Material Commodities in the United States, Data Series 140.
Mineral Commodity Profiles—Nitrogen. Open-File Report 2004–1290, 2004.
Nitrogen. Ch. in Mineral Commodity Summaries, annual.
Nitrogen in the Mississippi Basin—Estimating Sources and Predicting Flux to the Gulf of Mexico. Fact Sheet 135–00, 2000.
Nonpoint and Point Sources of Nitrogen in Major Watersheds of the United States. Water-Resources Investigations Report 94–4001, 1994.
Nutrients in the Nation's Waters—Too Much of a Good Thing?. Circular 1136, 1996.
Nutrients in the Nation's Streams and Groundwater, 1992–2004. Circular 1350, 2010.

Other

Amber Waves. U.S. Department of Agriculture, monthly.
Fertilizer Institute, The.
International Fertilizer Development Center.
International Fertilizer Industry Association.
Nitrogen + Syngas. BCInsight Ltd., bimonthly.

TABLE 1
SALIENT AMMONIA STATISTICS[1, 2]

(Thousand metric tons of contained nitrogen unless otherwise specified)

		2007	2008	2009	2010	2011
United States:						
Production		8,540	7,870	7,700	8,290	9,350 p, 3
Exports		145	192	16	35	26
Imports for consumption		6,530	6,020	4,530	5,540	5,600
Consumption, apparent[4]		15,000	13,500	12,300	13,800	14,900 p
Stocks, December 31, producers		157	302	167	165	178 e
Average annual price, free on board gulf coast[5]	dollars per short ton	307	590	251	396	531
Net import reliance as a percentage of apparent consumption[6]		43	42 r	38	40	37 p
Natural gas price, wellhead, average price[7]	dollars per thousand cubic feet	6.25	7.97	3.67	4.48 r	3.95 e
World:						
Production		130,000 r	129,000 r	127,000	131,000	135,000
Trade[8]		15,800	15,500	14,400	16,000 r	16,600 e

eEstimated. pPreliminary. rRevised.
1Data are rounded to no more than three significant digits.
2Synthetic anhydrous ammonia, excluding coke oven byproduct; data are for calendar year and are from the U.S. Census Bureau unless otherwise noted.
3Source: U.S. Census Bureau and The Fertilizer Institute; data adjusted by the U.S. Geological Survey.
4Calculated from production plus imports minus exports and industry stock changes.
5Source: Green Markets.
6Defined as imports minus exports; adjusted for industry stock changes.
7Source: Monthly Energy Review, U.S. Department of Energy.
8Source: International Fertilizer Industry Association Statistics, World Anhydrous Ammonia Trade.

TABLE 2

ANHYDROUS AMMONIA SUPPLY AND DEMAND IN THE UNITED STATES[1]

(Thousand metric tons of contained nitrogen)

	2009	2010	2011 [p]
Production:			
Fertilizer:			
January–June	3,040	3,550	4,090
July–December	3,430	3,580	4,080
Total	6,470	7,130	8,170
Nonfertilizer:			
January–June	603	577	590
July–December	632	585	590
Total	1,240	1,160	1,180
Grand total	7,700	8,290	9,350 [2]
Exports:			
January–June	9	28	13
July–December	7	7	13
Total	16	35	26
Imports for consumption:			
January–June	2,180	2,630	2,880
July–December	2,340	2,910	2,720
Total	4,530	5,540	5,600
Stocks, end of period:			
January–June	201	149	170
July–December	167	165	178 [e]
Apparent consumption:[3]			
January–June	5,920	6,750	7,550
July–December	6,430	7,050	7,360
Total	12,300	13,800	14,900

[e]Estimated. [p]Preliminary.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Source: U.S. Census Bureau and The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

[3]Calculated from production plus imports minus exports and industry stock changes.

Source: U.S. Census Bureau.

TABLE 3

MAJOR DOWNSTREAM NITROGEN COMPOUNDS PRODUCED IN THE UNITED STATES[1, 2]

(Thousand metric tons)

	2010						2011[p]					
	January–June		July–December		Total		January–June		July–December		Total	
	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content	Gross weight	Nitrogen content
Urea	2,680	1,230	2,450	1,120	5,120	2,350	2,840 [e]	1,300	2,590 [e]	1,190	5,430 [e]	2,490
Ammonium nitrate	3,410	1,160	3,380	1,150	6,790	2,300	3,490	1,180	3,450 [e]	1,170	6,930 [e]	2,350
Ammonium phosphates[3]	5,790	904	6,340	987	12,100	1,890	5,770	893	5,940	895	11,700	1,790
Nitric acid	3,490	767	3,450	758	6,930	1,530	3,520	774	3,480 [e]	766	7,000 [e]	1,540
Ammonium sulfate[4]	1,300	274	1,190	253	2,490	527	1,300	276	1,480	313	2,780	589

[e]Estimated. [p]Preliminary.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Ranked in relative order of importance by nitrogen content.

[3]Diammonium phosphate and monoammonium phosphate.

[4]Excludes coke plant ammonium sulfate.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B and The Fertilizer Institute; data adjusted by the U.S. Geological Survey.

TABLE 4
DOMESTIC PRODUCERS OF ANHYDROUS AMMONIA IN 2011[1]

(Thousand metric tons per year of ammonia)

Company	Location	Capacity[2]
Agrium Inc.	Borger, TX	490
Do.	Kennewick, WA[3]	180
CF Industries Holdings, Inc.	Donaldsonville, LA	2,490
Do.	Port Neal, IA	336
Do.	Verdigris, OK	953
Do.	Woodward, OK	399
Do.	Yazoo City, MS	454
Coffeyville Resources Nitrogen Fertilizers, LLC	Coffeyville, KS	375
Dakota Gasification Co.	Beulah, ND	363
Dyno Nobel Inc.	Cheyenne, WY	174
Do.	St. Helens, OR	101
Green Valley Chemical Corp.	Creston, IA	32
Honeywell International Inc.	Hopewell, VA	530
Koch Nitrogen Co., LLC	Beatrice, NE	265
Do.	Dodge City, KS	280
Do.	Enid, OK	930
Do.	Fort Dodge, IA	350
Do.	Sterlington, LA[3]	1,110
LSB Industries, Inc.	Cherokee, AL	159
Do.	Pryor, OK	210
Mosaic Co., The	Faustina (Donaldsonville), LA	508
OCI North America	Beaumont, TX[3]	231
PCS Nitrogen, Inc.	Augusta, GA	644
Do.	Geismar, LA[3]	483
Do.	Lima, OH	535
Rentech Energy Midwest Corp.	East Dubuque, IL	278
Total		12,900

Do. Ditto.
[1]Data are rounded to no more than three significant digits; may not add to total shown.
[2]Engineering design capacity adjusted for 340 days per year of effective production capability.
[3]Idle.

TABLE 5
U.S. NITROGEN FERTILIZER CONSUMPTION, BY PRODUCT TYPE[1,2]

(Thousand metric tons of nitrogen)

Fertilizer material[3]	2010 [r]	2011 [e]
Single-nutrient:		
Anhydrous ammonia	3,010	3,120
Nitrogen solutions[4]	3,120	3,230
Urea	2,290	2,380
Ammonium nitrate	221	229
Ammonium sulfate	248	257
Aqua ammonia	78	81
Other[5]	448	464
Total	9,420	9,760
Multiple-nutrient[6]	1,810	1,870
Grand total	11,200	11,600

[e]Estimated. [r]Revised.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Fertilizer years ending June 30.

[3]Ranked in relative order of importance by product type.

[4]Principally urea-ammonium nitrate solutions, 29.9% nitrogen.

[5]Includes other single-nutrient nitrogen materials, all natural organics, and statistical discrepancies.

[6]Various combinations of nitrogen (N), phosphate (P), and potassium (K): N-P-K, N-P, and N-K.

Source: Slater, J.V. and Kirby, B.J., 2011, Commercial Fertilizers 2010: Columbia, MO, Association of American Plant Food Control Officials Inc. Fertilizer/Ag Lime Control Service, University of Missouri, 42 p.

TABLE 6
U.S. PRODUCER STOCKS OF FIXED NITROGEN
COMPOUNDS AT END OF PERIOD

(Thousand metric tons of contained nitrogen)

Material[1]	2010	2011
Ammonia:		
January–June	149	170
July–December	165	178 [e]
Nitrogen solutions:[2]		
January–June	93	121
July–December	111	NA
Urea:		
January–June	37	NA
July–December	W	NA
Ammonium phosphates:[3]		
January–June	53 [4]	NA
July–December	W	NA
Ammonium nitrate:		
January–June	24	22
July–December	36	NA
Ammonium sulfate:		
January–June	44	38
July–December	16	NA
Yearend total[5]	328	NA

[e]Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data.
[1]Ranked in relative order of importance.
[2]Urea-ammonium nitrate and ammoniacal solutions.
[3]Diammonium and monoammonium phosphates.
[4]Diammonium phosphates data withheld.
[5]Calendar year ending December 31.

Source: U.S. Census Bureau, Current Industrial Reports MQ325B.

TABLE 7
PRICE QUOTATIONS FOR MAJOR NITROGEN COMPOUNDS AT END OF PERIOD

(Dollars per short ton)

	2010		2011	
Compound	June	December	June	December
Ammonium nitrate, free on board (f.o.b.) corn belt[1]	305–325	350–385	375	395–400
Ammonium sulfate, f.o.b. corn belt[1]	230–250	270–290	360–380	365–375
Anhydrous ammonia:				
F.o.b. corn belt[1]	380–455	640–685	625–685	670–710
F.o.b. gulf coast[2]	420	420	524	612
Diammonium phosphate, f.o.b. central Florida	395–400	540–550	540–550	540–575
Urea:				
F.o.b. corn belt,[1] prilled and granular	280–310	415–440	440–450	410–450
F.o.b. gulf coast, granular[2]	240–253	370–380	422–435	360–375

[1]Illinois, Indiana, Iowa, Missouri, Nebraska, and Ohio.
[2]Barge, New Orleans, LA.

Source: Green Markets.

TABLE 8
U.S. EXPORTS OF ANHYDROUS AMMONIA, BY COUNTRY[1]

(Thousand metric tons of ammonia and thousand dollars)

Country	2010 Gross weight	2010 Value[2]	2011 Gross weight	2011 Value[2]
Belgium	2	565	1	185
Canada	15	7,510	21	12,000
Chile	21	7,910	--	--
Korea	(3)	47	4	1,080
Taiwan	(3)	45	2	323
Other	5	2,030	4	1,780
Total	43	18,100	32	15,300

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Cost, insurance, and freight value.
[3]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 9
U.S. IMPORTS OF ANHYDROUS AMMONIA, BY COUNTRY[1]

(Thousand metric tons of ammonia and thousand dollars)

Country	2010 Gross weight	2010 Value[2]	2011 Gross weight	2011 Value[2]
Canada	1,010	451,000	1,160	687,000
Egypt	90	40,100	162	86,400
Estonia	46	19,600	109	62,900
Latvia	76	33,600	38	17,300
Russia	281	105,000	546	312,000
Saudi Arabia	--	--	57	40,800
Trinidad and Tobago	4,450	1,670,000	3,770	2,030,000
Ukraine	479	196,000	588	342,000
Venezuela	88	32,300	234	131,000
Other	220	91,100	142	87,000
Total	6,740	2,640,000	6,810	3,790,000

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF MAJOR NITROGEN COMPOUNDS[1]

(Thousand metric tons)

Compound	2010 Gross weight	2010 Nitrogen content	2011 Gross weight	2011 Nitrogen content	Principal destinations in 2011
Ammonium nitrate[2]	355	120	315	107	Mexico, 50%; Canada, 49%.
Ammonium sulfate[2]	938	199	1,050	222	Brazil, 44%; Peru, 11%; Canada, 9%.
Anhydrous ammonia	43	35	32	26	Canada, 67%; Republic of Korea, 14%.
Diammonium phosphate	4,090	736	3,940	708	India, 53%; Brazil, 8%.
Monoammonium phosphate	2,330	256	2,710	298	Canada, 33%; Brazil, 31%; Argentina, 10%.
Urea	152	70	207	95	Canada, 57%; Chile, 32%.
Total	7,910	1,420	8,250	1,460	

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes industrial chemical products.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS OF MAJOR NITROGEN COMPOUNDS[1]

(Thousand metric tons and thousand dollars)

Compound	2010 Gross weight	2010 Nitrogen content	2010 Value[2]	2011 Gross weight	2011 Nitrogen content	2011 Value[2]	Principal sources in 2011
Ammonium nitrate[3]	576	195	151,000	634	215	180,000	Canada, 61%; Georgia, 17%.
Ammonium nitrate and limestone mixtures	103	28	26,200	74	20	22,900	Netherlands, 36%; Ukraine, 22%; Russia, 18%; Turkey, 13%; Lithuania, 10%.
Ammonium sulfate[3]	357	76	66,100	300	64	68,200	Canada, 86%.
Anhydrous ammonia[4]	6,740	5,540	2,640,000	6,810	5,600	3,790,000	Trinidad and Tobago, 55%; Canada, 17%.
Calcium nitrate	34	6	4,530	34	6	6,160	Norway, 73%; Colombia, 16%.
Diammonium phosphate	190	34	101,000	260	47	155,000	Russia, 41%; Morocco, 34%; Lithuania, 12%.
Monoammonium phosphate	263	29	146,000	598	66	377,000	Russia, 69%; Canada, 13%; Morocco, 13%.
Nitrogen solutions	2,210	660	504,000	3,500	1,050	1,130,000	Trinidad and Tobago, 26%; Russia, 17%; Canada, 16%; Lithuania, 13%; Romania, 13%.
Potassium nitrate	77	11	45,700	115	16	77,400	Chile, 84%.
Potassium nitrate and sodium nitrate mixtures	(5)	(5)	250	2	(5)	998	Canada, 42%; Brazil, 36%; Chile, 17%.
Sodium nitrate	73	12	22,800	92	15	29,800	Chile, 86%; Germany, 9%.
Urea	6,630	3,040	2,220,000	5,860	2,690	2,690,000	Canada, 27%; Saudi Arabia, 10%.
Total	17,300	9,640	5,930,000	18,300	9,780	8,530,000	

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Cost, insurance, and freight value.
[3]Includes industrial chemical products.
[4]Includes industrial ammonia.
[5]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 12
AMMONIA: ESTIMATED WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons, contained nitrogen)

Country	2007	2008	2009	2010	2011
Afghanistan	16 r	18 r, 3	22 r, 3	27 r, 3	28
Albania	-- r	-- r	-- r	-- r	--
Algeria	524	500	614	600 r	600
Argentina	726	726	570	600	600
Australia	1,200	1,200	1,200	1,200	1,200
Austria	380 r	400	370 r	400 r	400
Bahrain	344 3	350	350	356 r	350
Bangladesh[4]	1,300	1,300	1,300	1,300	1,300
Belarus	830	805 3	750	800	820
Belgium	850	850	850	850	850
Bosnia and Herzegovina	-- r	-- r	-- r	-- r	--
Brazil	950	950	950	950	950
Bulgaria	350 r	350 r	320 r	320 r	320
Burma	30	30	30	30	30
Canada[3]	3,688 r	3,920 r	3,611 r	3,620 r	3,946 p
China[3]	42,480	41,140	42,290	40,870	41,740
Croatia	320	320	320	300	300
Cuba	47 3	42	27	27	27
Czech Republic	225	200	200	200	200
Denmark	2	2	2	2	2
Egypt	1,750	1,750	2,000	3,000	3,000
Estonia	170	170	170	170	170
Finland	62	62	62	60	60
France	800	800	800	800	800
Georgia	150	150	150	150	150
Germany[3]	2,746	2,819	2,363	2,677 r	2,820
Greece	130	130	125	120	120
Hungary	300	300	300	300	300

See footnotes at end of table.

TABLE 12—Continued

AMMONIA: ESTIMATED WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons, contained nitrogen)

Country	2007	2008	2009	2010	2011
India[5]	11,000	11,100	11,200	11,500	11,800
Indonesia	4,400	4,500	4,600	4,800	5,000
Iran	2,000	2,000	2,000	2,500	2,500
Iraq	10	10	30 r	126 r, 3	130
Italy	460	460	460	460	460
Japan	1,114 3	1,244 3	1,021 3	1,178 r, 3	1,200
Korea, North	100	100	100	100	100
Kuwait	485	485	470	480	480
Libya[3]	523	417	530 r	475 r	100
Lithuania	936 3	950	950	950	950
Malaysia	960	950	950	950	950
Mexico	714 3	826 3	895 3	826 3	820
Netherlands	1,800	1,800	1,800	1,800	1,800
New Zealand	125	125	125	125	125
Norway	350	350	350	350	350
Oman	1,000	1,000	1,000	1,119 r, 3	1,700
Pakistan	2,250	2,300	2,350 r	2,400	2,450
Peru	5	5	5	5	5
Poland	1,995 3	1,995 3	1,697 3	1,700 r, 3	1,700
Portugal	244	244	244	244	244
Qatar	1,500	1,600	1,700	1,885 r, 3	1,900
Romania	1,300	1,300	1,100	1,100	1,100
Russia	10,500	10,425 3	10,441 3	10,400	10,500
Saudi Arabia	2,600	2,600	2,600	2,600	2,600
Serbia	85	47	53	84 r	84
Slovakia	260	260	260	260	250
South Africa	480	480	430	450	480
Spain	400	400	400	400	400
Switzerland	32	32	32	32	30
Syria	120	120	210	170 r	150
Taiwan	12	12	12	12	12
Tajikistan	25	25	20	20	20
Trinidad and Tobago	5,129 3	5,130	4,946 3	5,553 r, 3	5,500
Turkey	-- 3	50	100	100	100
Turkmenistan	270	270	270	270	270
Ukraine	4,200	4,000	2,500	3,400	4,300
United Arab Emirates	380	380	380	392 r	400
United Kingdom	1,050	1,100	1,100	1,100	1,100
United States[3, 6]	8,540	7,870	7,700	8,290	9,350
Uzbekistan	1,000	1,000	1,000	1,000	1,000
Venezuela	1,160	1,160	1,160	1,160	1,160
Vietnam	300	300	300	300	300
Zimbabwe	35	20 r	14 r	29 r	30
Total	130,000 r	129,000 r	127,000	131,000	135,000

[p]Preliminary. [r]Revised. -- Zero.

[1]World totals, U.S. data, and estimated data have been rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through June 24, 2012.

[3]Reported figure.

[4]May include nitrogen content of urea.

[5]Data are for years beginning April 1 of that stated.

[6]Synthetic anhydrous ammonia; excludes coke oven byproduct ammonia.