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All Roads Lead To China

Alexandre Andrey, BMI Research, UK, examines the outlook for the Chinese nitrogen industry and its place in the global nitrogen market.

Leading The Way

Akhilesh Tamakoshi, Toyo Engineering Corp., Japan, explains the company’s recent developments in urea technology.

A Licence To Operate

Stephan Buss and Peter Jens Hoffmann, thyssenkrupp Industrial Solutions, Germany, outline the company’s portfolio of technologies and licences.

Evergreen Technology

Alberto Serrafero, Saipem S.p.A, Italy, details the company’s new urea process for improving energy efficiency.

Enhancing The Elements

Rafael Garcia, Shell Thiogro Technologies, Canada, and Dr Harald Françaíne, Uhde Fertilizer Technology, the Netherlands, discuss the fluid bed granulation of sulfur-enhanced urea in the production of a balanced nutrition granule.

Saving The Energy

Leon Postma, Stamicarbon BV, the Netherlands, explains the company’s latest developments in urea technology for use in the fertilizer industry.

A Perfect Fit

Valter Plasgård, Tranter, Sweden, considers which plate heat exchangers are most appropriate for different positions in ammonia plants.

Cutting Costs, Enhancing Efficiencies

Jens Hetzer and Dr Jörg Weidenfeller, ARVOS GROUP GmbH, provide insight into pressure relief using rupture discs and their combination with safety valves.

Two Sides Of The Same Coin

Frank Wiebe, Atlas Copco Gas and Process, Germany, takes a closer look at integral gear technology and explains the benefits it offers.

A Helping Hand

Pietro de Michieli, Bedeschi Spa, Italy, details recent installations that have been helping fertilizer handling across the world.

Handling Hurdles

James Luther, Nectar Group, UK, outlines certain fertilizer shipping and handling challenges at developing ports.

A Win-Win For Fertilizer Processing

Nate Reznechek, OSI, USA, outlines how the company’s InterSystems brand’s high-capacity dry fertilizer handling equipment is helping enhance capacity, speed and blend quality.

A Game Changer

Igor Makarenko, Solex Thermal Science Inc., Canada, details how NAK Azot overcame poor product cooling practices and achieved world-class granulated calcium ammonium nitrate through employing indirect contact cooling.

Pedal To The Metal

Chuck Young, Tricor Metals, USA, elaborates on the processes and metallurgy of reactive metals in fertilizer production.

Corrosion Control

Egoitz Lopategi and Raquel Rodríguez, Tubacex Group, Spain, outline corrosion control as more than just a chemical composition at fertilizer plants.

Relieving Pressure

Orha Karagöz and Dr Stefan Rüsenberg, Rembe, Germany, provide insight into pressure relief using rupture discs and their combination with safety valves.

Taking Control

Christopher Ristevski and Rosanna Kronfli, Macrotek Inc., Canada, detail innovative solutions for ammonia and urea removal in fertilizer plants.

A Spring Clean

Edward K. Fowler, Kimre Inc., USA, outlines the advances made in gas cleaning technology in response to the latest environmental regulations.

Working With Tropical Conditions

Mark Gilbreath, Devco, USA, outlines the construction of a dry sulfur handling facility on a small tropical site.

Leading The Way

Akihiko Tamakoshi, Toyo Engineering Corp., Japan, explains the company’s recent developments in urea technology.

The Right Kind Of Chemistry

ANNA Conference Review.

Precise Blending

Gustaf Zeeman, EMT Blending, Bagging and Transport Equipment, the Netherlands, details the company’s global operations, including working with Yara in Thailand.

The Right Kind Of Chemistry

Mark Wilcock, ICIS, UK, examines the outlook for the global potash market with the second half of 2016 seeing price improvements but 2017 and beyond may be far from balanced.

15 Facts On China

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COMMENTS

JAMES LITTLE, MANAGING EDITOR

“...for the times they are a changing...”
Bob Dylan, recipient of the Nobel Peace Prize for Literature, October 2016.

The November 2016 issue of World Fertilizer leads with a regional report by BMI Research, UK, on the outlook for the Chinese nitrogen industry to 2020. Whilst the author is clear that China’s position as the world’s dominant producer and consumer of nitrogen fertilizers will continue to endure over this reference period, it is strongly suggested that beyond 2020 its hegemony will be challenged by other regions and nations both in terms of production and usage. The catalyst for change will largely be brought about via internal pressures from central Chinese government as it tries to combat the ‘negative side effects of fertilizer usage’ in China. This hinges on both the Chinese industry’s reliance on coal as the key energy source for nitrogen fertilizer production as well as the Chinese agriculture sector’s over reliance on fertilizers for crop production. Which nations fill the void remains to be seen but cheap natural gas in the US, Russia and throughout the Middle East offer overwhelming advantages to producers in these regions, and could well lead to a changing picture in terms of global fertilizer production in the future.

On this same theme, the cover story of this issue on p. 94 details the construction of a unique materials handing facility, a key part of Mosaic’s sulfur re-melter project in Tampa, Florida. The building of this re-melter will fundamentally change the market dynamics for sulfur in North America, as well as further afield.

Change was also a key objective of the first ever Global Fertilizer Day held in London on 13 October 2016, in this case the public’s perception of the fertilizer industry. Timed to take place a couple of days prior to the annual World Food Day, this successful first event quite rightly sought to publicise the positive impact the industry has on the developed and developing world. Statistically fertilizers account for 50% of global food production and are responsible for the sustenance of two out of every five people alive in the world today. Fertilizers change lives and lift millions of people out of poverty and it is quite right that an event such as the Global Fertilizer Day seeks to promote the key role that fertilizers play worldwide. We look forward to seeing how this event develops and informs public opinion in the years ahead.

Following our own successful launch in September, World Fertilizer is hoping to help change the way that information is disseminated across the global fertilizer industry. Whether it is via our regular printed issue, the online digital edition or via the World Fertilizer App, which can be downloaded free of charge, we aim to make World Fertilizer a conduit for information and technology. If you are not currently receiving any of these versions of the magazine, please visit www.worldfertilizer.com for further information.

This month we are also delighted to announce that our ABC (Audit Bureau of Circulations) statement is now available from our website or www.abcc.org.uk. This statement provides a detailed breakdown of our global circulation and readership and is a guarantee to our valued advertisers that their advert is being seen across the global industry.

We hope you enjoy this issue and welcome your thoughts and comments on both World Fertilizer and the industry in general.
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INDIA JV forms to develop large-scale NPK fertilizer plant

OCOP and Kribhco have entered into a 50/50 joint venture (JV) to develop a large-scale greenfield NPK fertilizer plant in Krishnapatnam, Andhra Pradesh.

This fertilizer plant will require an initial investment of approximately US$230 million and will have a production capacity of 1.2 million tpy of NPK fertilizers. The project also includes the development of logistical infrastructure in the region.

OCP’s Chairman and CEO Mostafa Terrab commented: “OCP has always been, and remains fully committed to contribute to India’s agricultural development. We believe large-scale local investments designed to respond to farmers’ specific needs is the key ingredient to successful agricultural ecosystem development. As one of the major cooperatives in India, Kribhco is an excellent partner to develop a farmer-oriented agricultural input JV. This partnership is designed to be truly a win-win project for all the stakeholders involved but foremost for India’s agriculture and particularly for Indian farmers.”

USA Ammonia plant start-up successful

CF Industries Holdings Inc. has reported that its new ammonia plant at its Donaldsonville, Louisiana, nitrogen complex was started up in September 2016, and has now achieved consistent, stable operation over the nameplate capacity of approximately 3600 short tpd. The plant has produced more than 50,000 short t of ammonia since start-up.

This is the final new plant to be commissioned and started up as part of CF’s capacity expansion project at Donaldsonville. It is the largest ammonia plant by nameplate capacity in the world, sharing that distinction with three ammonia plants in Saudi Arabia.

“The start-up of the new ammonia plant signals the completion of our Donaldsonville capacity expansion project,” said Tony Will, President and CEO of CF Industries Holdings Inc. “With all three new plants from the expansion running consistently at or above nameplate capacities, Donaldsonville’s expanded asset base and unmatched logistics capabilities are ideally positioned to serve customers in North America and around the world, while strengthening our cash generation now and into the future.”

Total gross ammonia capacity at Donaldsonville is now 4.3 million short tpy, up from 3.1 million short tpy previously. The Donaldsonville complex has flexibility to switch production from merchant ammonia to upgraded products, so the actual mix of net ammonia and upgraded products for sale will vary based on market conditions.

With the commissioning and start-up of the new ammonia plant, the Donaldsonville complex is now the largest nitrogen facility in the world.

KAZAKHSTAN MoU signed for further commitment to developing fertilizer production

EuroChem Group AG’s Kazakhstan subsidiary has signed a memorandum of understanding (MoU) and Partnership (memorandum) with the Ministry of Investments and Development of the Republic of Kazakhstan and the regional government of Jambyl, Southern Kazakhstan.

The memorandum was signed at the XIII Russia-Kazakhstan Interregional Cooperation Forum in Astana, which was attended by Nursultan Nazarbayev and Vladimir Putin, the Presidents of the Republic of Kazakhstan and the Russian Federation respectively.

Under the memorandum, EuroChem has committed to continuing its investment in Kazakhstan as it aims to construct a fertilizer production complex near its phosphate rock mining operations in the Jambyl region and furthering its contribution to improving the local social and transport infrastructure. In turn, the Kazakh authorities, both at the state and local level, intend to facilitate a supportive legal and business environment for the seamless implementation of EuroChem’s project.

Dmitry Strezhnev, EuroChem’s CEO, commented: “The signing of the memorandum is an important and logical step in helping us implement one of our strategic projects. The state and regional authorities of Kazakhstan have been immensely supportive of our activities here and we are pleased to be deepening our cooperation. This demonstrates that we remain committed to continuing the implementation of our project, further improving the region’s social and transport infrastructure, and broadening this private-public partnership.”
**IN BRIEF**

**Nigeria**
IHO-Agro International Inc. has concluded an agent agreement with Ernest Consulting Ltd, where Ernest will act as the agent for the IHO-Bio and IHO-Agro business in Nigeria. IHO-Mineral is a natural mineral micronutrient supplement used in normal fertilization to be applied via foliar application in water dilution of the concentrated product. IHO-Bio is a natural supplement containing all the micronutrients present in IHO-Mineral, together with amino acids, vitamins and various natural plant hormones.

**UK**
Hancock Prospecting Ltd is expanding its agricultural interests and has made a US$300 million investment in UK fertilizer firm Sirius Minerals. Sirius is developing a polyhalite project in North Yorkshire, which will be marketed as a multi-nutrient agricultural fertilizer. The project involves the construction of a mine, a 37 km underground conveyor system, and materials handling and port facilities. The first phase of the project will involve the development of 10 million tpy capacity, with potential to quickly increase to 13 million tpy and (subject to further approvals) 20 million tpy.

**Africa**
The Abraaj Group, a leading investor operating in global growth markets, has acquired a minority stake in Indorama Fertilizers B.V, the largest urea fertilizer manufacturer in Sub-Saharan Africa. The stake was purchased from Indorama Holdings B.V. Netherlands, a wholly owned subsidiary of Indorama Corp. (Indorama), one of the world’s fastest growing petrochemical companies with operations in Asia, Africa, Europe and North America.

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**USA** Ammonia tank EPFC contract awarded

Matrix Service Co.’s subsidiary, Matrix Service Inc., has been awarded the engineering, procurement, fabrication and construction of a 20,000 short t ammonia tank for Fortigen Geneva LLC’s new anhydrous ammonia fertilizer manufacturing plant in Geneva, Nebraska.

The plant is Fortigen’s first fertilizer manufacturing facility and will produce 100 short tpd of anhydrous ammonia.

This facility will take advantage of the low cost of natural gas and reduced transportation costs to serve some of the most productive crop lands in the world.

“As we continue to execute our own growth strategy across the gas value chain, we are extremely proud to have been selected by Fortigen to provide this critical work at its new facility,” said John Hewitt, Matrix Service Co. President and CEO. “As a leader in the design, construction, maintenance and repair of aboveground, cryogenic and other storage tanks and pressure vessels, we look forward to delivering this project safely, on time and on budget.”

The project team has initiated civil work at the job site with construction of the tank scheduled for completion during 3Q17.

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**MOROCCO** Technology licensing agreement signed

Shell has signed a key strategic agreement with OCP regarding the licence of Shell Thiogro technology.

OCP will license Shell Thiogro technology, enabling the company to produce highly concentrated sulfur-enhanced fertilizers, helping end-users unlock even greater crop yields and improve soil health.

The technology will be installed at OCP’s Jorf Lasfar site in Morocco, helping to expand its portfolio by incorporating micron-sized particles of elemental sulfur into its existing ammonium phosphate, NPKs and current sulfur-enhanced products.

“This partnership with Shell will bring us one step closer to achieving our goal of offering farmers a wide selection of customised products tailored to the specific needs of their soils,” said Mustapha El Ouafi, OCP’s Managing Director. “We look forward to working with Shell as we implement the Thiogro technology, which will provide OCP with a new solution to address our customers’ needs for balanced, sulfur-enhanced fertilizers.”

“We are pleased to license our Shell Thiogro technology to OCP, one of the world’s leading fertilizer producers, whose efforts continue to contribute to improved food security in Africa and across the globe,” said Michael Lumley, Vice President of Shell Sulphur Solutions. “Our team of sulfur experts have worked hard to develop a safe and efficient technology for the incorporation of elemental sulfur into fertilizers, and we have no doubt that this agreement will have a positive impact for OCP and the farmers they serve.”

The technology is expected to be installed and commissioned in 2017.
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USA
The DuPont 2017 Best Practices Workshop, which will be held in Ojai, California, from 1 – 4 May 2017, has opened for registration. Designed to address all aspects of sulfuric acid alkylation, the 2017 workshop will cover regulatory challenges, technology configuration and selection, technical design considerations, operations and maintenance, as well as technology troubleshooting. New for 2017 is an Operations Roundtable session in which operators will have the opportunity to discuss specific troubleshooting scenarios.

Brazil
Anglo American has completed the sale of its niobium and phosphates businesses located in Goiás and São Paulo to China Molybdenum Co. Ltd (CMMC), following the agreement announced on 28 April 2016. Anglo has received cash proceeds of approximately US$1.7 billion, constituting the agreed consideration of US$1.5 billion and approximately US$187 million of working capital and other adjustments, subject to certain post-closing adjustments.

UK
Fertilizer importer Thomas Bell and Sons is making additional fertilizer handling investments at Associated British Ports’ (ABP) Port of Immingham. The company signed a new deal with ABP that will enable it to invest in a new blending unit at Immingham. As well as a £2 million spend on undercover storage at its dedicated fertilizer terminal, ABP will also invest £100 000 in infrastructure to support the new unit at Immingham Bulk Park and its agreement with Thomas Bell has been extended to cover this latest investment.

Mali Phosphate project update
A comprehensive geological programme has been initiated at Great Quest Fertilizer’s Tilemsi phosphate project. The programme is intended to advance the inferred resource to that of a measured and indicated resource. A bulk sample will be obtained, additional drilling will be undertaken and a detailed topographical survey for mine planning will be completed.

The programme duration is expected to be approximately six weeks. It is anticipated that the company will be in a position to report both mineral grades and revised resource calculations by the end of the year. Jed Richardson, CEO of the company, commented: “The completion of this work is a necessary step to secure mining permits for the phosphate project. We believe the upgrading and granting of the permits should advance the project to a stage where we can secure funding for construction of our project with the aid of regional and international development finance institutions.”

Additionally on 27 October, Great Quest Fertilizer reported in a media release that it had successfully renewed the Aderfoul permit, one of three concessions that form the Tilemsi phosphate project. This renewal, which is the first of two allowed under the mining regulations in Mali, grants the company a further two years for exploration work on the permit.

The company is currently seeking to advance from an exploration permit to an exploitation permit and is completing the necessary work for that purpose.

Egypt Partnership agreement
Following the start of construction of a new factory in Dunkirk, France, in March and the opening of a centre of excellence and pilot plant in Bulgaria in September, Belgian group EcoPhos has signed a 50/50 joint venture (JV) agreement with the Egyptian group Evergrow for the construction of a 110 000 tpy dicalcium phosphate (DCP) factory to produce animal feed.

The new plant will be built in Sadat City, 95 km from Cairo, and will require an estimated investment of US$120 million. The new complex will include plants for the production of 100 000 tpy of low-cadmium fertilizer, as well as a 600 tpd sulphuric acid plant and a 60 000 tpy CaCl₂ plant.

In addition to these plants, further investment is planned for the construction of an NPK production plant.

The JV is intended to serve local and regional demand and was signed by Mohamed El-Kheshen, Chairman of Evergrow, and Mohamed Takhim, CEO of EcoPhos S.A.

EcoPhos will provide the technology, equipment and the outline and detailed engineering for the construction of the new facility.

This agreement follows the agreement already signed with Evergrow in 2015 for the construction of a plant to produce 110 000 tpy of DCP, 50 000 t of which will be converted to technical grade phosphoric acid.
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EcoPhos through its subsidiary Aliphos is a market leader in Animal Feed phosphate. www.ecophos.com - info@ecophos.com

Change your mind about phosphate.
**EGYPT Steam reformer heater supply contract**

Amec Foster Wheeler has been awarded a contract by the National Company for Fertilizers & Chemicals, AGROCHEM, to supply material and detailed engineering for a steam reformer heater for its fertilizer facility in Alexandria.

The steam reformer heater, based on Amec Foster Wheeler’s Terrace Wall™ design, will operate as the primary reformer in the 250 tpd ammonia production unit. This will allow AGROCHEM to have the complete production line within its facility without any external sourcing of ammonia.

Jonathan Lewis, Amec Foster Wheeler’s Chief Executive, said: “Amec Foster Wheeler has a proven track record in the design and supply of fired heaters. Our proprietary Terrace Wall fired heater technology is unique and proven globally and we look forward to applying it to this important facility for AGROCHEM.”

The scope of work is scheduled for completion at the end of 2016.

**UK Successful launch of Global Fertilizer Day**

On 12 – 13 October 2016, international agriculture professionals gathered in London and Rothamsted to observe the first ever Global Fertilizer Day, celebrating fertilizers and the valuable role they have in producing the world’s food.

The aim of marking this day was to engage the general population in the importance of farming and fertilizer, through creating a network of international agricultural professionals, including renowned agricultural scientists, environmental and agricultural media representatives, industry executives and associations, for open and constructive discussions. It provided a platform for industry experts to discuss their main concerns about the industry, current trends, the future of farming and agriculture, and where the industry could be heading in terms of innovative solutions.

The first day was held on the premises of the Rothamsted Research Centre in Harpenden, the oldest continuously running agricultural research facility in existence. Keith Goulding, a scientist at this institution, was the group’s main guide and led the delegates through sample archives, which included some soil samples that are nearly two centuries old.

The second day was held at the Farmers’ Club in London. The day served as a platform for discussion about looking towards the prospects of farming in a conversation titled “Going Forward: Where are we headed with products and technology”. This debate gave the delegates an opportunity to discuss their main concerns about the agriculture industry with the objective of suggesting innovative solutions for the future. A significant take-away from these discussions was the concept of diversity in different countries and continents with regards to climate change and farming practices.
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ALL ROADS LEAD TO CHINA

ALEXANDRE ANDREY, BMI RESEARCH, UK, EXAMINES THE OUTLOOK FOR THE CHINESE NITROGEN INDUSTRY AND ITS PLACE IN THE GLOBAL NITROGEN MARKET.
China will remain the world’s largest producer and consumer of nitrogen fertilizers over the coming years. Owing to continued investment in production capacity, the country will maintain this standing despite challenges from the domestic coal sector, slower crop production growth, stricter environmental regulations and growing competition in key export markets.

This article begins by outlining global trends in nitrogen supply and demand and follows with a focus on the Chinese nitrogen industry, highlighting key trends and why it will remain a world leader out to 2020 despite challenges.

Global supply: leading producers adding most of new capacity
The leading global producers of nitrogen fertilizers will remain in the top spots out to 2020 as they will account for most of the growth in capacity over the period, according to the International Fertilizer Industry.
Natural gas: primary input for nitrogen fertilizers

The prices of natural gas and energy are the drivers of nitrogen fertilizer production, as natural gas and energy are the key inputs to the production process. These prices determine the cost of production for ammonia and urea, as well as the optimal location for investment in additional production capacity. According to industry estimates, gas costs account for more than 90% of the ammonia production costs at a typical plant. Moreover, gas and energy costs make up almost 85% of the urea production costs through two channels: the cost of ammonia and the cost of energy required to produce urea. The price of natural gas is generally cheapest in the MENA region, followed by the US and Russia, and finally Europe and Asia – although prices can differ widely between countries that are part of the same region. A large share of Chinese urea production facilities rely on coal as a source of energy rather than gas, which reduces the sensitivity of Chinese output to gas prices and increases its competitiveness.

Global demand: China and India to see strongest consumption growth

BMI Research expects China and India, currently the world’s first and second largest consumers respectively, to see the strongest volume growth in nitrogen fertilizer consumption out to 2020. This is due to China and India seeing solid growth in agricultural production over the next five years, while other large producers will face a challenging outlook over the period. A key implication of these views is that nitrogen consumption will be increasingly concentrated as China and India are already the world’s largest consumers.

Looking at specific products within the nitrogen complex, it appears that urea dominates the world market with more than 50% of total nitrogen-based fertilizer demand as of 2011. The research group expect this to remain the case out to 2020 as the dominance of urea is due to the preference of farmers in emerging markets for urea over other alternatives. As of 2011, urea made up about 51% of Brazil’s nitrogen fertilizer consumption, a share which rose to 67% in China and 78% in India. In contrast, UAN and ammonia were the most favoured by US farmers, while nitrates accounted for about 43% of European nitrogen consumption.

Figure 1. China: uncontested world nitrogen leader. LHC: 2013 nitrogen fertilizer production (million nutrient tonnes) RHC: 2012 ammonia and urea production (million tonnes).
Source: IFA.
Note: Ammonia is an input for urea production and a share of urea production is used as nitrogen fertilizer, while the remainder serves as an input in the production of other fertilizers.

Figure 2. Price linkages between nitrogen fertilizers and natural gas. Select prices – green market US Gulf NOLA fertilizer prices (US$/short t) and Generic Front-Month Henry Hub natural gas futures price (US$/million BTU), weekly data. 
Source: Green Market, Bloomberg.
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Figure 3. Emerging countries favouring urea drives global nitrogen market. LHC: 2013 nitrogen fertilizer consumption (million
nutrient tonnes); RHC: global nitrogen consumption, 2011 product breakdown (%).
Source: IFA.

Figure 4. China produces nitrogen at the highest cost.
Select regions – total cost of production for integrated urea manufacturing (US$/t).
Note: ‘Integrated urea’ refers to a manufacturing plant that produces urea using ammonia that is also produced on site.
Source: Bloomberg, BMI.

Figure 5. China: swing producer on the nitrogen export market. Nitrogen fertilizers – total exports by origin (million tonnes).
Source: ITC, BMI.

This outperformance of urea in emerging markets is due to the following reasons. First, urea is generally cheaper than other nitrogen fertilizers on a per nutrient basis as it contains 46% nitrogen, second only behind ammonia itself. Second, urea is easier to distribute and apply than anhydrous ammonia. This is because urea comes in dry solid form, prilled or granular, while ammonia comes as a pressurized liquid that is flammable and turns into gas when applied. Third, urea is relatively easy to blend with other types of fertilizers for application and it dissolves well in water.

Regarding crops, given that nitrogen is a key nutrient required by most plants for growth, grains and oilseeds hold the largest share of the world’s nitrogen consumption as they are the most cultivated crops at the global level. The notable exception is soybean. While soybean has similar phosphate and potash requirements as grains and other oilseeds, the crop requires very little nitrogen. This is because soybean has a nitrogen-fixing ability, as it is able to get its nitrogen requirements through a symbiotic relationship with soil bacteria, a trait similar to legumes but unlike grains and other oilseeds.

Additionally, the research group highlight a side-trend in nitrogen consumption: the growth differential between industrial and fertilizer use of nitrogen. Industrial use accounts for about 20% of total nitrogen consumption according to estimates by Yara, and the IFA forecasts this segment to grow by almost 30% between 2014 and 2019. In contrast, fertilizer, the main user of nitrogen, will only grow by about 6% over the same period. Examples of industrial use of nitrogen include specialty chemicals, explosives and emission filters. BMI Research will monitor the evolution of this trend in the coming years and determine whether it represents a risk for the nitrogen fertilizer market.

Focus on the Chinese nitrogen industry: remaining a world leader despite challenges

China is the world’s largest producer of nitrogen fertilizers, and this position will be secured by further investment into production capacity. Over BMI’s forecast period to 2020, the country is set to increase ammonia production capacity and build new urea production units – despite already being the world leader in this regard. However, the group highlights that China’s dominance over the global nitrogen market is paradoxical for two reasons:
Firstly, China is the only large producer of nitrogen fertilizers that primarily uses coal – instead of natural gas – as the raw material for ammonia production, with ammonia being the main component of most nitrogen fertilizers. This is owing to the fact that Chinese coal is significantly cheaper and more abundantly available to domestic nitrogen producers than natural gas; this is a situation that is in stark contrast to producers in the US, Russia and the Middle East and North Africa (MENA) region.

Secondly, despite the use of coal instead of natural gas, Chinese nitrogen producers still face some of the highest costs in the industry, as other global producers have direct access to natural gas that is cheaper than Chinese coal. This means that they face lower input costs than their Chinese peers. In a global comparison, the cost of Chinese coal-based nitrogen production is above that of most regions, including Western Europe, where producers rely on relatively expensive natural gas.

Despite high operating costs, China continues to be the world’s largest exporter of nitrogen fertilizers, consistently producing large surpluses of nitrogen products – urea in particular. The combination of large surpluses and elevated production costs have resulted in China becoming a swing producer on the global market. Indeed, the country is able to channel substantial amounts of fertilizers to the export market at little extra cost if global prices become more attractive than domestic prices. Conversely, as prices fall close to or below Chinese production costs, the country is able to withdraw large quantities of the product from the market.

In spite of emerging challenges to the Chinese nitrogen sector over the next five years, BMI does not expect these to materially affect its positive outlook on the sector out to 2020.

**Chinese coal sector: consolidation will not affect nitrogen producers**

The biggest challenge facing China will come from a reduction in its coal production; BMI’s mining team forecasts a sharp decline over the coming two years. That said, the group does not expect this to be a major impediment to the nitrogen industry, as the Chinese government is pushing for coal consolidation in order to curb overcapacity, meaning there is still enough cheap coal available for domestic industries. Coal production will decline from a high base, and any strength in demand will not be sufficient to push prices significantly higher. Therefore, BMI expects the impact to be minimal for Chinese nitrogen producers over the coming quarters.

Towards the later years of BMI’s 2016 – 2020 forecast period, challenges from the coal sector will fade. Production growth is expected to recover by 2018, while consumption will remain on its secular decline. In particular, Chinese power generation, which made up half of the country’s coal consumption in 2013, will steadily reduce its reliance on coal over the coming years. Consequently, Chinese nitrogen producers will continue to benefit from abundant coal supply and relatively low coal prices out to 2020.

**Weaker fertilizer consumption: no major risk out to 2020**

Subdued agricultural production growth and a potential contraction in fertilizer consumption constitute further challenges to the country’s nitrogen sector. The group sees two factors driving weaker fertilizer consumption in China over the next five years: slower growth in agricultural production and rising environmental concerns.

Regarding agricultural production, the agricultural sector is the prime consumer of nitrogen products and the Chinese nitrogen sector is heavily dependent on the domestic market despite the country being the world’s largest exporter. In 2013, crops absorbed 93% of the country’s total nitrogen production. BMI forecasts growth in Chinese crop production to be slower over the 2016 – 2020 period than during the previous five years. Nevertheless, this slower growth will occur from a high base, much like coal production, and will remain positive for most crops. Consequently, the group expects demand from the agricultural sector to remain...
China – farm subsidies by type (CNYbn).

Note: ‘Seed’ data for 2012 – 2014 is not available.

Source: NDRC (National Development and Reform Commission), USDA, BMI.

Figure 9. Lower self-sufficiency to drive nitrogen use by Chinese farmers.

China – self-sufficiency by crop (%).

f = BMI forecast.

Source: China Ministry of Agriculture, USDA, BMI.

China’s agricultural sector still employs more than 200 million people and agronomic practices take time to adapt.

Global nitrogen market: growing competition, but marginal for China

Greater competition on the export market is the final challenge BMI highlights for Chinese nitrogen producers. China’s main export markets are India, Southeast Asia and the US. In India and Southeast Asia, Chinese nitrogen exports will face growing competition from producers in the MENA region. In the US, cheap natural gas resulting from shale production will enable domestic nitrogen producers to scale up output in a bid to fill the import gap, competing directly with imports from China.

Nevertheless, BMI does not expect these challenges on the export market to weigh on Chinese nitrogen production out to 2020. This is because China already has elevated nitrogen capacity in place and coal costs will remain low for domestic producers over the period, while the country’s competitors are still building assets to increase output. According to PotashCorp., greenfield nitrogen projects take at least three years to complete, which underpins BMI’s view for China to face only moderate threats until 2020. Moreover, domestic consumption accounts for the bulk of Chinese nitrogen production, which means that trends on the export market have a limited impact on the sector. 

Figure 10. Chinese producers largely immune to competition in key markets.


Source: ITC, BMI.

on an uptrend, particularly as Chinese farmers use large quantities of nitrogen fertilizers, a trend that will remain in place for most of the 2016 – 2020 period (Figure 7).

Regarding environmental concerns, the Chinese nitrogen sector is under scrutiny from the government, which aims to curb the negative side effects of fertilizer usage, in a way similar to the coal sector. Chinese crop production is heavily reliant on fertilizers, particularly urea, which contributes to the country’s position as the world’s top nitrogen fertilizer consumer. This over-reliance on external nutrients has resulted in substantial environmental degradation, with water being the most negatively affected. Elevated consumption of fertilizers has also impacted the quality of soil and air.

Indicative of China’s concerns about the issue, the government aims to rebalance input usage away from fertilizer and increase the use of seeds and machinery in order to boost yields in the coming years. Indeed, the government has reduced subsidies for fertilizers and increased them for seeds and machinery, which will induce farmers to modify their input choices. Although BMI expects environmental considerations to gain traction over the coming years, it does not expect this to have a material negative impact on Chinese nitrogen consumption out to 2020. This is because the group forecast China’s self-sufficiency in most crops to deteriorate over the coming years, with the exception of barley. Moreover, China’s agricultural sector still employs more than 200 million people and agronomic practices take time to adapt.
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