CRU

Phosphate Fertilizer
Market Outlook

January 2016

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Phosphate Fertilizer Market Outlook

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Publication Schedule 2015

Product	Phos Fertilizer Market Outlook	Phos Fertilizer Cost Service	Phos Rock Market Outlook	Phos Rock Cost Service	Industrial /food Market Outlook	Inorganic feed Market Outlook
Frequency	Quarterly	Annual	Quarterly	Biennial	Biennial	Biennial
Last publication	Jan-16	Oct-14	Nov-15	Oct-15	Mar-15	Dec-12
Forthcoming publications	Apr-16 Jul-16 Oct-16	2016	Feb-16 May-16 Aug-16	2017	2017	2016

Unless otherwise noted in the text, the market statistics in this Report are drawn from CRU's fertilizer teams' database for fertilizers, minerals and chemicals. This database is assembled by the expert staff of CRU's fertilizer team, using information from a wide range of sources, including the International Fertilizer Industry Association (IFA), various regional and national agencies, and suppliers of international trade statistics, including Global Trade Information Services Inc. (GTIS), as well as individual producers and exporters of these products.

Glossary of terms

Concentrated phosphates	DAP, MAP, TSP
DAP	Di-ammonium phosphate, typically 18-46-0
DCP	Di-calcium phosphate, typically 41% P_2O_5
DFP	De-fluorinated phosphate, typically 41% P_2O_5
DSP	Double super-phosphate, typically 0-32-0-(6S)
HCl	Hydrochloric acid
IFP	Inorganic feed phosphates
KCl	Potassium chloride
MAP	Mono-ammonium phosphate, typically 11-52-0
MCP	Mono-calcium phosphate, typically 50% P_2O_5
MES	MicroEssentials
MGA	Merchant-grade acid, typically 52-54% P_2O_5
NP	Nitro-phosphates
PPA	Purified phosphoric acid, typically 61% P_2O_5
SPA	Superphosphoric acid, typically ≥ 70% P_2O_5
SSP	Single super-phosphate, typically 0-18-0-(10S)
STPP	Sodium tri-polyphosphate
TSP	Triple super-phosphate, typically 0-46-0
ANDA	Associação Nacional para Difusão de Adubos (Brazil)
CFMW	China Fertilizer Market Week (China)
CPPA	Chinese Phosphate Producers Association (China)
FAI	The Fertilizer Association of India (India)
FAO	Food and Agriculture Organization of the UN (global)
FAPRI	Food and Agricultural Policy Research Institute (global)
FW	Fertilizer Week (global, part of CRU)
GTIS	Global Trade Information Services Inc. (global)
IFA	International Fertilizer Association
NBS	National Bureau of Statistics (China)
	OR Nutrient Based Subsidy (India)
TFI	The Fertilizer Institute (USA)
USDA	United Stated Department of Agriculture (USA, global)

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Executive Summary

Weak demand not helped by additional capacity

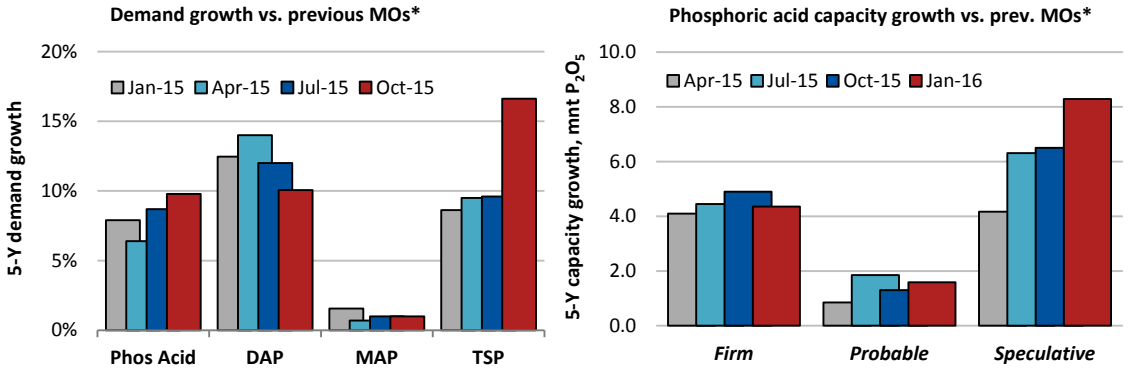
With Chinese producers growing their global DAP and MAP market share to 50%, they have signalled early intent to fight aggressively for market share. They are focusing on both existing and growing demand regions, and will compete against the export focused capacity being commissioned in Morocco and Saudi Arabia over the next five years. As a result our view on prices has weakened, with the bottom projected to be reached in 2018/2019.

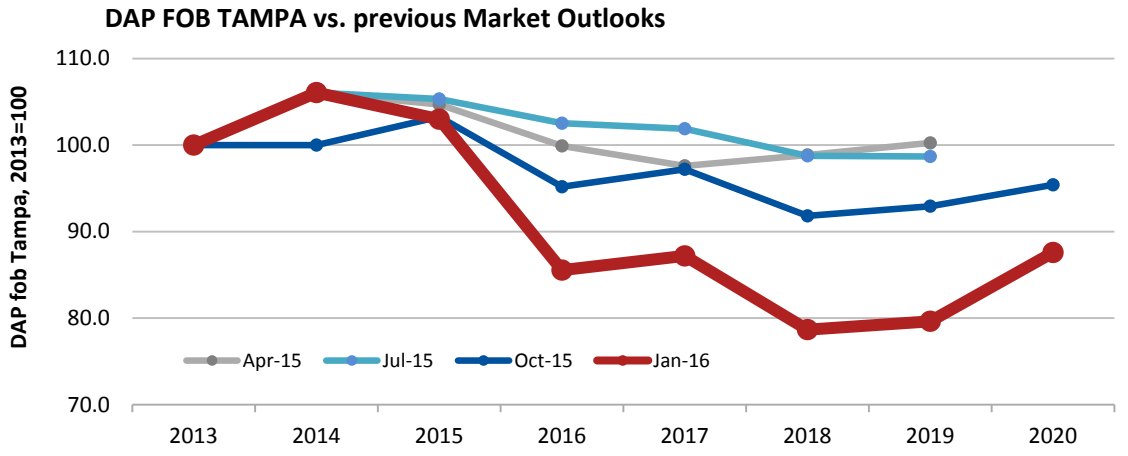
KEY INDICATORS: JANUARY 2016 MARKET OUTLOOK

KEY INDICATORS:

	2014	2015	2016	2017	2018	2019	2020
DEMAND SIDE INDICATORS (million metric tonnes P_2O_5 unless otherwise specified):							
Global P_2O_5 fertilizer demand	42.9	43.4	43.2	44.6	45.5	46.4	47.6
Chinese DAP/MAP/TSP demand	9.4	9.8	9.5	9.5	9.6	9.6	9.6
US DAP/MAP/TSP demand	3.2	3.3	3.4	3.5	3.5	3.5	3.5
Indian DAP imports[1]	3.6	6.2	4.8	5.7	7.0	8.0	8.7
Brazilian P_2O_5 demand	3.7	4.7	4.9	5.1	5.3	5.8	5.8
SUPPLY SIDE INDICATORS (million metric tonnes P_2O_5 unless otherwise specified):							
Global phosphoric acid capacity[2]	54.5	54.9	55.9	56.3	57.5	57.9	58.6
Moroccan MGA production	4.5	4.6	4.9	5.6	5.3	5.8	6.2
Chinese DAP/MAP/TSP exports	3.5	4.9	4.4	4.4	3.9	3.8	3.7
PRICE INDICATORS (US$/metric tonne product unless otherwise specified):							
MGA CFR INDIA	716	808	713	688	597	577	636
DAP FOB TAMPA	472	459	381	388	350	355	390
MAP CFR BRAZIL	493	471	389	395	358	367	400
TSP FOB MOROCCO	392	388	330	306	280	283	316

Notes: [1.] million metric tonnes product; [2.] Base-case





Data: CRU; **Note**: *comparison up to 2019

Key risks to the January 2016 outlook

Fertilizer and raw materials prices continue their downward slide. Lower raw materials input costs have provided support to downstream margins, even down fertilizer prices have declined. A review of Mosaic's FOB costs in Florida suggests their current site costs at Riverview are in the US$300-US$310/tonne range. By this measure, the company is making a US$60-90/tonne margin over their site costs. The same estimate made for YTH's Tian'an yields a CFR cost of around US$340/tonne, which would mean a CFR cost of US$355-360/tonne to India, which compares to a delivered price of US$390-400/tonne. At CRU our view is that prices have scope to fall in the immediate future, but will recover in Feb/March in through Q2, as demand picks up ahead of spring applications.

Indian DAP demand falls below 4.0 million tonnes P_2O_5 for the year. Our base case forecast sees DAP demand falling to 4.0 million tonnes P_2O_5 in 2016, following a sharp rise of stocks. This is based on the view that the monsoon arrives in time, and is in line with long term averages, encouraging strong application rates. However, if the macroeconomic environment weakens and the rupee to devalues sharply, or alternatively rains are delayed, we could see demand fall below the current forecast, possily by a further 500,000 tonnes P_2O_5. If this were to happen, supply side competition would intensify beyond current expectations driving prices well below current forecasts for 2016.

Brazilian demand to underperform in 2016, again. Following four years for strong demand growth, Brazilian demand for fertilizers declined in 2015, driving import volumes downwards. Our current forecast sees Brazilian phosphate fertilizer demand returning to positive growth in 2016, underpinned by lower stock levels compared to in January 2015. However, a lack of credit could impact this, causing consumption to stagnate, removing some 400,000 tonnes of MAP equivalent from the demand outlook.

Highlights from the January 2016 Phosphate Fertilizer Market Outlook

- Have grain and oilseed prices found a floor?
- Will Brazilian demand rebound following a difficult 2015?
- How will proposed changes to Chinese corn area impact phosphate demand?
- How much DAP and MAP has China produced in 2015?
- When will OCP commission JPH2-JPH4?
- Are MGA buyers in India beginning to diversify their supply?
- Which companies supplied DAP to India in 2015 & who bought the product?
- What is the outlook for prices through to 2020?

Desperate times call for desperate measures

At the time of writing, the **FOB TAMPA DAP** price stood at US$375/t, a US$60/t reduction from the October 2015 Market Outlook. **FOB** prices in **NORTH AFRICA** held up better at US$445/t as sales into Europe were prioritized. That said, OCP's control over **MGA** prices seems to be weakening as the **CFR INDIA** benchmark fell to US$715/t. The **CFR BRAZIL MAP** benchmark was assessed at US$365/t as traders opted to wait for further reductions.

DAP prices slid through November as demand weakened in key markets. With concerns growing over Indian stocks, deliveries to the country dried up. This put pressure on the **CFR INDIA DAP** benchmark, which fell to US$418/t by month end. Meanwhile, the **CFR BRAZIL MAP** benchmark fell as supplies failed to recover lost ground. Instead, any remaining optimism turned negative as dryness delayed soybean plantings and a lack of credit hurt the farming community. However, the most significant factor was the news of the commissioning of the first of OCP's four new projects in Jorf Lasfar, capable of producing 1.0 m t DAP or equivalent per year.

December is usually a slow month in fertilizer markets, and 2015 was no exception. In China, local demand for the upcoming spring plantings remained weak as lower crop prices started to squeeze farming budgets. While stocks were not yet a serious concern, DAP inventories are believed to be 25-30% of their potential, and there did not appear to be many outlets outside China. As such, DAP prices came under renewed pressure, with the **CFR INDIA** benchmark falling by a further US$12/t to US$406/t. Notably, the **MGA CFR INDIA** price for Q1 2016 was agreed at US$715/t.

Following recent reductions, there was a feeling that prices may now be low enough to encourage spot sales. However, even with the **CFR BRAZIL MAP** benchmark at US$365/t these failed to materialize. Instead, traders have held off in anticipation of further reductions. At the time of publication the **CFR TAMPA AMMONIA** price for February had been lowered to US$310/t, while the Q1 **FOB TAMPA SULPHUR** benchmark was also lowered to US$95/t. Meanwhile, OCP announced that their rock prices would be US$10-20/t lower in Q1. While the market waited for a demand response, producers tried to take matters in their own hands. Mosaic, YUC and Kailin all announced cutbacks, while Mosaic even bought back barges to prop up prices.

Demand fared better than expected in 2015

Despite continued losses in grain and oilseed markets and volatility in foreign exchange rates, 2015 phosphate fertilizer demand was better than initially expected. The charts below compare CRU's current 2015 consumption estimate, with our forecast from the same time last year, for the four key consuming countries: China, USA, India and Brazil.

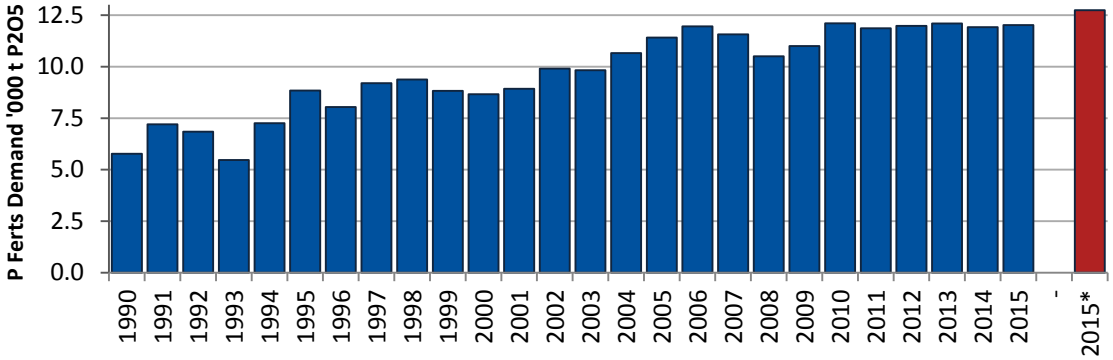
Chinese fertilizer demand has been revised downward over the past 12 months, which explains the difference between the 2015 estimate provided a year ago, and our current views. While demand moved upwards y/y in 2015, growth appears to have stalled from the 2010-14 rate, which poses some questions for the outlook in 2016 and onwards. Meanwhile demand in the **US** is believed to have fared much as we had expected: totalling 4.1 million tonnes P_2O_5.

Having underperformed over the past few years, **Indian** apparent demand rose sharply during 2015. Despite the imbalance caused to Indian nutrient consumption by the NBS system, the prospects for the 2015 CY looked robust right from the start. According to the FAI, closing stocks of DAP and NPK at the end of 2014 were just 168,000 tonnes DAP and 468,000 tonnes NPK, compared to 759,000 tonnes DAP and 618,000 tonnes NPK a year earlier. Although DAP imports were slow to get going, Q2 arrivals exceeded 850,000 tonnes product per month. While good rainfall supported this volume of purchases through June and July, the monsoon failed to live up to early expectations in August and September, sharply reducing farm consumption during H2 2015. As DAP imports continued to arrive throughout Q3, stocks began to grow despite the heavy discounts being offered by distributors.

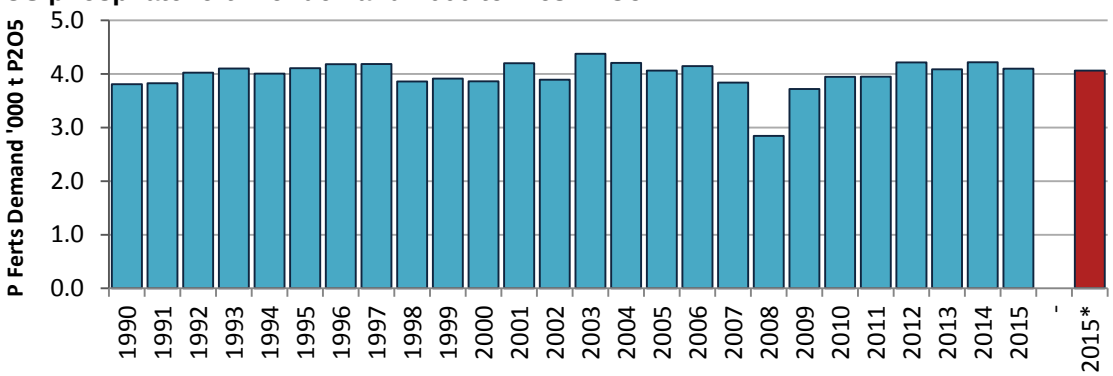
Shifting over to Latin America, the chart shows how quickly **Brazilian** phosphate fertilizer consumption has grown over the past decade, encouraging investment into supply and distribution networks across the country. However, in 2015, demand stalled owing to the country's weaker macroeconomic position, a sharply devalued currency and difficulties in obtaining credit. Given just how important Brazil is to the demand side of the market, we have prepared a special focus in Chapter 1 of the report, summarising our views on a recent research trip to the country. The special focus breaks down the Brazil supply chain and discusses how fertilizers are purchased by farms, along with an outlook on the future evolution of the industry. Although difficulties are expected to remain in 2016, consumption is forecast to rebound modestly, aided by lower global fertilizer prices, higher domestic corn and soybean prices and some industry adjustment.

Key demand regions: China and USA flat, India higher and Brazil weaker in 2015

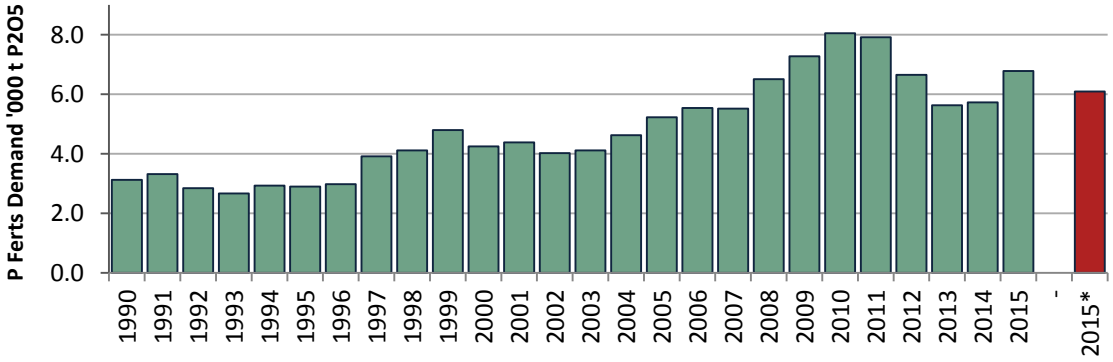
Chinese phosphate fertilizer demand - 000 tonnes P2O5



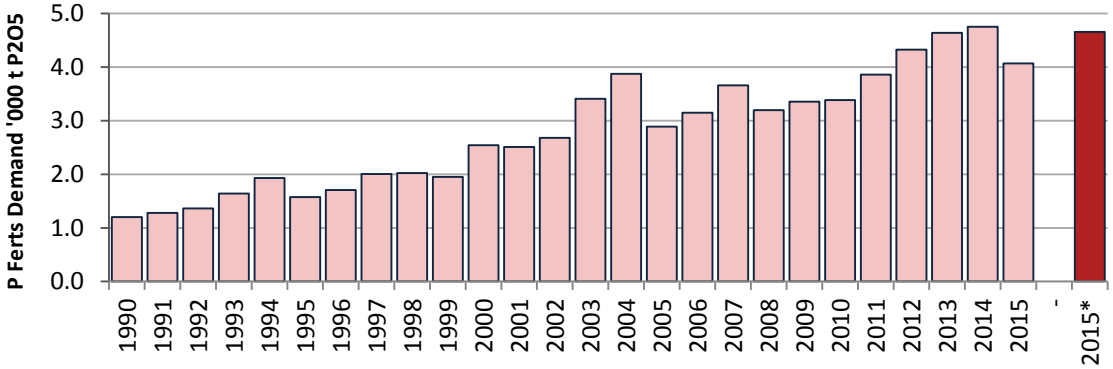
US phosphate fertilizer demand - 000 tonnes P2O5



Indian phosphate fertilizer demand - 000 tonnes P2O5



Brazilian phosphate fertilizer demand - 000 tonnes P2O5



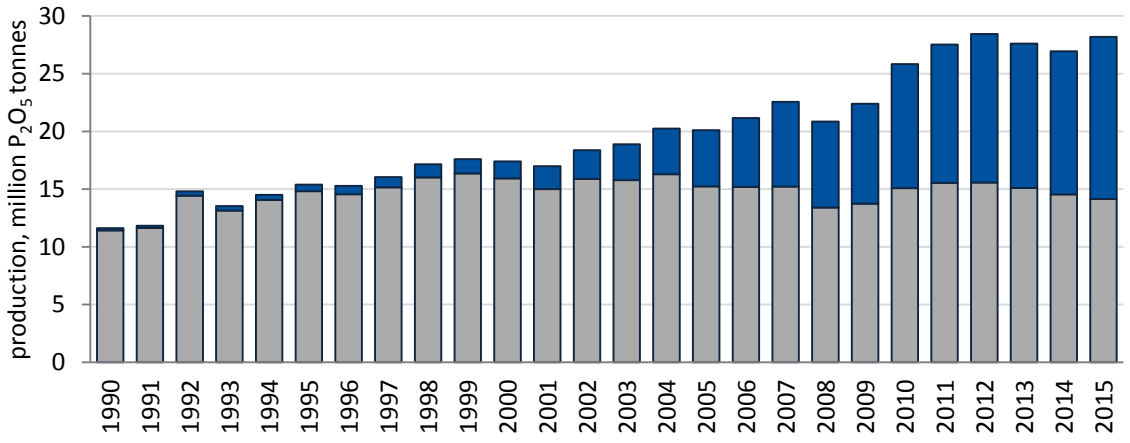
Data: CRU

Note: 2015 - CRU's Phosphate Fertilizer Demand forecast presented in January 2015*

China accounts for half of global production

CRU estimates combined Chinese ammoniated phosphate production hit 14.0 million tonnes P_2O_5 during 2015 CY, an increase of 13.3% y/y. This is a remarkable feat, as it suggests that Chinese producers accounted for 50% of global DAP/MAP production in 2015, up from 41% in 2010 and just 8.5% in 2000.

Chinese producers responsible for half of global DAP & MAP supplies



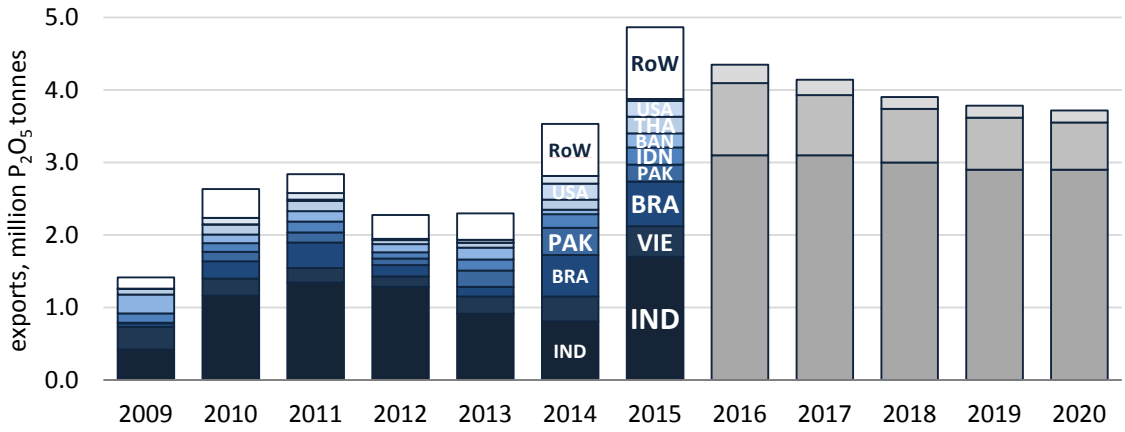
Data: CRU, IFA, CFMW, CPPA, TFI, ANDA, AFA, Azotecon,

As domestic demand for concentrated phosphate fertilizer has remained flat since 2010, any production growth has had to be supported by sales into international markets, and in particular, India and Brazil. This is illustrated in the following chart, which not only shows the rate at which exports have grown since 2009, but also the role played by India as an outlet for fertilizer supplies. Even in its worst year – 2014 – India accounted for more than a fifth of China's concentrated phosphate fertilizer exports. Last year, however, was a different story: between March and October an average of 435,000 tonnes of Chinese DAP per month was shipped to India, driving the country's sales into India up to 3.6 million tonnes product (or 1.7 million tonnes P2O5). This, along with a willingness to offer discounted product, provided the basis to drive DAP production upwards to 8.3 million tonnes P2O5 for the calendar year.

Outside of India, China's courting of Brazil has seen it become China's second largest market, accounting for 10-25% of its concentrated phosphate sales. In 2015 this included around 1.0 million tonnes of MAP (11-44-0) and 275,000 tonnes of TSP. This is impressive for several reasons: first, to get to Brazil product must be transported 11,000 nautical miles, taking over a month to arrive at its destination. Not only are other exporters better positioned, but many also have lower production and delivery costs. Second is quality. When China first started shipping 11-44-0 to Brazil, the consensus was that Brazilian farmers would not be comfortable with a lower quality product, which is often used as feedstock for NPK production. Third is

distribution. Chinese product is mainly handled by traders into Brazil, which places it at a disadvantage to companies that have direct access to customers. Yet, each of these issues has been overcome and, in Chinese product has continued to gain traction.

Annual DAP, MAP & TSP exports from China, 2015 and forecast



Data: CRU, CFMW, GTIS, IFA, company reports, port data

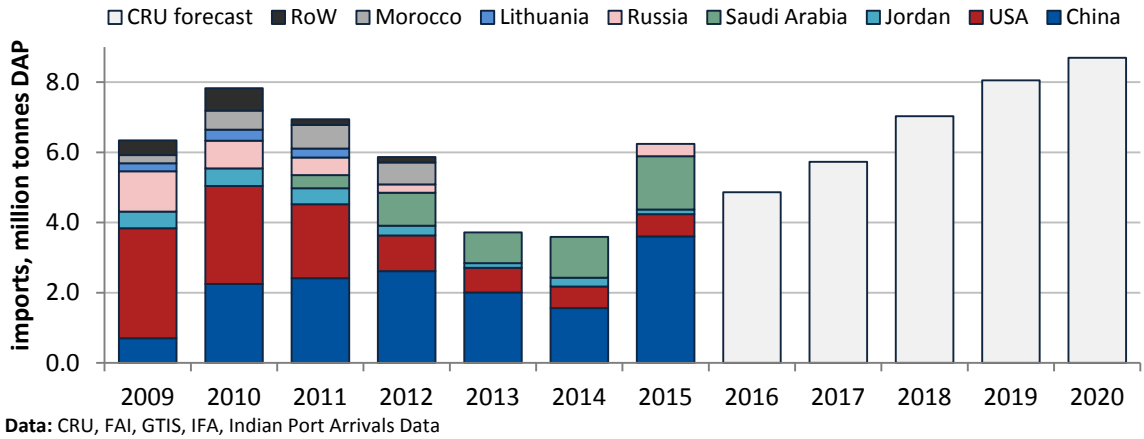
We continue to forecast that higher cost Chinese capacity will be curtailed in the medium term; however, as we've seen in recent years, this is taking longer than expected. Chinese exporters have shown that they can adapt quickly to changing circumstances and, as previously discussed, are able to enter markets that seem to be out of their reach. When it comes to forecasting production and exports, it is important to bear in mind both the economic and social dimensions of Chinese policies. China's much vaunted economic rebalancing ought to see closures of non-economically competitive assets as Government support is reduced. However, Chinese national and local authorities have shown considerable reluctance to close assets when social discontent may result, particularly in more remote and less prosperous areas, and so this process may be considerably slowed. That said, the prospect of much lower cost and export focused capacity ramping up over the next few years in Morocco and Saudi Arabia, much of which will target the same markets, will have implications for even the most protected Chinese operations. Our forecast therefore sees their concentrated phosphate fertilizer exports moderating from 4.9 million tonnes P2O5 in 2015 to 3.7 million tonnes in 2020.

The storm brewing in India and China

Although January is not usually an especially eventful month with respect to phosphate demand, the year appears to be starting on a poor note. Demand in China has underachieved as distributors have aimed to keep stocks at a minimum in anticipation of poor spring demand. This has not been helped by speculation that authorities plan to float corn prices, which for the past three years have been supported through subsidies. While details have not been announced, government officials have in the past indicated that policy will be aimed at allowing markets to determine prices, and that farmers would no longer be subsidised through support prices. Our view is that this would be detrimental to corn area and resultant fertilizer demand, as generous support prices have helped to maintain application rates. In Chapter 1 of this report, we analyse the impact that a 10% and 20% reduction of corn area would have on demand for phosphate fertilizer, and the implications this would have on the availability of product for exports.

As we move into the second half of the year, our attention shifts towards the Indian market. The country is still showing evidence of long term growth, but short term trends remain as volatile as ever. DAP demand has swung from a high of 5.2 million tonnes P_2O_5 in 2010 to a low of 3.1 million tonnes P_2O_5 in 2014. Last year, it moved back towards to the upper range, totalling 4.5 million tonnes P_2O_5 as imports soared to 6.3 million tonnes product. Close to 60% of this was supplied by Chinese exporters, with MPC in Saudi Arabia accounting for a quarter and Russian product also making a reappearance. However, supplies appear to have been well above the country's requirement as farmers cut back applications in H2, leading to the rapid building of stocks.

Indian DAP arrivals soar in 2015, which will have consequences



Data: CRU, FAI, GTIS, IFA, Indian Port Arrivals Data

At the end of December, the FAI estimated Indian DAP stocks at 958,000 tonnes DAP and 1.0 million tonnes NPK. This is their highest volume since 2012, and suggests that actual

consumption will moderate in 2016 as these are drawn down through H1. Moving into the second half of the year, all eyes will be on developments of the 2016 monsoon as well as the underlying strength of the economy (and their resultant impacts on exhcnage rates). Last year, the monsoon arrived on time, but failed to deliver. Provided the rains arrive in time during 2016, and in line with long term averages, DAP demand is set to remain above 4.0 million tonnes P_2O_5. This would represent an 11% reduction y/y, would mean that consumption remains above volumes recorded during 2013 and 2014. That said, if there were to be any delays to the start of the monsoon, or altenatively, if the rupee weakens beyond our estimate of INR66.8/$ for the calendar year, we could easily move into a 2013/2014 demand scenario.

The outlook for phosphate fertilizer prices

With the prospects for India and Pakistan returning to the market early in 2016 increasingly unlikely, given their large stock positions, DAP demand is set to remain under pressure. Bearing in mind the reductions in raw material prices, we have taken the view that DAP prices have further to fall in Q1 2016. Our base case forecast sees the **FOB TAMPA DAP** benchmark contract to a quarterly average of US$380/tonne. In North Africa, OCP's prices are also set to fall, but by a smaller margin as they prioritise sales to the European market. In Brazil, purchases of spot cargos have failed to materialize in Q1 which will drive MAP prices lower. Our Q1 **CFR BRAZIL MAP** price is estimated at US$373/tonne. On an **FOB** Basis, the **TAMPA MAP** benchmark is set to have an edge over **RUSSIAN MAP** benchmark, given that Mosaic owns distribution capacity in Brazil. Our view is that in order for the Russian exporters to grow their market share in Brazil, they will need to rely on discounting product. Perhaps most concerning in the MAP export markets is the lack of domestic demand for NPK in China, which may also be driven toward exports markets. This together with the Chinese authority's plans to reform corn support prices, may see local corn prices fall to half their current level.

During Q2, we expect phosphate fertilizer prices to improve across the board, as demand picks up in the northern hemisphere ahead of summer plantings. In the case of **MGA,** with contracts shifting back to quarterly agreements in 2016, the **CFR INDIA** benchmark should more closely relfect developments in ammoniated phosphate prices. That said, our cost estimates indicate the **CFR INDIA MGA** price would have needed to fall to US$660/tonne in order to be in line with our estimate for DAP prices during Q1. For Q2, MGA prices have scope to fall to US$690/tonne, based on our forecast for **CFR INDIA DAP** prices at US$418/tonne, but our forecast sees them rising to US$720/tonne. While Brazil will not approach its main buying season until mid-year the **MAP**

CFR BRAZIL benchmark is expected to move upwards, driven by an improvement of pricing in the US.

Quarterly concentrated phosphate fertilizer price forecast

	2015			2016				2017	
US$/tonne, Nominal	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
DAP									
FOB TAMPA	469	464	419	380	382	395	367	375	375
FOB MOROCCO	499	492	469	441	423	425	403	415	415
FOB JORDAN	473	471	444	405	408	417	385	382	382
FOB SAUDI ARABIA	478	469	423	395	405	418	386	384	384
CFR INDIA	489	472	427	405	418	426	393	394	394
MAP									
FOB RUSSIA	473	470	429	377	379	396	365	377	377
FOB TAMPA	471	466	421	380	382	400	367	380	380
CFR BRAZIL	489	479	419	373	393	410	379	389	389
TSP									
FOB MOROCCO	387	393	371	335	338	340	307	304	304
Phosphoric Acid									
FOB MOROCCO	778	780	780	785	695	689	675	680	680
CFR INDIA	805	810	810	715	721	715	701	706	706
CFR NW EUROPE (low F/Fe)	945	950	950	900	902	890	809	810	810

Data: CRU, Fertilizer Week

Moving into the second half of the year, our base case sees Indian stocks lower, which will stimulate demand for imported product. If this were to occur in tandem with a improvement of Brazilian purcahses through Q3, we could see a temporary tightening of demand fundamentals, that should spur prices upwards. However, we are only forecasting modest increases through the quarter, with the **CFR INDIA DAP** and **CFR BRAZIL MAP** benchmarks increasing by US$8/tonne and US$17/tonne respectively, as the comissioning of the second JPH project keeps a ceiling on an further growth.

During Q4 2016 prices are again forecast to fall, with demand in the key planting in a seasonal lull. Moreover, in Q4 OCP is scheduled to bring into production the third JPH project, which would mean that three of four of the new projects would now be operating. As such **FOB TAMPA DAP** price is set to fall by US$28/tonne to US$367/tonne. While the added capacity is considerable, we do not expect prices to fall to the US$350/tonne level until 2018 once the new Ma'aden plant has had a chance to ramp up its production.

Forecasting phosphate prices – Input variables

US$/tonne	2014	2015	2016	2017	2018	2019	2020
Ammonia (cfr Tampa)	545	454	336	345	362	402	440
Phosphate rock (fob Morocco)	110	117	112	109	110	101	104
Sulphur (cfr Tampa)	124	132	98	95	93	90	94
Corn	195	172	178	192	197	202	206
Soybeans	464	370	373	394	404	409	420

Data: CRU

Looking at the 2017-2020 period, we have lowered our forecasts across the board with in line with lower raw materials input costs coupled with weaker demand/supply fundamentals. Since the publication of the last Phosphate Fertilizer Market Outlook in October, the FOB TAMPA DAP benchmark has been lowered by US$45/tonne for 2016. For 2018/19 the spread between the old and the new forecast is US$-60/tonne, before narrowing to US$-35/tonne in 2020.

Industry will have to absorb a large volume of new supply in a short period of time, particularly in 2018. OCP's development schedule will see its JPH2 plant online during Q2/Q3 2016 and the JPH3 plant online in Q4 2016. The final 450,000 tonnes/year P_2O_5 plant is planned for commissioning in 2017. All of these operations are currently in construction, and classified as *firm* in our *Project Gateway System*. A further three identical units are included as probable in our forecast which extends through to the end of 2020. Meanwhile, in Saudi Arabia, Ma'aden will bring 1.5 million tonnes P_2O_5 capacity online in Q4 2017 and there are a number of other expansions in development in China, Tunisia, Brazil and other locations.

Given the additional volume of capacity coming online during the forecast period, it is our view that phosphate producers will have to accept lower prices in order to maintain their market shares. As explained in the *Short-term Price Outlook*, we do not expect there to be a sufficient demand increase for this to happen. Beyond 2017, dynamics drive our price forecasts lower. With the introduction of Ma'aden's and other new capacity in 2018, competition to secure sales in key markets is expected to be fierce, pushing prices down.

Annual phosphate fertilizer price forecast

US$/tonne, Nominal	2015	2016	2017	2018	2019	2020	Δ '15-20
DAP							
FOB TAMPA	459	381	388	350	355	390	↓
FOB MOROCCO	492	423	399	360	365	402	↓
FOB JORDAN	467	404	385	347	350	386	↓
FOB SAUDI ARABIA	462	401	382	348	353	388	↓
CFR INDIA	465	410	395	358	361	396	↓
MAP							
FOB RUSSIA	463	379	384	347	351	386	↓
FOB TAMPA	460	382	389	351	359	392	↓
CFR BRAZIL	471	389	395	358	367	400	↓
TSP							
FOB MOROCCO	388	330	306	280	283	316	↓
Phosphoric Acid							
FOB MOROCCO	774	711	662	565	564	627	↓
CFR INDIA	808	713	688	597	577	636	↓
CFR NW EUROPE (low F/Fe)	948	875	801	693	672	712	↓

Data: CRU, Fertilizer Week

We expect healthy demand growth through the forecast period, at 1.7% per year on average, exceeding the forecast growth for phosphoric acid capacity between 2015 and 2020. However, the outlook is complicated by the fact that China and Russia's presence in export markets is much expanded due to exchange rate and legislative changes and we do not expect this to change. The rouble is forecast to strengthen only gradually in our macroeconomic forecasts, from RUB60.96 on average in 2015 to RUB54.92 in 2020, and we expect gradual Chinese capacity closures to reduce DAP exports by only 2% between 2015 and 2020.

About CRU

CRU's reputation with customers across mining, metals and fertilizers is for integrity, reliability, independence and authority.

CRU's insights are built on a twin commitment to quality primary research and robust, transparent methodologies. You can rely on our work - our data, our views, our models -because we have built them ourselves, from the ground up, since our foundation in 1969.

The requirement for exclusive, first-hand knowledge has driven us to invest in a global team of analysts, the key to gaining a real understanding of critical, hard-to-reach markets such as China. CRU's people - whether delivering market outlooks, price assessments, cost analysis or consulting - focus on helping customers to make important business decisions.

Across a comprehensive range of commodities, we strive to provide customers with the best service and the closest contact - flexible, personal and responsive.

CRU - big enough to deliver a high quality service, small enough to care about all of our customers.

Chapter 1
Demand

1.1 Overview of global phosphate demand

Total global demand for phosphate products in 2015 is estimated at 50.6 million tonnes P_2O_5, increasing a modest 0.9% from 2014 levels (50.1 million tonnes P_2O_5). Total P_2O_5 nutrient demand (consumed by crops) is estimated to have climbed 0.3 million tonnes P_2O_5 year on year, to 43.2 million P_2O_5. The countries with the largest demand in 2015 were **China** (14.4 million tonnes P_2O_5), **India** (6.9 million tonnes P_2O_5), **USA** (5.6 million tonnes P_2O_5) and **Brazil** (4.7 million tonnes P_2O_5).

Table 1.1: Global P_2O_5 demand, million tonnes

	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP (46% P2O5)	32.7	35.7	35.0	36.4	37.5	38.4	39.3	↑
MAP (52% P2O5)	22.7	22.6	23.3	23.7	24.0	24.2	24.4	↑
TSP (46% P2O5)	5.7	5.4	5.6	5.8	5.9	6.1	6.3	↑
Total Conc Phos (100% P2O5)	**29.5**	**30.7**	**30.8**	**31.7**	**32.5**	**33.1**	**33.7**	↑
Total P_2O_5 Nutrient (100% P_2O_5)	42.9	43.4	43.2	44.6	45.5	46.4	47.4	↑
Other P_2O_5 demand (100% P_2O_5)	7.2	7.4	7.5	7.6	7.7	7.8	7.8	↑
Total P_2O_5 (100% P_2O_5)	**50.1**	**50.8**	**50.7**	**52.1**	**53.2**	**54.1**	**55.2**	↑

Data: CRU, AFA, ANDA, Azotecon, CFMW, CPPA, FAI, Fertilizer Week, GTIS, IFA, NBS, NFDC, TFI

The major change from the *Phosphate Fertilizer Market Outlook October 2015 Edition* is the downward revision for **Brazil** 2015 demand, which is now estimated at 4.1 million tonnes (P_2O_5 tonnes consumed as crop nutrient), sharply down from the record 4.8 million tonnes consumed in 2014. A sliding *Brazilian Real* (BRL) and economic turbulence has resulted in lower phosphate fertilizer imports and farmer demand. CRU recently conducted a demand focused research trip to Brazil to investigate these issues and the impact on future demand. A special focus can be found on page 36.

Lower 2015 demand in Brazil came as a shock to the industry, however very strong import demand from **India** helped to alleviate this issue and cushioned price falls. Total DAP imports are estimated to have increased 74% year on year, to 2.9 million tonnes (P_2O_5 basis). This exceptional demand was a saving grace for the global industry in 2015; however the India market is expected to fall away significantly in 2016, owing to high stock levels. Although

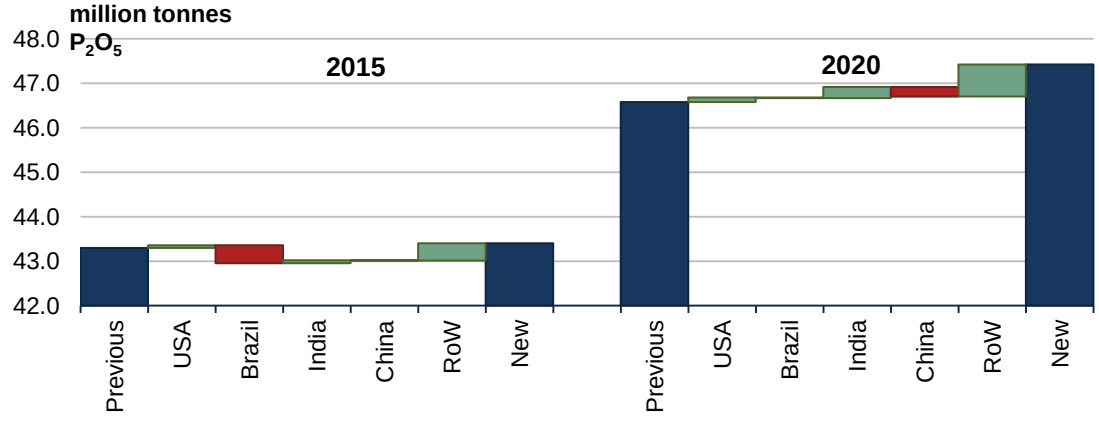
import volumes were very high in 2015, farm off-take did not match this, and inventories have built to burdensome levels. 2012 was the last time inventories were so high, and 2013 prices and imports consequently collapsed. While a similar collapse is not forecast for 2016, CRU does expect lower demand, resulting in a distinctively bearish market tone.

Demand is also forecast to fall in **China**, where lower crop prices have farmers cutting back input costs. Early 2016 demand has waned as fertilizer distributors reduce buying in anticipation of poor farm demand. A special focus on page 32 analyses government proposals to reduce corn area by 10% by 2020 and the implications on phosphate demand. Over the medium term, total phosphate nutrient consumption is projected to decline to 11.6 million tonnes (12.0 million estimated in 2015), with total demand seen at 14.1 million, (14.3million in 2015).

While the demand story is rather negative for the above three major markets, there is some support from the **United States**, despite continued low crop prices and expectations of diminished farm returns. The planting of corn, a nutrient intensive crop, is expected to expand 4.9% in 2016, to a projected harvested area of 34.2 million hectares. While some cuts in application rates are expected, the severity of these cuts should be limited, with lower production costs (including significantly lower fertilizer prices) set to boost net returns and spur additional fertilizer use. Total P_2O_5 demand is set to increase marginally from strong 2015 levels, at 4.2 million tonnes. This volume is projected to be maintained over the medium term period.

Global demand growth over the medium-term is forecast at a CAGR of 1.8%. Longer term growth prospects in Brazil and India remain strong, offsetting weakness from China. Medium sized markets like Pakistan, Indonesia, Vietnam and Poland are also projected to demand more phosphate products as their agricultural output increases.

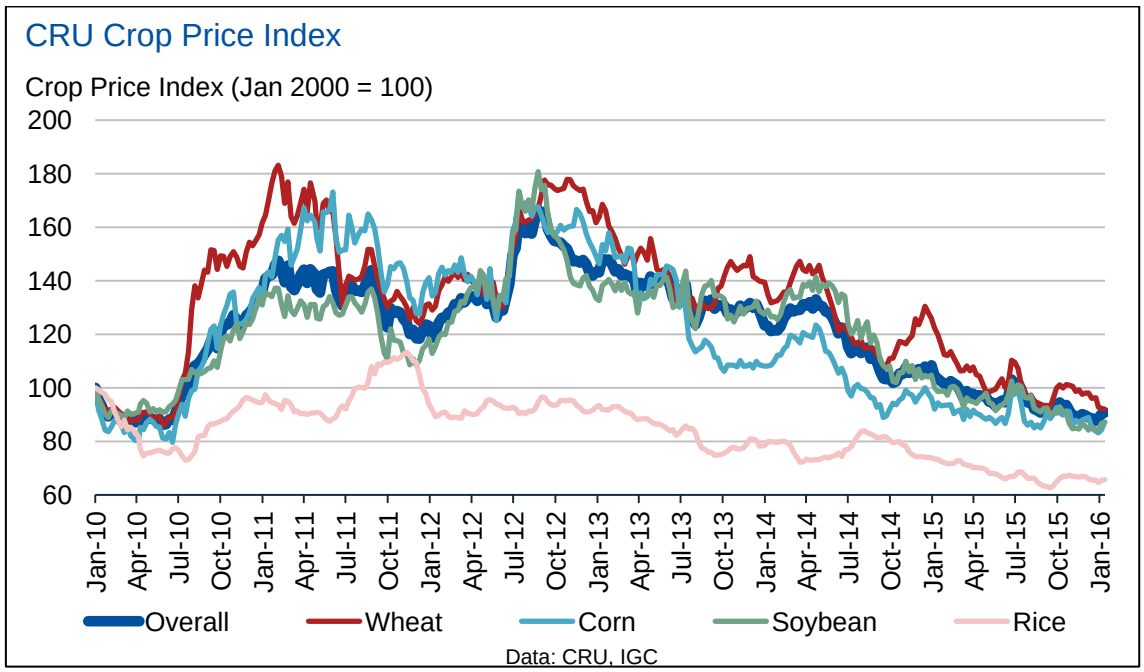
Variation of P_2O_5 Nutrient Forecast Revisions



Data: CRU

1.2 Agricultural Market Overview

International agricultural markets have not been immune to the commodities price downturn. This is reflected in the CRU crop price index, which continued to slide lower in 2015. A brief price spike in the middle of the year was due to concerns over corn and soybean production prospects in the United States. However these concerns were quickly alleviated by an extended period of favourable weather (but show how vulnerable these markets are to weather events). Ample supplies continue to weigh on all prices, despite robust demand.

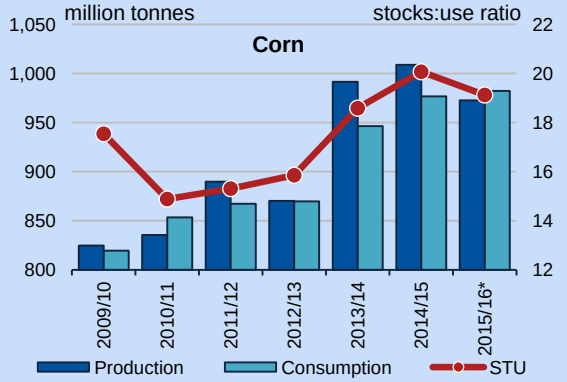


Harvesting of 2015 crops is complete in the Northern Hemisphere and production has again been excellent. China produced record volumes of agricultural products, but corn support prices continue to fall and policies designed to reduce crop area are being introduced. This is likely to impact fertilizer consumption over the medium term (see special focus on page 32). Farms in Brazil are harvesting soybean crops which have been impacted by a dry growing season. Delays in plantings due to dryness are set to squeeze the planting window for safrinha (second season) crops, and phosphate applications for these crops are expected to be reduced.

The El Nino weather phenomenon has impacted rainfall in south-east Asia, India and Australia. Wheat production estimates have been lowered in Australia due to dry spring conditions, and palm oil output in Indonesia and Malaysia is set to fall in 2016l. Production prospects of the rabi wheat crop in India are poor due to dry conditions. Farmers have reportedly switched some of their intended wheat area to pulse crops due to their higher prices and lower fertilizer requirements.

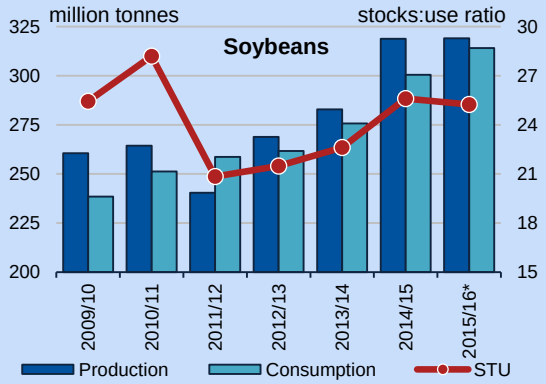
1.2.1 Short and medium term considerations

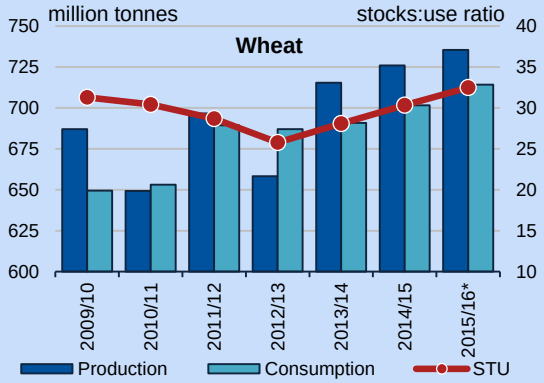
Grain and oilseed production down, but stocks remain high



- **Corn** production in the United States is forecast to drop 4% year-on-year, to 345 million tonnes, given reduced planted area and lower yields following an outstanding 2014.
- Drought in India and South Africa has lowered output on those countries, while dryness in China has lead to some lower estimates for production, which is now seen at 225 million tonnes (a record).
- **Although the stocks:use ratio remains inflated, prices are thought to have found a floor, a positive for overall fertilizer demand.**

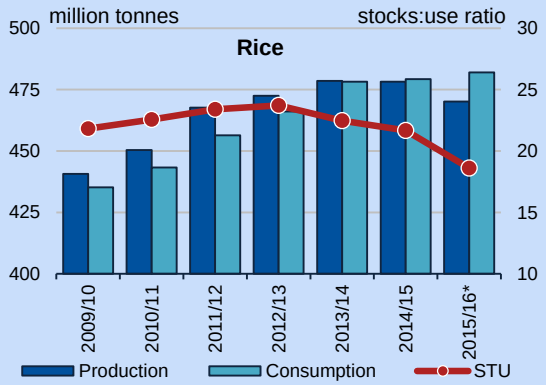
- Despite early yield concerns, 2015 US **soybean** production is estimated at a record 106.9 million tonnes, fractionally higher than 2014.
- Harvesting in Brazil is underway, and production is forecast to reach a record 100 million tonnes, despite challenging conditions. Planting was been hindered by dryness in key regions. Nevertheless, harvest area is seen at 32.9 million hectares, up 4.1% from last year.
- **In absence of any weather related supply shocks, we expect prices remain capped by large supplies, encouraging farmers to plant more fertilizer intensive crops.**





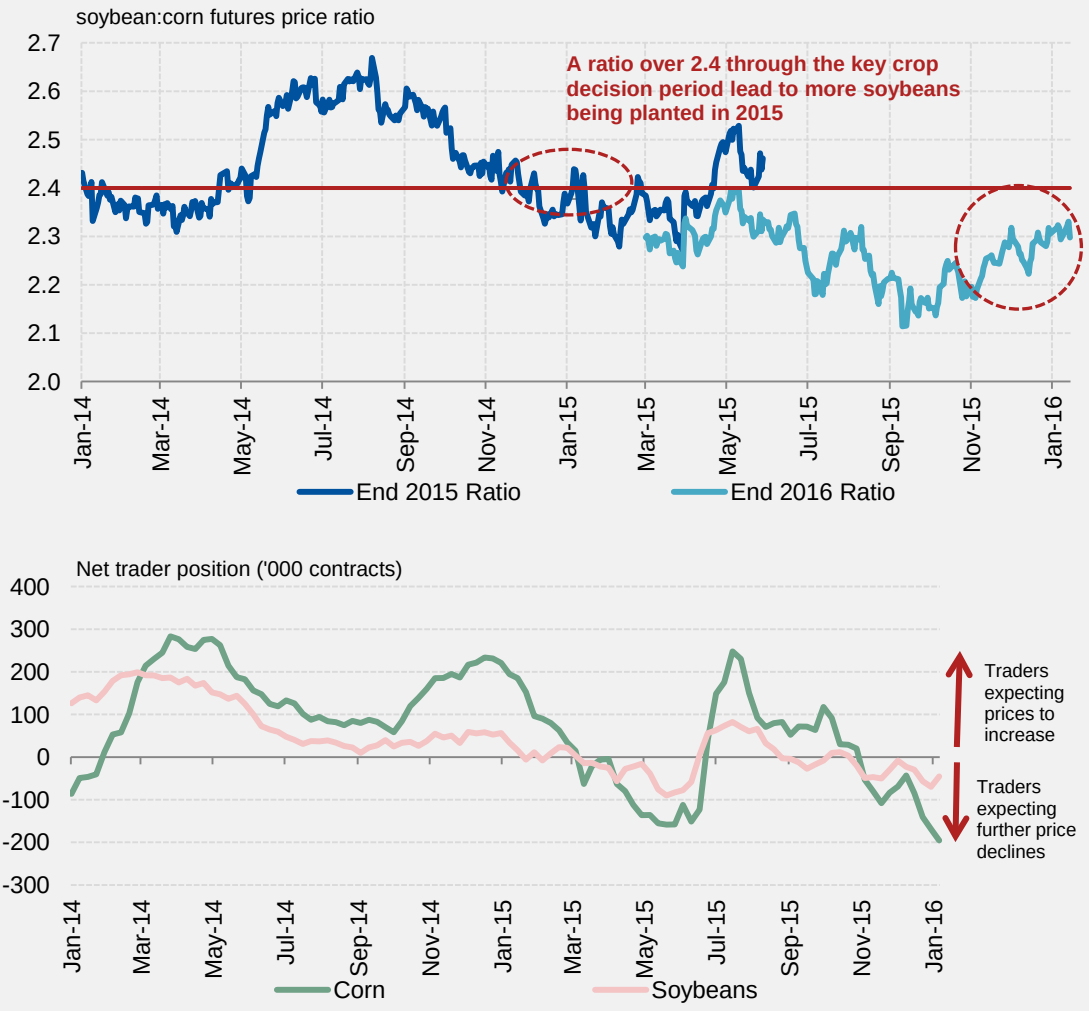
- The EU produced another record **wheat** crop in 2015, at 157.7 million tonnes. Winter planting in the region is now complete and conditions are excellent.
- Winter crop conditions in Ukraine have been affected by dry weather and only 64% of the crop is rated as good/satisfactory.
- **Price developments are set to remain limited, with stocks at record levels and demand subdued; negatively impacting the demand for phosphate fertilizers.**

- Consumption is set to exceed production again in 2015/16, forcing the stocks to use ratio lower for the third consecutive year. Indeed, the ratio should be at its lowest since 2006/07.
- Output India is set to contract to 100 million tonnes, the lowest in five years, following disappointing monsoon rains. Production in China, the largest grower, is estimated to expand to 145.8 million tonnes.
- **Rice values remain under pressure from only modest demand and trade. This is unlikely to have a major impact on phosphate fertilizer consumption in key regions**.



Data: CRU, USDA WASDE – Jan 2016. **Note**: *forecast

Soy/corn price ratio. Soy gains… But corn still favoured.

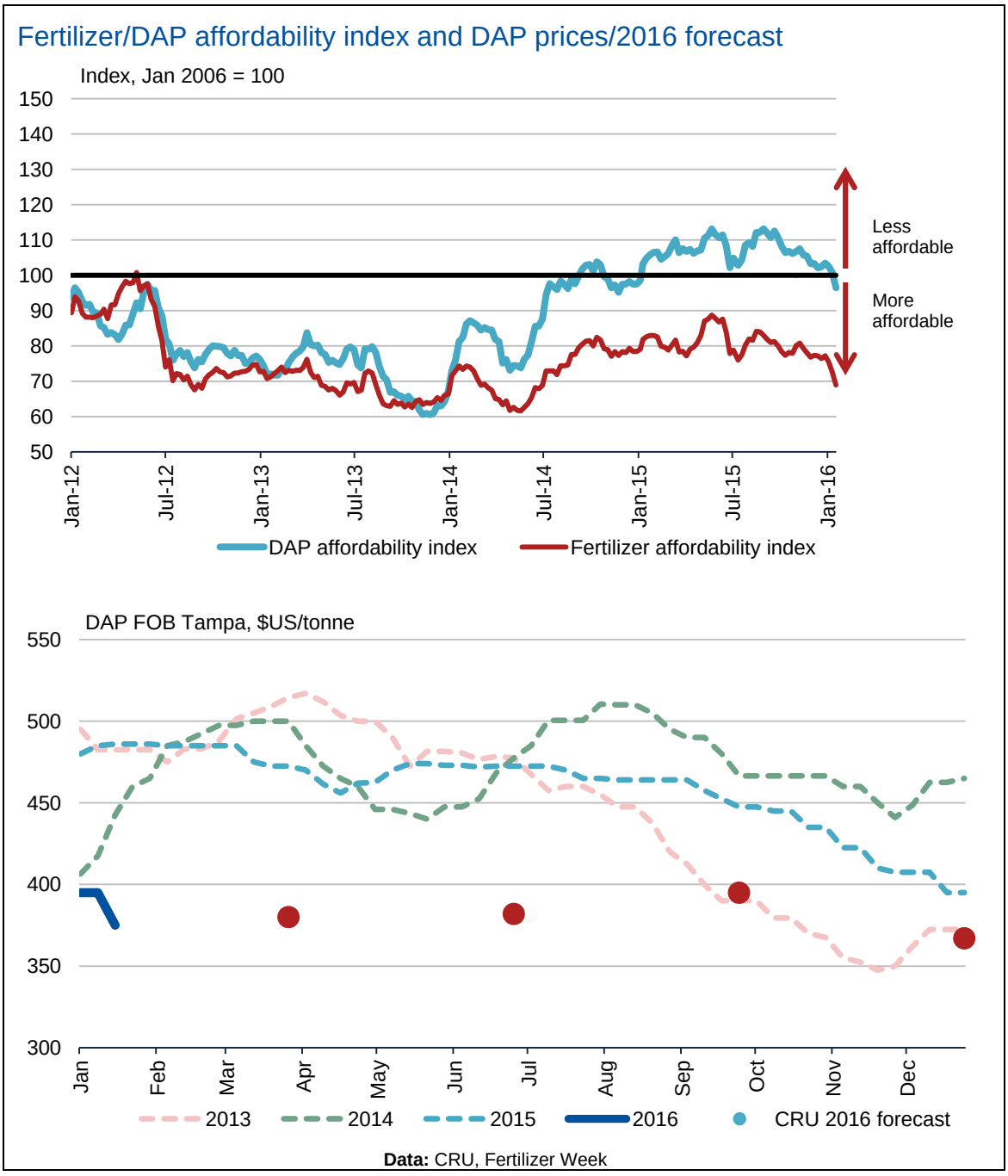


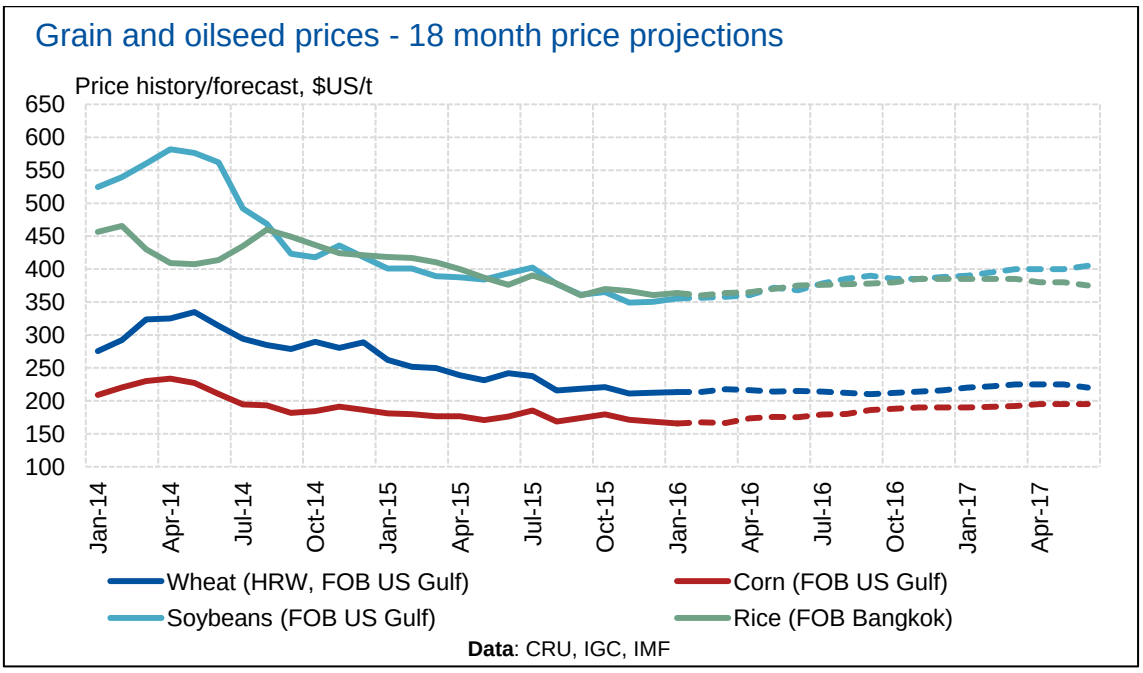
Data: CRU, CME, CFTC

Despite some recent gains in soybean prices, the soy:corn futures price ratio continues to favour the increased planting of corn in the US in 2016. CRU forecast corn area to expand 4.9% from 2015, to 34.2 million hectares. Soybean area is projected to fall 3.8% to 32.1 million hectares, remaining historically high. November and December is the key time of year for farmers making decisions on 2016 crops, and although soybean prices increased relative to corn in this period, the ratio remained in favour of corn. Any nearby increases in soybeans prices may be too late to spur crop switching. Commitment of trader's data shows the market is taking a bearish position for both corn and soybeans prices, based on the significant net short position. This may provide some nearby support for corn prices in particular, as traders look to exit these short positions.

This will favour overall fertilizer consumption in the US, although application rates are likely to be pressured due to tighter farmer margins. Indeed, corn application rates are forecast at 54kg/ha P_2O_5, unchanged from last year. Soybean rates are projected at 22kg/ha.

Fertilizer prices have fallen sharply over the past six months, represented in the index of fertilizer prices below. The extent of losses in major nitrogen and potash markets has exceeded those of phosphates. Despite some modest losses, DAP and MAP prices have held up well in a weak global market. While the crop price index has also moved lower, the losses in fertilizer prices have far outweighed this. Improving crop prices and continued weakness in phosphate fertilizer markets should help to trigger additional demand over 2016 and beyond. Indeed, CRU are forecasting DAP prices to remain relatively steady until Q4 2016, before declining to $367 by the end of the year, while crop prices are expected to have found their floor already.

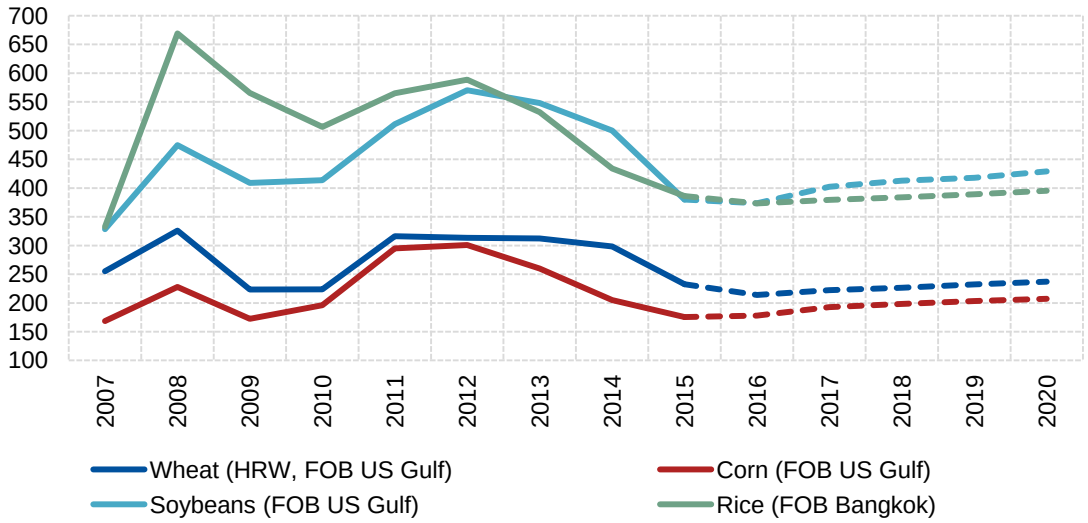




High inventory levels mean there are only modest gains in grain and oilseed prices to be expected over the coming 18 months. Wheat is expected to suffer an extended period of weakness due to a very competitive export market. This is dependent on the absence of any significant weather events occurring and causing crop losses. Longer term prospects are more favourable, particularly for corn and soybean prices as demand increases and inevitable crop losses occur. The last two years of agricultural production have been characterised by a lack of supply shocks, which often support prices. These events are impossible to factor into price forecasts, and if a drastic climatic event were to occur in a major crop production region, prices would respond. However, the high stock situation within the grains and oilseed market should cap any sharp price spikes over eighteen month outlook.

Prices towards the end of the five year outlook period will be supported by increasing populations and calorie requirements. Commodities used for animal feed production, mainly corn and soybeans; have more price upside, as diets in developing countries evolve to include more animal protein.

Grain and oilseed prices - 5-year crop price projections

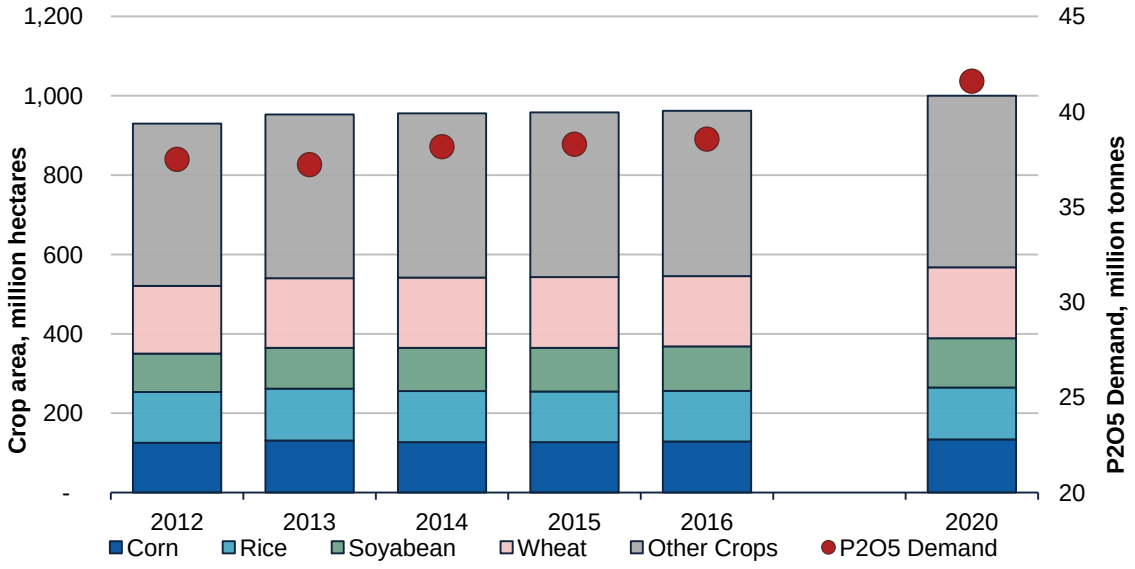


Data: CRU, IGC, IMF, World Bank, EIU

1.2.2 Implications for phosphate nutrient demand

Trends in agriculture will directly or indirectly determine the consumption of fertilizers, with agricultural prices being one of the key drivers for the direction of fertilizer prices, market sentiment and phosphate demand. As such, CRU uses its agricultural forecast to project phosphate fertilizer consumption. These forecasts are based on projections of global food demand as a function of population and GDP growth, as well as on crop area and fertilizer application rates on a crop and country level.

Top 27 agricultural nations - crop area and P_2O_5 demand



Data: CRU

Note: The top 27 countries include Argentina, Australia, Bangladesh, Belarus, Brazil, Canada, China, Egypt, France, Germany, India, Indonesia, Iran, Italy, Japan, Malaysia, Mexico, Pakistan, Poland, Russia, Spain, Thailand, Turkey, United Kingdom, United States, Ukraine and Vietnam.

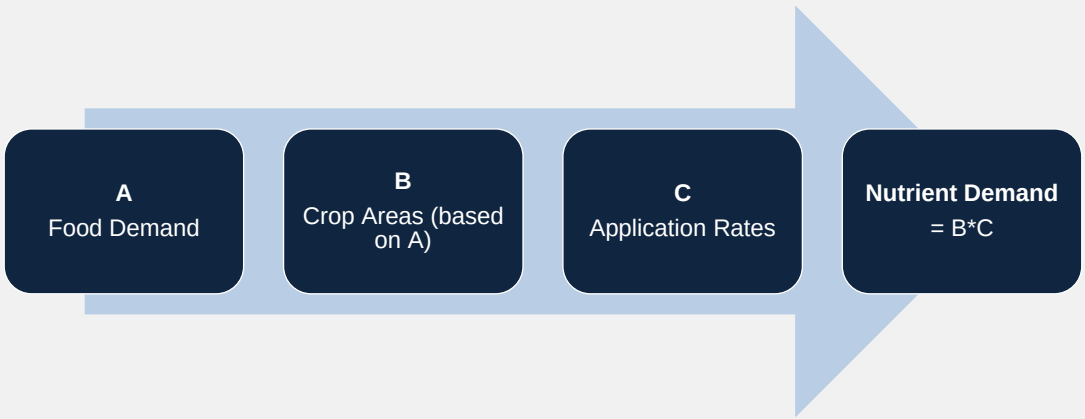
Nutrient Forecasting Methodology

CRU has developed a nutrient demand model, forecasting consumption at a country level over the next five years. Agricultural production is a function of food demand; therefore the first stage is to forecast **global food demand**, which is a function of population and GDP growth. Population growth determines total caloric requirements, while rising income affects food consumption (i.e. which food group will make up those calories).

The second and third stages are to forecast **crop area** and **application rates** by country. On a global basis, twenty seven countries (**major consumers**) account for approximately 90% of nutrient demand. By comparison, the remaining one hundred and fifty countries in our model (**minor consumers)**, account for just 10% of global nutrient consumption. As such we have used two different approaches to calculate crop area and application rates in these two groups.

Concept of nutrient demand model

Growth in **harvested area by crop** in **major consuming** countries is based on our food demand projections. This is calculated using an historical series from the FAO, recent and current data from various sources, and forecasts from the CRU crop model. The forecast is then disaggregated by country and by crop, factoring in population, food intake, and average yields. All of these elements enable us to produce a robust forecast of production growth rates on a country and crop level, and thus a forecast of crop area calculated by country and by crop.

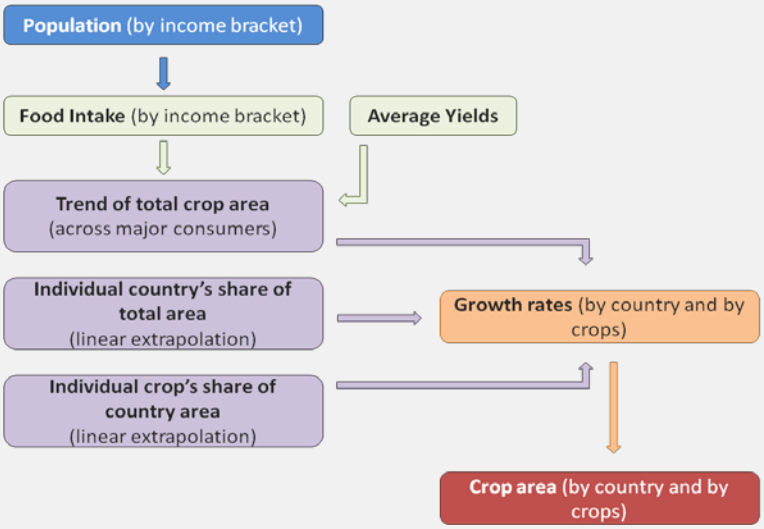


To calculate nutrient application rates by crop, we estimate the base year using IFA/FAO and FAPRI data or national sources. This is back-casted for all crops using country-level application rates, unless national sources are available, such as USDA data.

The forecast is then based on recent trends and analyst judgement, and manual adjustments at country-level are made to reflect current apparent **nutrient demand** for N, P_2O_5 and K_2O. A much simpler approach is used when calculating crop area and application rates in **minor consuming** countries. In this case, we extrapolate recent trends to aggregate crop area by

country and application rate by country. Thus, **nutrient demand** is calculated as a function of these.

Crop area forecast in major consuming countries

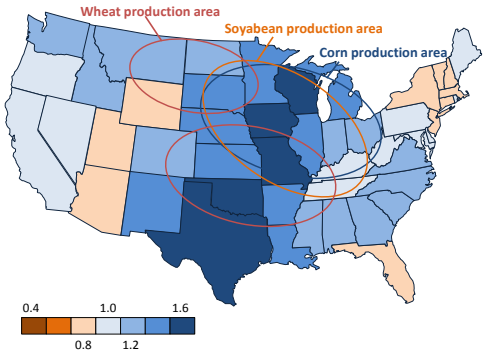


1.3 Regional Assessment of phosphate demand

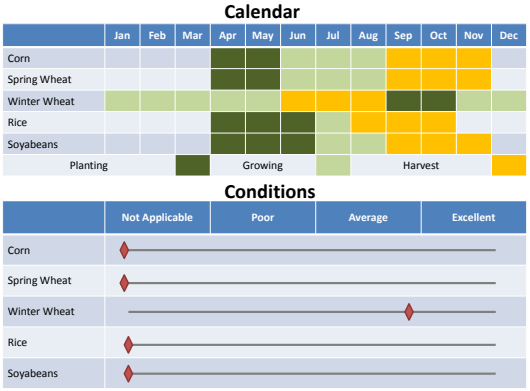
1.3.1 Americas

United States – Agricultural Demand Dynamics

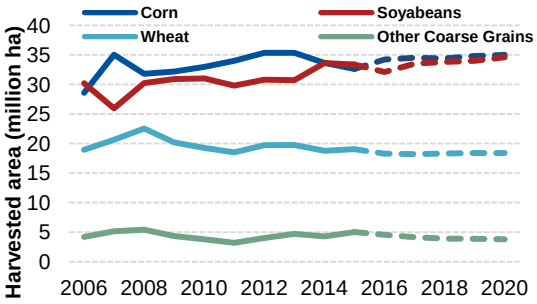
90 Day Precipitation (as at 21-Jan)



Crop calendar and conditions



Major crop areas



Crop contribution to P consumption

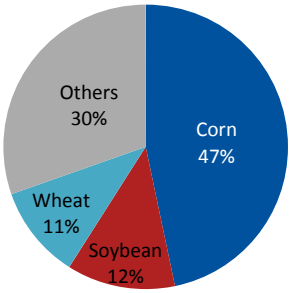


Table 1.2: United States phosphate consumption, 2014-2020

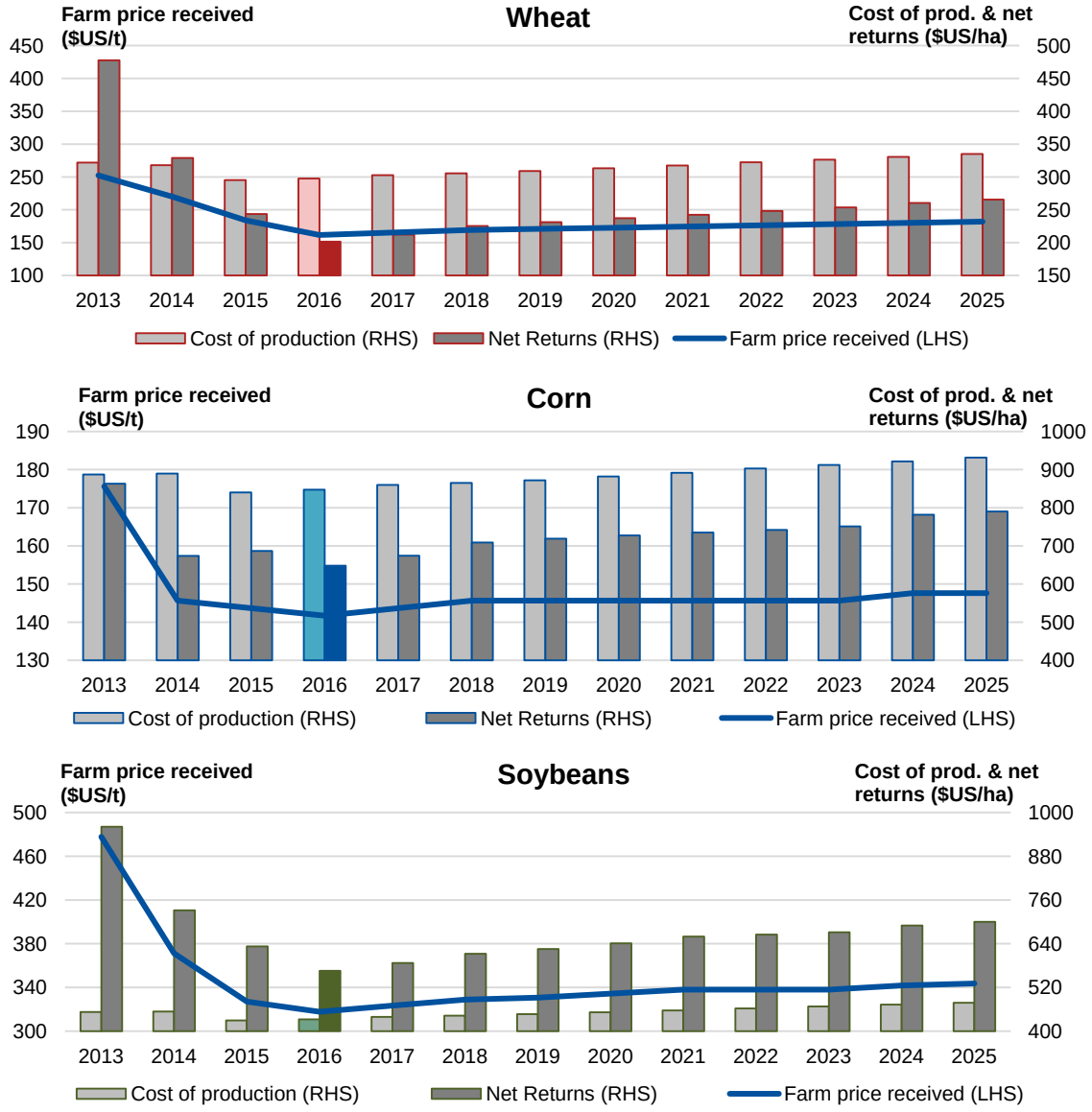
	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP (46% P_2O_5)	2.7	3.3	3.3	3.3	3.3	3.3	3.3	↑
MAP (51% P_2O_5)	3.6	3.4	3.6	3.6	3.7	3.7	3.7	↓
TSP (46% P_2O_5)	0.3	0.2	0.2	0.2	0.2	0.2	0.2	↔
Total Conc Phos (100% P_2O_5)	**3.2**	**3.3**	**3.4**	**3.5**	**3.5**	**3.5**	**3.5**	↓
Total P_2O_5 Nutrient (100% P_2O_5)	4.2	4.1	4.2	4.2	4.2	4.2	4.2	↑
Other P_2O_5 demand (100% P_2O_5)	1.6	1.5	1.5	1.5	1.6	1.6	1.6	↑
Total P_2O_5 (100% P_2O_5)	**5.8**	**5.6**	**5.7**	**5.7**	**5.7**	**5.8**	**5.8**	↑

Data: CRU, FW, IFA, TFI, GTIS

- Wheat area is forecast to decline significantly in 2016, with winter plantings (responsible for around 70% of total area) falling 7%. Prices are set to remain low, with the US uncompetitive in the global export market. This will hinder planted area into the medium term.
- Corn harvested area is forecast to rebound to 34.2m ha in 2016, with soybeans set to decline modestly to 32.1m ha (but remains well above historical levels). Growth in soybean area is expected to be stronger over the medium term owing to higher animal protein demand.
- Demand in early 2016 has been limited, with buyers waiting for prices to fall further. Demand is forecast to increase over February as retailers look to fill spring demand. While some phosphate applications are occurring now, most applications are expected to occur around March, weather permitting.

Wheat prices are an important indicator for phosphate demand and prices in North America. Global oversupply in the wheat market means values will continue to be pressured over the coming 12 months, and net farm returns from this crop are likely to remain low.
The USDA recently released their long term projections for grains and oilseeds to 2025. This data shows that net returns are set to bottom out in 2016, with a modest recovery projected over the following ten years.

USDA projected crop prices, cost of production and returns

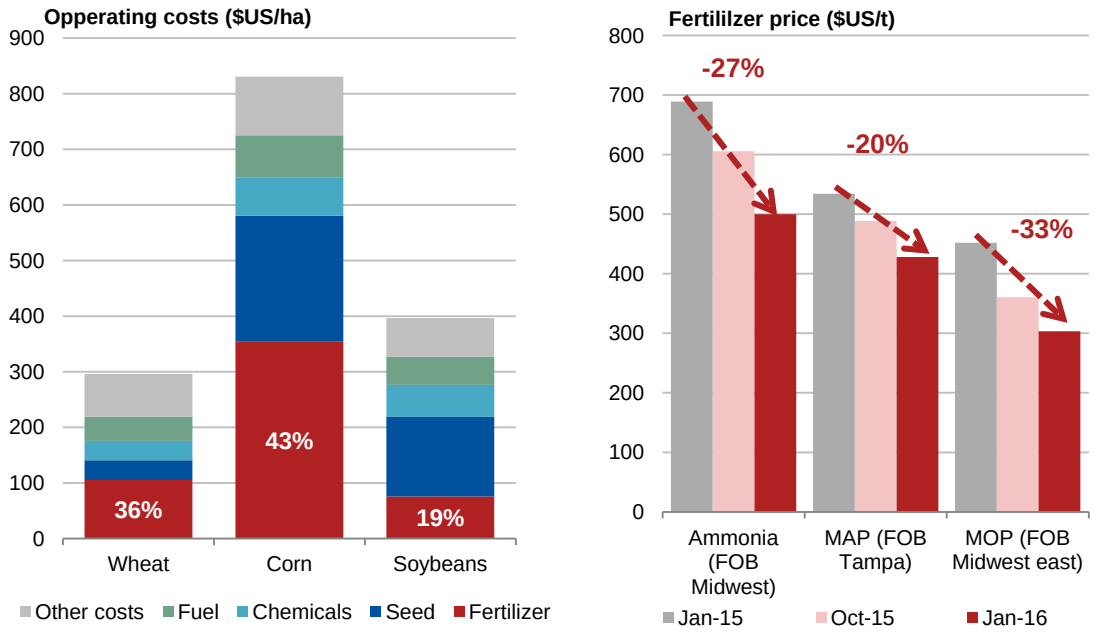


Data: CRU, USDA

Wheat is forecast to 'bottom out' with net returns in 2016, but the USDA also forecast returns for corn and soybeans to be lower, pressuring phosphate fertilizer demand. However, these assumptions include a higher cost of production estimate for 2016, which given current fertilizer, fuel and chemical prices, is incorrect. The charts below show the breakdown of operating costs on a US-wide basis, with fertilizer responsible for a particularly large share of

corn costs. The chart also shows the slide in fertilizer prices over the past twelve months, and from October, when the USDA numbers where generated, fuel, seed and chemical costs have also fallen, providing further input cost savings. **This will support higher net returns than forecast by the USDA**. Lower net returns were expected to pressure US phosphate fertilizer demand in 2016 and 2017; however lower input prices are will provide some upside to our demand estimates of 4.2m t P_2O_5 for both years.

US crop operating cost breakdown and input prices

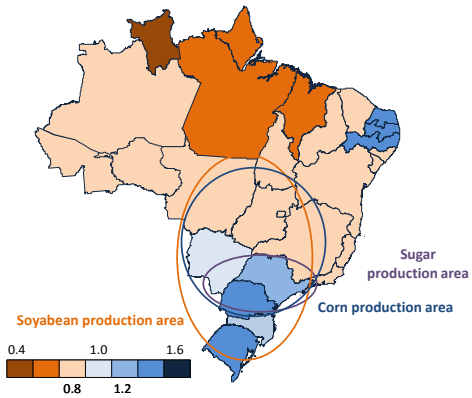


Data: CRU, USDA – production costs are average of 2010-2014 data, not including overheads.

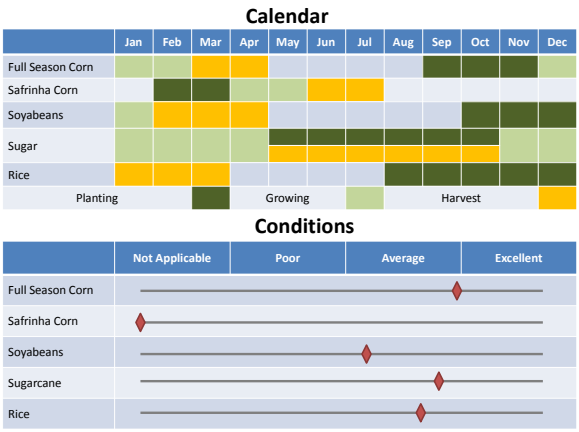
Crop areas in **Canada** are set to remain steady over the medium term. Corn acreage is projected to expand modestly, moving to 1.4 million hectares by 2020. Total P_2O_5 demand is forecast to remain flat at 0.8 million tonnes to 2020. While NPs (Micro-Essential) products are showing increasing popularity in Canada, MAP is forecast to retain 75% of total phosphate fertilizer share, with the product better suited to the soil types. Indeed, total MAP demand is forecast at 0.6 million tonnes P_2O_5 from 2016 through to 2020.

Brazil – Agricultural Demand Dynamics

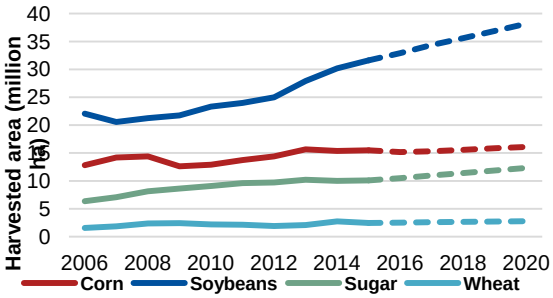
90 Day Precipitation (as at 21-Jan)



Crop calendar and conditions



Major crop areas



Crop contribution to P consumption

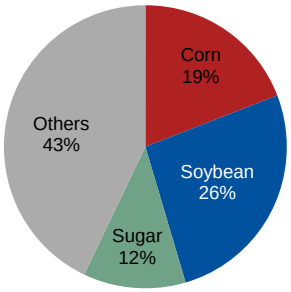


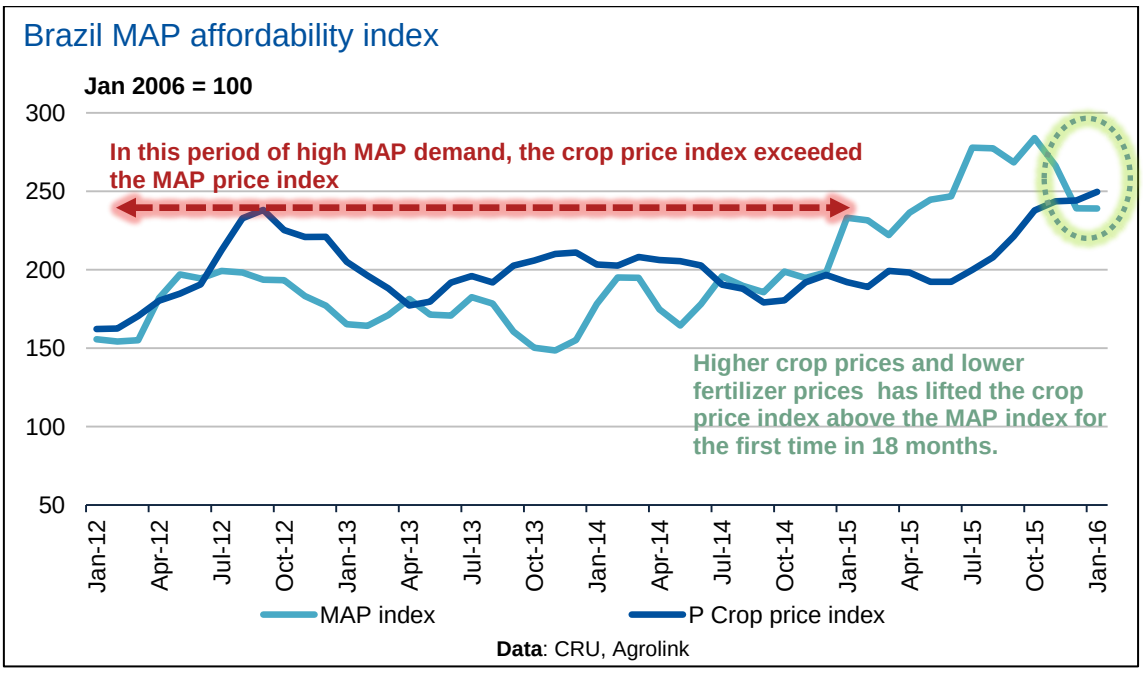
Table 1.3: Brazil phosphate demand, 2014-2020

Million tonnes product	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP (46% P_2O_5)	0.7	0.5	0.4	0.4	0.4	0.4	0.5	↓
MAP (53% P_2O_5)	4.7	4.2	4.5	4.7	4.8	5.0	5.1	↑
TSP (46% P_2O_5)	1.8	1.9	1.9	2.0	2.1	2.2	2.3	↑
Total Conc Phos (100% P_2O_5)	**3.7**	**3.3**	**3.4**	**3.6**	**3.7**	**3.8**	**3.9**	↑
Total P_2O_5 Nutrient (100% P_2O_5)	4.8	4.1	4.3	4.6	4.8	5.0	5.2	↑
Other P_2O_5 demand (100% P_2O_5)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	↔
Total P_2O_5 (100% P_2O_5)	**5.3**	**4.7**	**4.9**	**5.1**	**5.3**	**5.8**	**5.8**	↑

Data: CRU, FW, IFA, TFI, GTIS

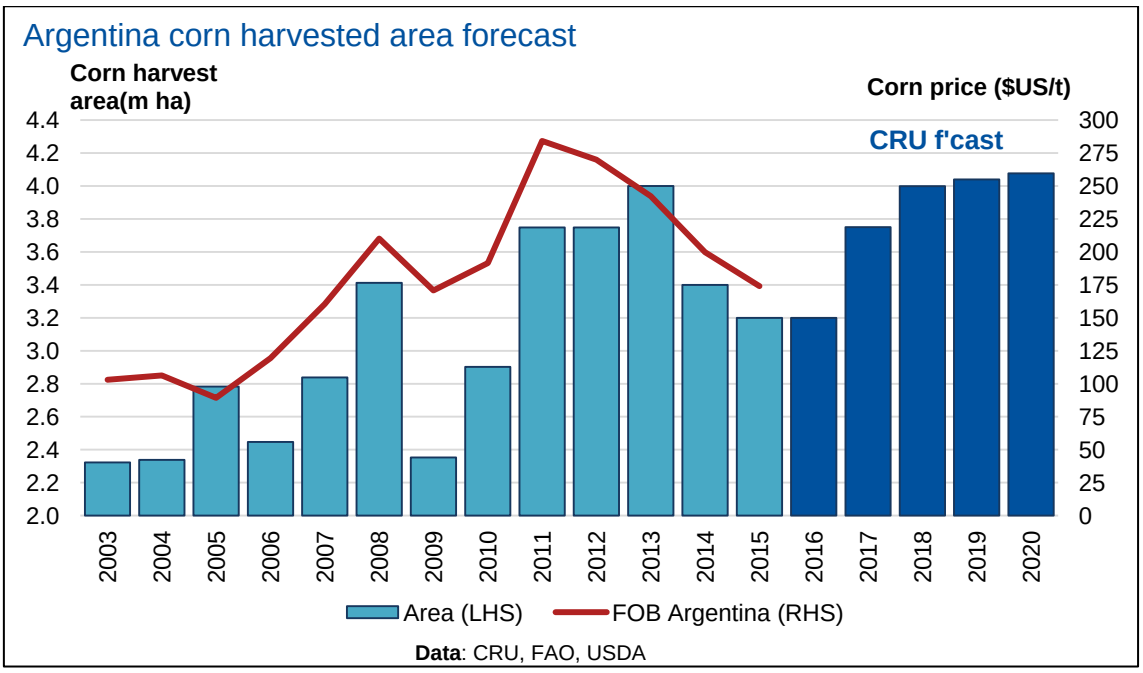
Key developments

- CRU has recently conducted a fertilizer demand research trip of Brazil, a special focus on page 36 discusses the findings from this trip and the implications on phosphate demand.
- Soybean harvesting has begun later than usual, owing to delays in planting. Dry conditions through October and November lowered yield potential, and production is not expected to exceed 100 million tonnes. Wet conditions forecast for the harvest period are likely to result in further harvest delays.
- These harvest delays will impact the planting of safrinha corn crops. The optimal safrinha planting window closes towards the end of February; however an unprecedented level of forward selling of safrinha crops will make farmers plant crops outside of the ideal window.
- Total P_2O_5 demand for 2015 has been cut significantly, from 4.5million tonnes last report, to 4.1million tonnes this report. A modest recovery in demand was expected in Q4, however this did not eventuate. 2016 demand is set to rebound modestly, to 4.3 million tonnes.
- 2015 MAP imports are estimated to have declined 13% from 2014 volumes, at 3.1 million product tonnes. Importers and farmers have blamed the sharply devalued Brazilian real and issues in obtaining terms of credit.
- A weaker Brazilian real has helped to improve grain prices and this will support the rebound in demand in 2016. While problems with credit and financing are expected to continue, the industry will have adjusted to a 'new normal' and the issues will not shock the industry as much as 2015.



Agriculture in **Argentina** continues to be challenged by restrictive export tax policies. The 3.4 million hectares of wheat planted in 2015 was a 100 year low. Falling prices and government restrictions on exports has resulted in farmers losing interest in wheat. Corn plantings are also set to be significantly lower in 2015, with some market sources suggesting a 40% y-o-y contraction in area. Again, low prices, government interference and the high cost of inputs has encouraged farmers to increase soybean acreage in place of more nutrient intensive crops like corn. Total P_2O_5 demand for 2015 is estimated at 0.6 million tonnes, well below the record 0.7 million tonnes consumed in 2011.

The recent election of Mauricio Macri has provided some optimism for Argentina's agricultural industry. The previous Fernández de Kirchner reign implemented hefty taxes on corn, wheat and soybean exports. These export taxes drastically reduced the margins farmers received, which resulted in a shift towards less input intensive crops like soybeans. Macri has already followed through on promises to reduce agricultural export taxes. Indeed, corn and wheat exports have already started to flow out of the country following the abolishment of their respective taxes. Soybean taxes are set to be gradually phased out, with a set reduction 5% per year (from 35%) announced. This would be beneficial for corn planted area, which has been reduced significantly over the past few years, some industry players are expecting a 20% increase in 2016/17 plantings, and continued expansions thereafter. This would support phosphate consumption, which is projected to expand to 0.7 million tonnes by 2020. MAP is expected to remain the most widely used fertilizer with a 39% share, although the DAP share is set to increase to 30% (from 26% in 2016).



1.3.2 Europe and CIS

Dry conditions in **Europe** lowered 2015 crop yields from 2014's outstanding levels. Dryness and heat have particularly hit corn crops, with highly variable conditions throughout the continent lowering final yields. However, a significant fall in corn supply will support domestic prices, encouraging increased planting and fertilizer use in 2016. Regulatory pressure on farmers to lower application rates of fertilizer use continues to place downwards pressure on overall fertilizer demand across the continent.

Table 1.4: Western & Eastern Europe phosphate demand, 2014-2020

Million tonnes product	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP (46% P_2O_5)	2.3	2.3	2.4	2.4	2.5	2.5	2.5	↑
MAP (52% P_2O_5)	0.8	1.0	1.0	1.1	1.1	1.1	1.2	↑
TSP (46% P_2O_5)	0.5	0.5	0.6	0.6	0.6	0.6	0.6	↑
Total Conc Phos (100% P_2O_5)	**1.7**	**1.8**	**1.9**	**1.9**	**2.0**	**2.0**	**2.0**	↑
Total P_2O_5 Nutrient (100% P_2O_5)	3.5	3.4	3.4	3.5	3.5	3.5	3.5	↑
Other P_2O_5 demand (100% P_2O_5)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	↑
Total P_2O_5 (100% P_2O_5)	**4.6**	**4.5**	**4.5**	**4.6**	**4.6**	**4.6**	**4.6**	↑

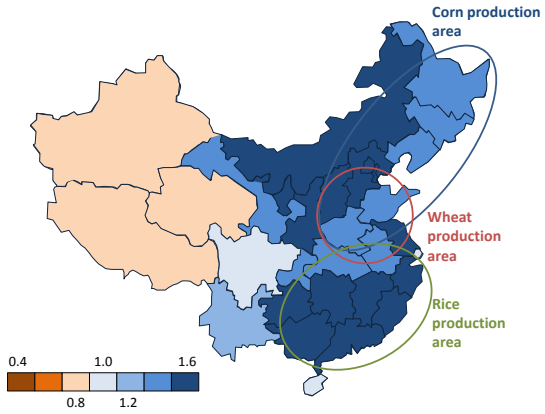
Data: CRU, IFA, GTIS

Medium term phosphate demand is set to remain steady, with the market generally considered 'mature'. DAP is the preferred phosphate fertilizer among European farmers and is forecast to account for the largest share of total demand in 2015. Most of the soils used for agriculture in Europe are neutral-to-acidic, rendering DAP particularly suitable.

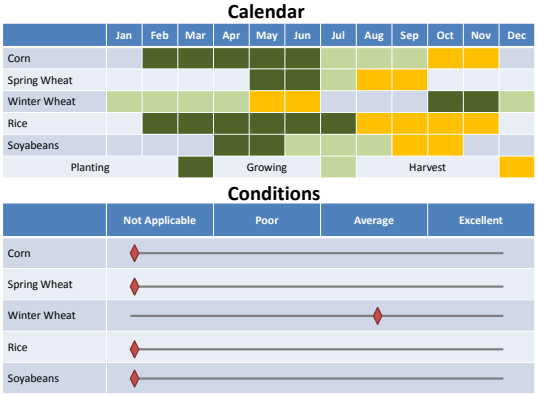
1.3.3 Asia

China – Agricultural Demand Dynamics

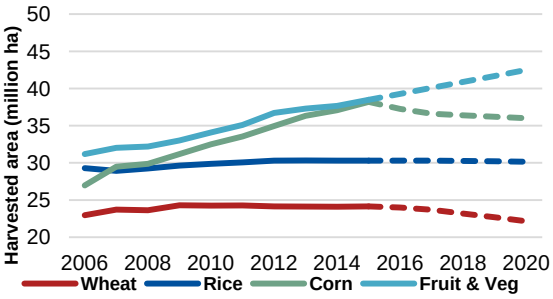
90 Day Precipitation (as at 21-Jan)



Crop calendar and conditions



Major crop areas



Crop contribution to P consumption

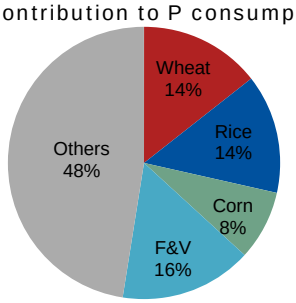


Table 1.5: China phosphate demand, 2014-2020

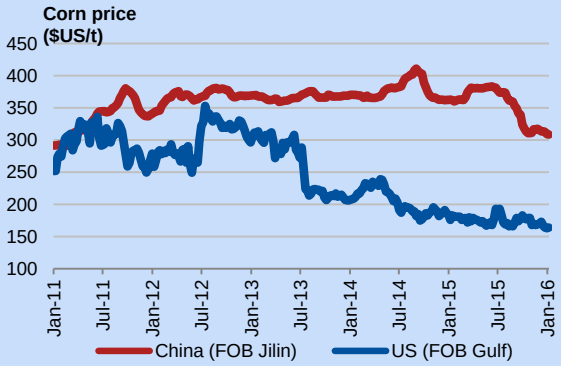
Million tonnes product	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP (46% P_2O_5)	10.7	10.7	10.0	10.1	10.3	10.3	10.4	↓
MAP (45% P_2O_5)	9.4	10.4	10.4	10.3	10.3	10.3	10.3	↓
TSP (46% P_2O_5)	0.4	0.4	0.5	0.5	0.5	0.5	0.6	↔
Total Conc Phos (100% P_2O_5)	**9.4**	**9.8**	**9.5**	**9.5**	**9.6**	**9.6**	**9.6**	↓
Total P_2O_5 Nutrient (100% P_2O_5)	11.9	12.0	11.7	11.6	11.6	11.6	11.5	↓
Other P_2O_5 demand (100% P_2O_5)	2.3	2.4	2.4	2.5	2.5	2.5	2.5	↑
Total P_2O_5 (100% P_2O_5)	**14.2**	**14.4**	**14.1**	**14.1**	**14.1**	**14.1**	**14.1**	↓

Data: CRU, IFA, GTIS, CFMW, CPPA

Key developments

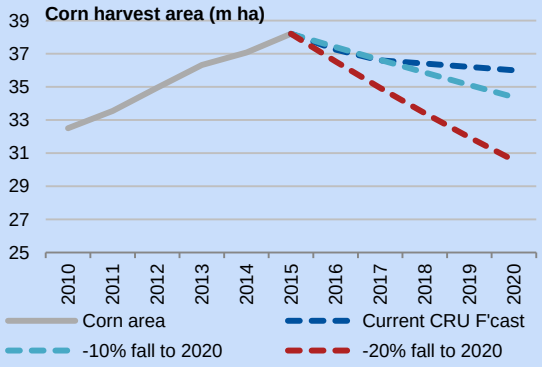
- Earlier in 2015, the Chinese government announced intentions to cap chemical fertilizer consumption growth to 1% per year to 2020 and 0% thereafter. This has not had an impact on our forecast, which was already anticipating slightly lower demand.
- Chinese crop prices moved lower in H2 2015, particularly for corn in Northeast China and Inner Mongolia. Chinese crop inventories stand at record highs and there is limited room for the government to accept more product. The outlook for crop prices in 2016 is soft and this is expected to hit phosphate fertilizer demand, which is forecast to decline 2.9% y/y, to 11.7 million tonnes.
- Low crop prices are expected to reduce farmers' enthusiasm for planting, with double cropping expected to be reduced. Planting on marginal farmland is also set to decline. Support prices for corn have already been reduced in 2015 and there are rumours the government want to slash another 10% before the program ends next spring.
- Owing to a decline in groundwater, the government of Hebei province asked farmers to reduce the area of winter wheat planted in Q4 2015. Longer term, regulations will be implemented so only one crop is planted per year, likely to be less phosphate intensive crops.

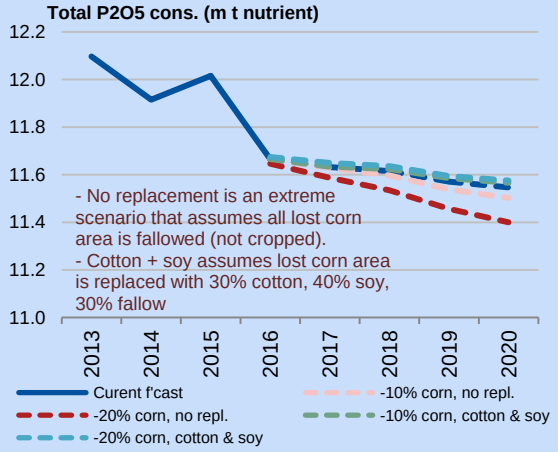
Reforms on corn procurement and policy: Impacts on phosphate demand



- Corn is a key phosphate consuming crop in China, and its area has expanded rapidly over the past 15 years.
- High domestic corn prices have supported sharp increases in planted area over the past three years, even as global prices have declined sharply.
- Corn enjoys a floor price set by the government which encourages farmers to plant more of the crop when S&D fundamentals suggest they should not.
- This support price has recently been reduced, and there are suggestions the support price policy will be completely reformed in 2016.

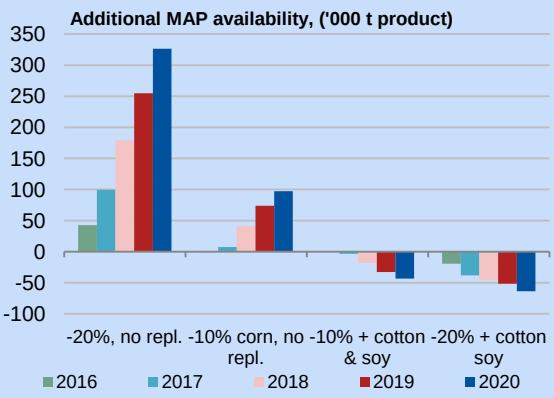
- Swelling inventories and high levels of wastage have triggered a wave of proposed reforms.
- The National Development and Reform Commission (NDRC) recently published proposals to reduce the amount of corn planted in fringe production areas over the next five years.
- Indeed, the NDRC want to lower corn production to 175 million tonnes (221m t estimated to have been produced in 2015). A reduction to 10-20% in planted area has been proposed.





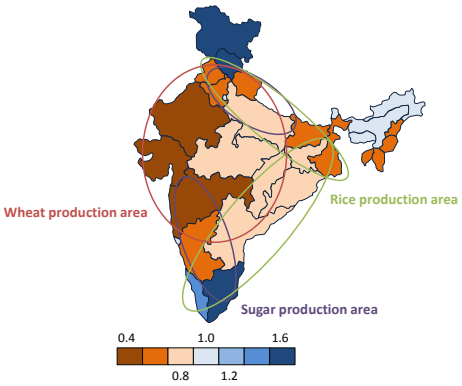
- The NDRC outlined that corn could be replaced by various crop/fallow mixtures.
- The proposals state that farmers near China's north-eastern border grow soybeans instead of corn, while farmers in northern and north-western regions would be given subsidies to switch to silage corn as forage for cattle. They also suggest corn be rotated with cotton in parts of northern China.
- The scenario analysis opposite shows the impact on total phosphate consumption with reduced corn area. The scenarios represent both a 10 and 20% reduction in area and different crop substitutions. The most extreme scenario results in 150,000 tonnes less P_2O_5 being consumed in 2020.

- If the difference in P consumption is translated to MAP tonnes (45% P_2O_5), and domestic fertilizer production remains constant, the most extreme (and highly unlikely) scenario results in an additional 327,000 tonnes of available MAP, which could be re-directed to the export market.
- The most likely scenario (+10% reduction in area, most of which is replaced by cotton and soy) shows that more P_2O_5 would be used by the 2020.
- **The change in corn policy is unlikely to have an impact on domestic P_2O_5 consumption, with replacement crops likely to use even more P_2O_5 than corn.**

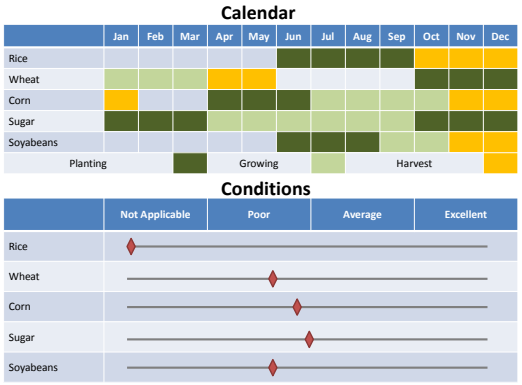


India – Agricultural Demand Dynamics

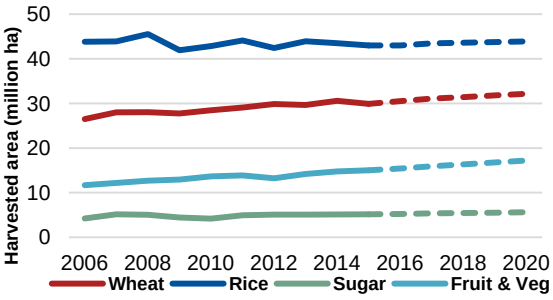
90 Day Precipitation (as at 21-Jan)



Crop calendar and conditions



Major crop areas



Crop contribution to P consumption

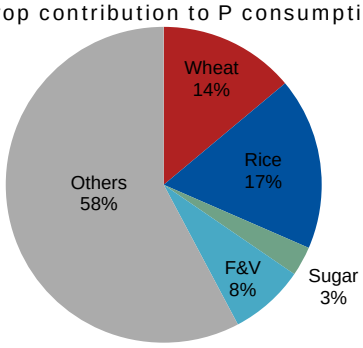


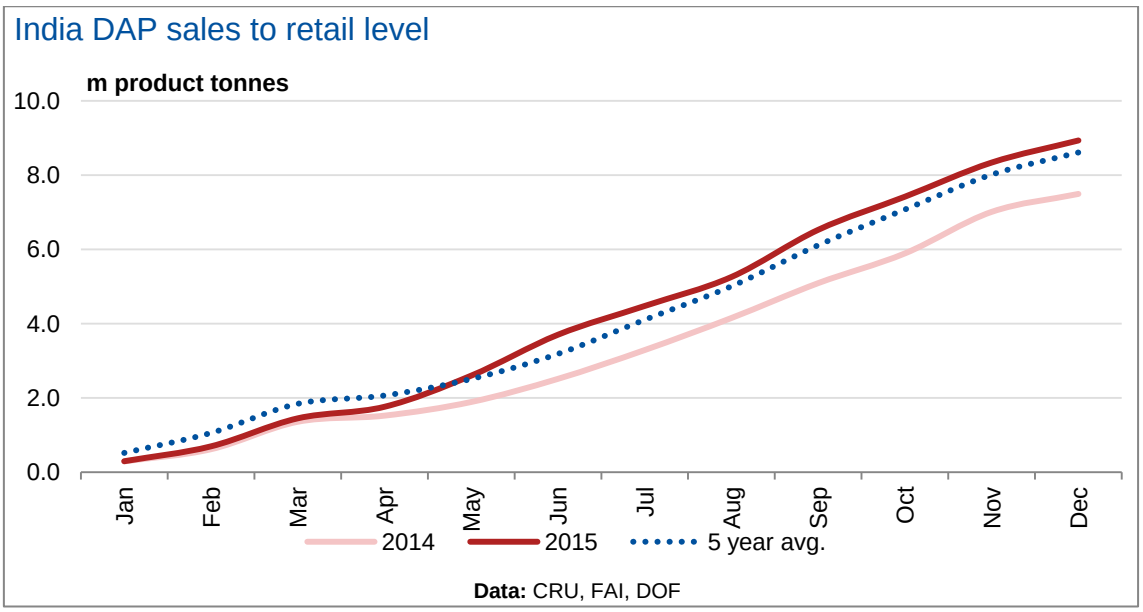
Table 1.6: India phosphate consumption, 2014-2020

Million tonnes product	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP (46% P_2O_5)	6.9	9.8	8.8	9.8	10.5	11.1	11.6	↑
MAP (52% P_2O_5)	0.2	0.1	0.3	0.3	0.3	0.3	0.4	↑
TSP (46% P_2O_5)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	↔
Total Conc Phos (100% P_2O_5)	**3.3**	**4.6**	**4.2**	**4.6**	**5.0**	**5.3**	**5.5**	↑
Total P_2O_5 Nutrient (100% P_2O_5)	5.7	6.8	6.3	6.9	7.3	7.6	8.1	↑
Other P_2O_5 demand (100% P_2O_5)	0.1	0.2	0.2	0.2	0.2	0.2	0.2	↔
Total P_2O_5 (100% P_2O_5)	**5.9**	**6.9**	**6.5**	**7.1**	**7.5**	**7.8**	**8.3**	↑

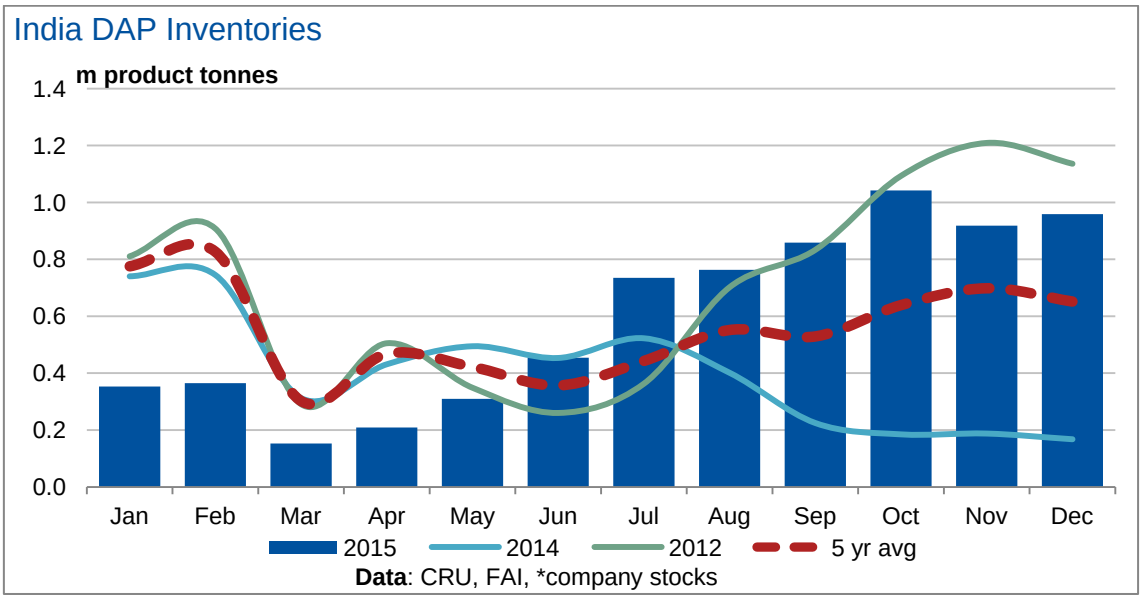
Data: CRU, IFA, FAI, GTIS

Key developments

- Domestic DAP sales are estimated to have reached 9.0 million tonnes product in 2015 (7.5 million in 2014). Companies aggressively pushed sales ahead of the kharif season, in anticipation of better rainfall. However, a dry second half of the monsoon season impacted consumption and farmers avoided purchasing expensive fertilizers (DAP/NP/NPKs) to minimise the cost of cultivation.
- Planting of rabi season crops is almost compete with 90% of crop planting completed by the second week of January. This means farm DAP purchasing for this crop is complete. Planting pace as been slower than previous years, owing to very dry conditions following a disappointing end to the monsoon season. Many farms have preferred to use only urea and SSP to minimize cost of cultivation. This has resulted in inflated stocks of P&K fertilizers at the retail level.
- Hot weather has impacted the yield potential of wheat, the main rabi crop. Production is forecast at 89 million tonnes, equal with last year's disappointing crop and an equal five year low. The disappointing crop is expected to have only a modest impact of fertilizer buying for the kharif season. Indeed, the 2016 kharif season is expected to be normal for fertilizer demand, weather permitting.
- The decline in global fertilizer prices will encourage the government to reduce the NBS subsidy for P&K fertilizers, to be announced in February. **CRU expects NBS rates for DAP to decline by INR1,200-1,800/t from INR12,350/t.** This is based on an average DAP import price of $430/t CFR, a rupee exchange rate of 65INR/$US and a net MRP of around INR23,000/t for 2016-17. DAP cash costs for both rock and MGA is estimated at $430/t, following sharp declines in ammonia, MGA and sulphur prices.



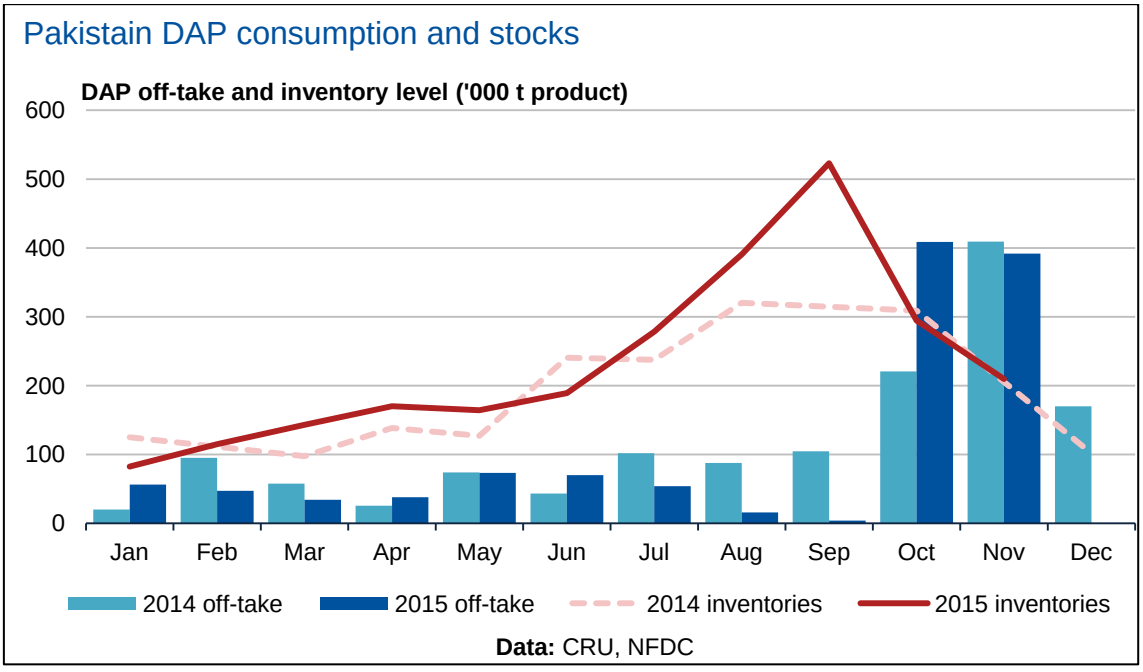
In 2015, fertilizer distributors were aggressive in pushing sales to the retail level, despite limited consumption and depreciation of the rupee. Indeed, by the end of the year distributors were offering hefty discounts and extended credit periods to retailers (INR1,000-1,800/t DAP) in order to increase sales. 2015 sales volumes ended almost 2 million tonnes higher than the previous year. However, limited demand at the farm level has inflated inventory levels. According to the FAI, company level DAP socks reached to 0.9 million t by end of December, but actual inventories are estimated at 2.2-2.3 million tonnes. This is a similar situation to 2012, when large stocks were carried into 2013. Consequently imports in 2013 fell 37% y/y, to just 1.7 million tonnes, pressuring global prices. With 2016 starting stocks so high, DAP imports are forecast to fall 22% y/y, to 2.2 million tonnes, placing further pressure on global values.



In **Pakistan**, a recent subsidy announcement has provided the market with some nearby demand support. The Pakistani government formally passed its subsidy of PKR 20 billion (US$190.9 million) for DAP, NP and NPK fertilisers to farmers across the country in October. The Ministry of National Food Security and Research announced that the subsidy shall be paid at PKR 500/50 kg bag of DAP and PKR 217/50 kg bag of NP/NPKs.

The State Bank of Pakistan has set aside INR10 billion to distribute among fertilizer manufacturers and importers, with the remaining 50% of the subsidy amount to be transferred by the provincial governments of Punjab and Sindh. The subsidy will last for as long as these funds are available and is designed to boost agricultural production in this period of low commodity prices. Although there were worries of the subsidy not being paid through December, the first payments have now being received, with the State Bank citing slow authorisation from the finance ministry as the reasons for the delays.

Like India, DAP stocks accumulated through the second half of the year. This is attributed to very low cotton prices, which forced farmers to cut back on inputs and in some cases, switch crops. Furthermore, floods are thought to have damaged around 40% of the crop in Punjab, the main growing state. However, off take in October and November improved as rabi wheat planting commenced, with total P_2O_5 demand for 2015 estimated at 1.0 million tonnes. This is forecast to remain steady in 2016 and expand to 1.1 million by 2020.



1.3.4 Rest of the world

Demand for phosphate fertilizers in **Australia** has remained steady over recent years, and is forecast to do the same over the medium term. A dry end to the winter cropping season is likely

to see wheat, barley and canola yields below initial expectations. Nevertheless, grain prices have been supported by a lower AUD and this should provide some market confidence going into the main 2016 fertilizer import buying season.

The entry of Chinese product into the Australian market over the past two years has altered market dynamics, particularly in the last year. There is an increasing level of competitiveness in the market, and this has partly been responsible for slow peak season demand. Import purchasing peaks in December; however with global prices declining buyers have been waiting for the market to find a floor. Purchases through January were also slow, with some reports of larger sales towards the end of the month. High inventory levels, after strong buying in 2015, are thought to been proving additional downwards pressure as are dry conditions in Victoria and South Australia. Total P_2O_5 demand is projected to remain steady in the medium term, at 0.9 million tonnes, with MAP remaining the dominant product.

Drought in Southern Africa is set to hinder near term demand of phosphate fertilizer. However, the drought has underpinned higher domestic grain prices, with the SAFEX (**South Africa**) maize futures contract recently posting a record high price. Higher crop prices will support demand once farmers have recovered from the drought. P_2O_5 demand in South Africa is projected to remain at around 0.2 million tonnes over the medium term, with MAP the dominant product.

Special focus: Dissecting the Brazil phosphate fertilizer market.

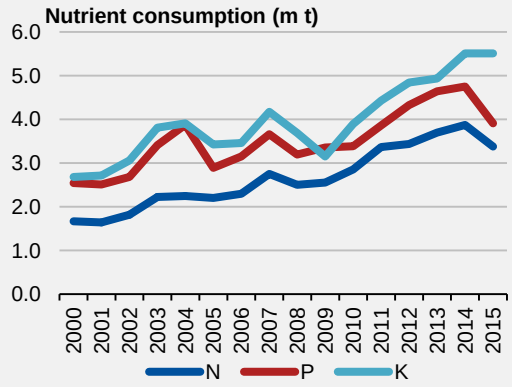
Key points:

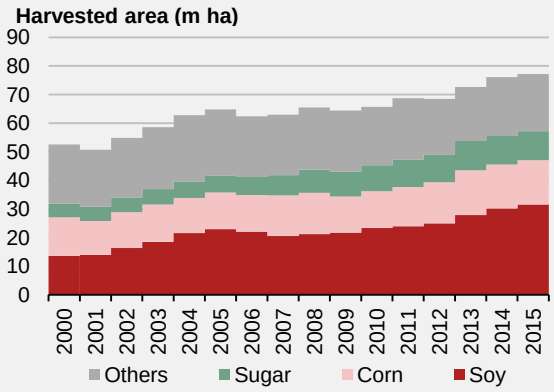
- CRU conducted a demand focused research trip to Brazil in October 2015, this special focus analyses the dynamics of the Brazilian market and how it will evolve.
- 2015 was a challenging year for the Brazilian fertilizer market, primarily due to a lack of credit and a weak currency. Total P_2O_5 consumption is estimated to have fallen 18% from 2014 volumes, to 3.9 million tonnes.
- Despite this sharp fall, volumes remain impressive considering the difficult circumstances. The industry continues to be supported by the expansion of farming and agriculture.
- Farmers are changing the way they purchase fertilizers and distributors need to adapt to sell more product. Distributors will have to inherit some risk over the coming years, which may advantage companies less exposed to currency fluctuations.
- Growth amongst all nutrients is forecast to remain strong, but below the rate set in 2010-2014. P_2O_5 consumption is projected to recover to 5.1m nutrient tonnes by 2020, a

compound annual growth rate of 5.0%. MAP is the most popular phosphate fertilizer, and demand for this is forecast at 2.7 million tonnes P_2O_5 by 2020.

Perspective:

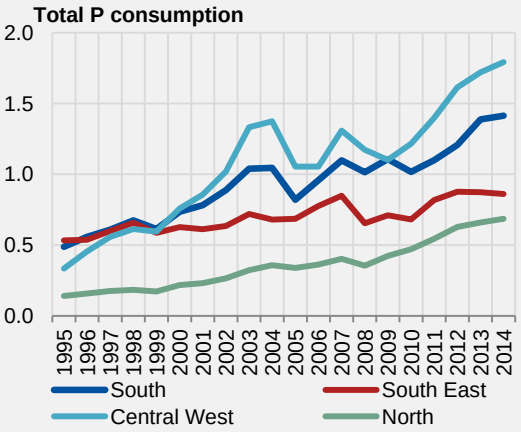
The total volume of fertilizer consumed in Brazil has expanded at 4.8% per annum over the past 10 years, with nitrogen leading the way, expanding at 5.6% and phosphate at 3.6%. This unprecedented growth has been underpinned by continued expansions in agricultural area, particularly for soybeans, corn, cotton and sugar. Indeed, soybeans have seen the greatest growth. **The share of soybeans within total area has moved from 26% to 41% within 15 years**.





Expanding crop area has been the primary factor the sharp increase in fertilizer demand, but high application rates have provided further support. These rates have been supported by the 'opening up' of virgin land, most often attributed to the conversion of inefficient pastures to soybean, corn and cotton crops. **The table below shows the fertilizer regime of a large farming group based in Mato Grosso**, where soybeans are mostly planted in October, harvested in January/February and immediately followed by a 'safrinha' corn or cotton crop. For comparison we have included average US application rates for the respective crops. Farmers recognise that phosphate applications on establish land may be higher than necessary, potentially capping future demand growth.

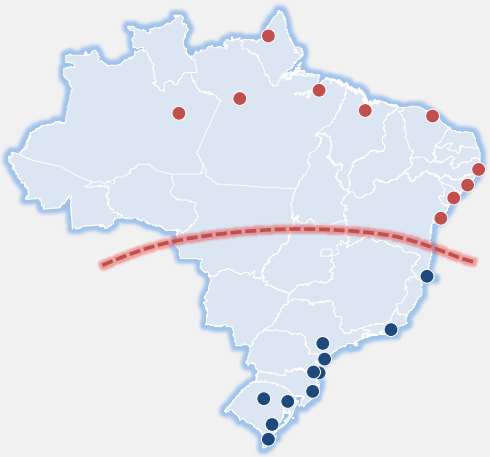
	App rate. kg/ha	1st year	2nd year	3rd year	US average
Soybeans	**N**	18	18	24	*3*
	P	269	169	132	*16*
	K	180	150	102	*23*
	S	130	70	48	
Safrinha Corn	**N**	No corn grown in first year of cropping	114	108	*154*
	P		92	90	*53*
	K		90	90	*55*
	S		14	10.5	



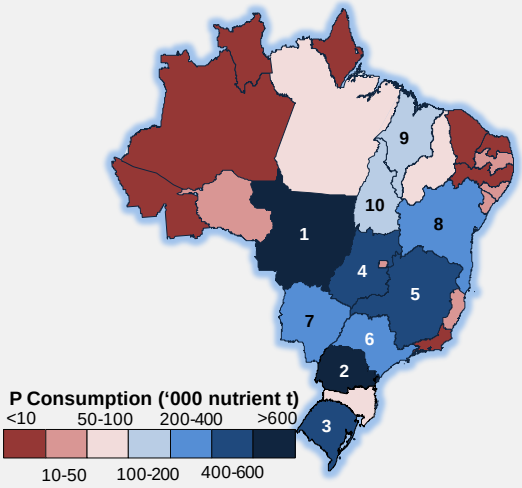
Concentration of demand and distribution:

2014 was a record for total fertilizer consumption, of which phosphate consisted of 4.7m nutrient tonnes, between the 5.4m tonnes of potash and 3.9m tonnes of nitrogen consumed. **The diagram opposite shows state phosphate consumption rankings, numbered by the top ten consumers**. **The rates of consumption growth are impressive across the 4 regions of the country, particularly the Central West, underpinned by the state of Mato Grosso.** Northern states have posted impressive gains in consumption since 2008, as broad acre farming becomes more popular.

Much of the fertilizer consumed on farm in Brazil is in the form of blended fertilizer. Fertilizer products, including urea, AS, MAP, SSP, TSP, MOP, are blended together to provide the farmer with a specific formulation that best suits their crop and soil. Popular blends for soybeans in Mato Grosso include 0N-16P-16K and 0-20-20, generally a combination of SSP and MOP.

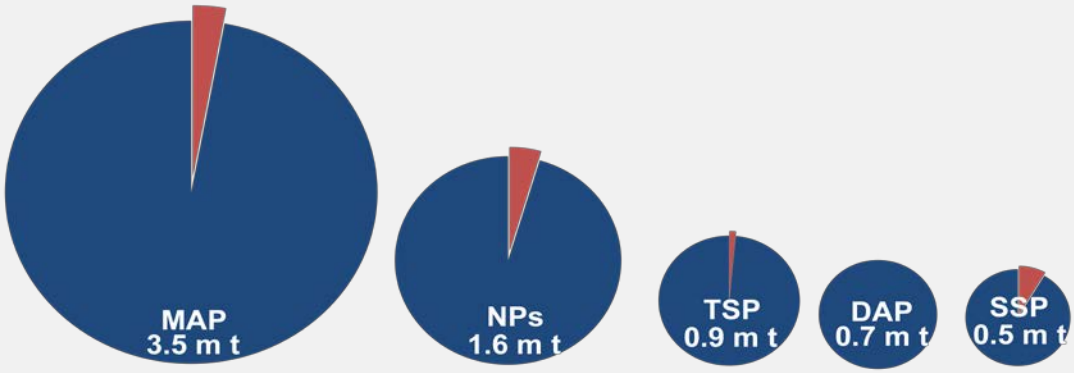


Each state in Brazil has a different taxation system for fertilizer, and because of this products are mostly transported directly from the ship in port, to the final warehousing/blending destination. If a trader in Mato Grosso purchases imported MAP from Paranagua port, it will be unloaded from the port directly onto a truck. This truck will drive directly to Mato Grosso (a two day journey) and unload there. If the product was to be stored in Paranagua state, it would incur and additional tax.



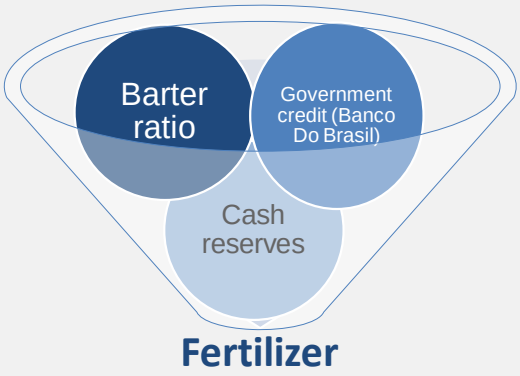
The map across shows **the location of ports in Brazil, split by north and south**, while the **pie charts show the phosphate fertilizer product split between the two regions for 2014 imports**. As logistics improve and northern ports become capable of accepting greater volumes of fertilizer, areas above this red line are expected to be fully served by northern ports. This will lead to a gradual shift in the north/south

port split, with the north set to take a greater share than at present.



Farm credit: How is fertilizer purchased?

As the very high application rates suggest, fertilizer represents a significant proportion of the farm budget. IMEA data shows that for a soybean crop in Mato Grosso, fertilizer makes up 29% of the total crop production budget. Despite global fertilizer prices falling in 2015, the sharply weaker real (BRL) made phosphate fertilizer more expensive, as a majority of the product is imported. Indeed, the popularity of SSP increased in 2015, as most of this is domestically produced and costs were lower. **The figure below shows a generalised split of fertilizer funding sources**.



The barter ratio: A tool used by farms to purchase fertilizer in lieu of cash or credit. It involves the transaction of 60kg bags of grain (mainly soybeans) for 1 tonne of fertilizer. This is most popular in the Cerrado (Central West) region of the country. Major grain buyers like ADM and Bunge use the barter ratio to accumulate grain and oilseeds. These companies have fertilizer supply agreements with Mosaic and Yara respectively. In 2013 and 2014 use of the barter ratio waned, given high grain and oilseed prices improving farm margins. The use of the ratio is thought to have increased in 2015, as farmers looked for alternative sources of credit amid lower grain prices. We expected the barter ratio to continue being a popular tool in 2016 as other sources of credit remain restricted.

Government credit: Subsidized loans provided by the Brazilian government have been a key source of farm credit, and have played an important role in expanding agricultural production. The National System of Rural Credit (otherwise known as the 'Harvest Plan') allows farms to apply for loans for the production and marketing of their crops at interest rates well

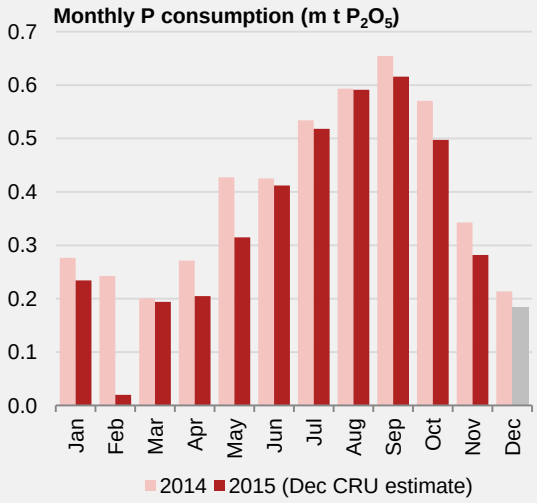
below the free market level. Most of the loans are distributed through the government bank, 'Banco do Brasil' (Bank of Brazil).

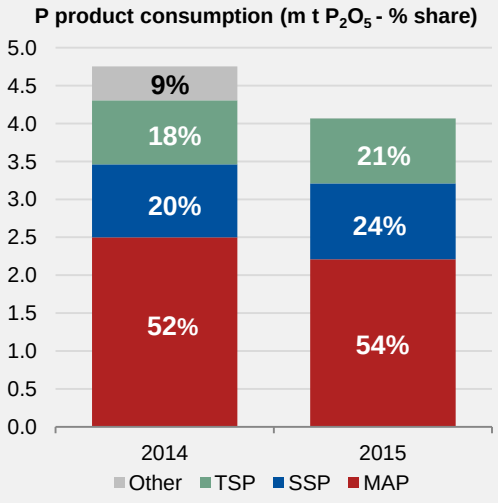
Delays in the announcement of the harvest plan and difficulties in securing loans have been blamed for the reduction in fertilizer consumption in 2015. The harvest plan is traditionally announced in May, but in 2015 was delayed until June. Although an increase in funding was announced, the structure of the program was altered, and most of the increase in funding was directed towards non subsidized loans. Farms reported that it was difficult to obtain subsidized loans due to increased red tape. Credit from private banks was also limited due to extremely high interest rates.

Farmer cash reserves: With fertilizer becoming significantly more expensive in 2015, cash reserves were reduced. Indeed, the proportion of inputs purchased with cash reserves was thought to be higher **between** 2012-2014, as farm profitability benefitted from high prices of grain and oilseeds. Cash reserves are again expected to be limited in 2016.

A summary of 2015 demand:

The lack of available credit and high domestic fertilizer prices pushed fertilizer consumption lower in 2015. The first half of the year particularly hit phosphate consumption, as farmers struggled to obtain credit from the harvest plan. Although those interviewed on the research tour were reluctant to admit they had cut application rates, ANDA consumption data suggests they have. Farmers insisted that rather than lower applications, they had been purchasing cheap and low analysis fertilizer, explaining the increased share of SSP and lower quality Chinese MAP (11-44-0). **The charts below shows phosphate fertilizer deliveries to November (CRU estimate in December) and the phosphate product share**.



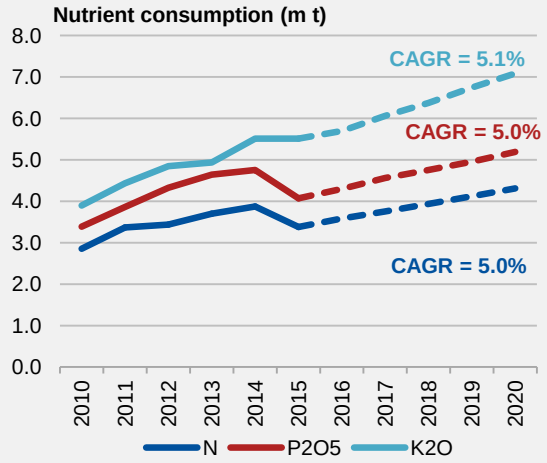


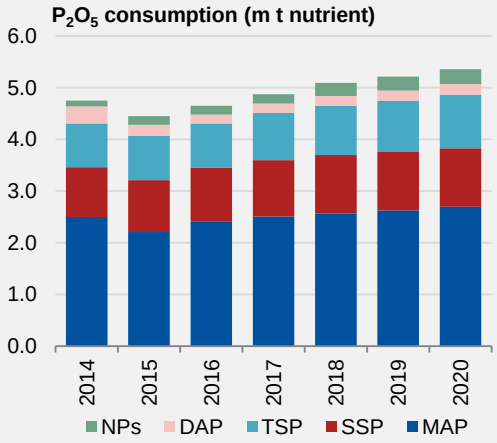
Although 2015 consumption has fallen sharply from record 2014 volumes, if placed in a historical context the levels remain very impressive. While the economic, credit and currency issues will continue to limit the overall growth of the industry, demand will remain very strong and Brazil will remain the most important fertilizer market in the world.

What does 2016 and beyond hold?

The availability of credit has been an ongoing issue in 2015 and has persistently been touted as the primary factor behind reduced imports into Brazil. Few industry players expect the availability of government credit to improve over the next few years and this will hinder some consumption growth. Although high prices and a lack of cash and credit 'shocked' the industry in 2015, farms have been creative in looking for different sources of funding for input purchases. Indeed, farms are purchasing fertilizer not only on the price being offered by the distributor, but also the credit terms being offered. If a farm does not have cash reserves or is unwilling to commit grain for the barter ratio, they are asking distributors to offer reasonable credit terms to pay for the fertilizer post harvest.

A changing approach to input funding and continued strength in agricultural production will provide modest support to phosphate fertilizer demand in 2016 and beyond. Although consumption is not expected to reach 2014 volumes again until 2017, it will remain one of the best global prospects for high volume demand growth over the medium and long term.





Application rates of phosphate and potash are well above the global averages, attributed to the opening up of new land. It is a common opinion that phosphate is over applied in some areas, with farmers underestimating the ability of soil to bind phosphate, which can be 'carried over' to other crops. In contrast, potash cannot be held in the soil, and farmers need to maintain applications year after year. As farmers look to cut input costs to maintain margins, they are

likely to reduce unnecessary fertilizer applications. This may pressure phosphate demand in established farm areas into the future, although the continued expansion of virgin land will offset this.

The share of MAP in the phosphate product mix has increased sharply the past twenty years, moving from 21% of the total share in 1990, to 54% in 2015. This has come at the expense of SSP and other low analysis fertilizers. SSP gained some ground in 2015, as farmers looked for cheaper sources of fertilizer. SSP demand is forecast to remain strong in 2016 as credit difficulties continue and is forecast to have a 21% share of total P_2O_5 demand, but this is projected to fall to 18% by 2020. Indeed, NPs (including Micro Essential) are set to take a larger share of demand over the medium term. The difficulties faced in 2015 slowed the growth of these specialty premium fertilizers, but sales volumes were maintained from 2014. This shows that farmers using these products have developed loyalty towards these products, and while the rate at which farmers are converting over the next few years may be slower than initially hoped, these products will continue to take a large share of the phosphate market.

Data sources: CRU, ANDA, Orion, FAO, CONAB, IMEA

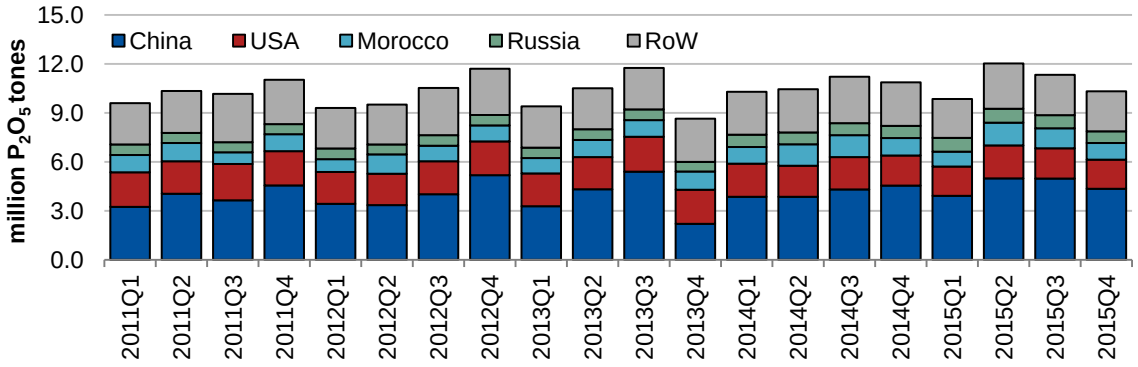
Chapter 2
Supply

2.1 Overview of global phosphate fertilizer supply

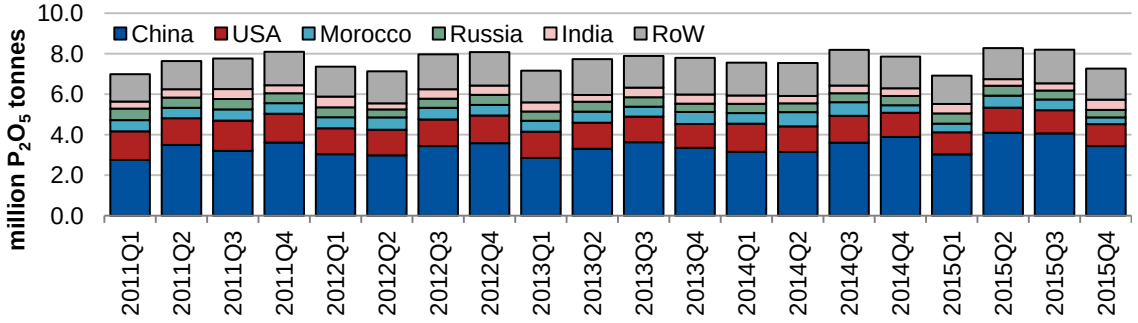
Annual global phosphoric acid production in 2015 is estimated by CRU to have totalled nearly 44.2 million P_2O_5 tonnes, reflecting a 2% y-o-y increase, driven by greater concentrated phosphate fertilizer production in the CIS and East Asia. In 2016 we expect this to increase by a further 1.5% y-o-y at over 44.9 million P_2O_5 tonnes. We forecast this to grow to 48.5 million P_2O_5 tonnes by 2020 despite expecting capacity closure in China, . This increased production will feed downstream fertilizer production arising from expansions in China, Africa and the Middle East. Annual African DAP production will almost double over the medium-term, mostly due to expansions in Morocco. Global DAP production is forecast to rise from 16.4 million P_2O_5 tonnes in 2015 to 18.1 million P_2O_5 tonnes by the end of the decade.

Global quarterly phosphate production

Global quarterly phosphoric acid production



Global quarterly DAP, MAP & TSP production



Data: CRU, AFA, ANDA, ANSD, Azotecon, CFMW, CPIA, FAI, GTIS, IFA, INEGI, NFDC, TFI, company report, port data

Concentrated phosphate fertilizer production through 2015 has held up relatively well in **North America**, with CRU estimating 2015Q3 phosphoric output to have only declined by 6% y-o-y at around 1.9 million P_2O_5 tonnes. Phosphoric acid utilization rates across the continent remained higher y-o-y and are forecast to continue to grow. Likewise, despite a 10% y-o-y decline in DAP production through 2015Q3 at an estimated 1.2 million tonnes, utilization rates have increased over the same comparative period. However, the prioritization of MES production by Mosaic, which will be more evident with the 2016 expansion of capacity at its New Wales plant, and the closure of capacity at PotashCorp's White Springs facility has resulted in 2015Q3 MAP production declining on a continental level by an estimated 16% y-o-y at around 1.3 million tonnes.

Major phosphate producers in **China** continue to prioritize DAP production, which was all the more apparent when the CPIA reported 2015Q3 production to have increased by 8% y-o-y at around 4.6 million tonnes. The contribution of the *BIG4* to domestic DAP output has exceeded 50% throughout the year and the ramping up of utilization at Yihua's Hubei Chuxing plant has helped maintain this. Consequently, there was a 6% y-o-y decline in MAP production at about 3.2 million tonnes over the same comparative quarter. Likewise, TSP production in 2015Q3 is estimated by CRU to have increased by 20% y-o-y at around 340,000 tonnes. The growth of DAP and TSP production for the quarter has exceeded MAP volume falls and CRU estimates that phosphoric acid production in China through 2015Q3 increased by up to 15% y-o-y to reach 4.9 million P_2O_5 tonnes.

In **Africa**, ICS was the only producer to raise y-o-y phosphoric acid production for 2015Q3 as overall output on the continent for the quarter is estimated by CRU to have declined by 15% y-o-y to below 1.5 million P_2O_5 tonnes. Whilst GCT in Tunisia finally realized its first q-o-q increase in phosphoric acid production for a year, the low demand for MAP imports to Brazil negatively impacted captive demand for phosphoric acid from MAP production on the rest of the continent and consequently CRU estimates MAP production to have declined in 2015Q3 by 36% y-o-y at around 462,000 tonnes. Likewise, DAP production in Africa for 2015Q3 declined by an estimated 15% y-o-y at around 491,000 tonnes despite the marginal y-o-y increase in OCP production for the period following good US import demand.

Despite the closure of capacity in Iraq and the limited availability of phosphate rock in Syria, the estimated 5% y-o-y decline in phosphoric acid production for 2015Q3 in the **Middle East** has been quite dispersed, with only ICL reporting a y-o-y increase following record quarterly output. This was also apparent in concentrated phosphate fertilizer production in the region, which CRU estimates to have declined by 10% y-o-y at a combined 528,000 P_2O_5 tonnes.

This was most noted in the estimated 23% y-o-y decline in DAP production, which fell to around 740,000 tonnes for the quarter, with only RPC in Iran recording a y-o-y quarterly production increase. Whilst TSP output increased at LCC in Lebanon and Gubretas in Turkey, regional production through 2015Q3 is estimated to have declined overall by 14% y-o-y at around 230,000 tonnes.

Concentrated phosphate fertilizer production in **Central & South America** through 2015Q3 is estimated by CRU to have declined by 5% y-o-y to a combined 321,000 P_2O_5 tonnes; mostly because of limited phosphoric acid availability in Brazil following repairs at Anglo American and maintenance at Vale. In Mexico, greater y-o-y DAP and TSP production was offset by a decline in MAP output at Fertinal. In Brazil, a 12% y-o-y, 190,000 tonne, decline in quarterly TSP production of around offset the marginal y-o-y increase in MAP production over the same period at around 265,000 tonnes.

Phosphoric acid production in the **CIS** is estimated to have increased by 5% y-o-y in 2015Q3 at 880,000 P_2O_5 tonnes, attributed to growth in Russia, with relatively flat y-o-y production elsewhere in the region. Whilst 2015Q3 DAP production is estimated to have nearly doubled y-o-y at around 185,000 tonnes, this was offset by a 16% y-o-y decline in regional MAP production for the quarter at around 730,000 tonnes.

Low phosphate rock prices for buyers in **Southern Asia** support CRU estimates of 2015Q3 phosphoric acid production on the subcontinent increasing by 14% y-o-y to around 460,000 P_2O_5 tonnes. This, in combination with low DAP prices for importers, resulted in a regional 2% y-o-y decline in DAP production at just above 1.0 million tonnes, mostly attributed to the decline in India.

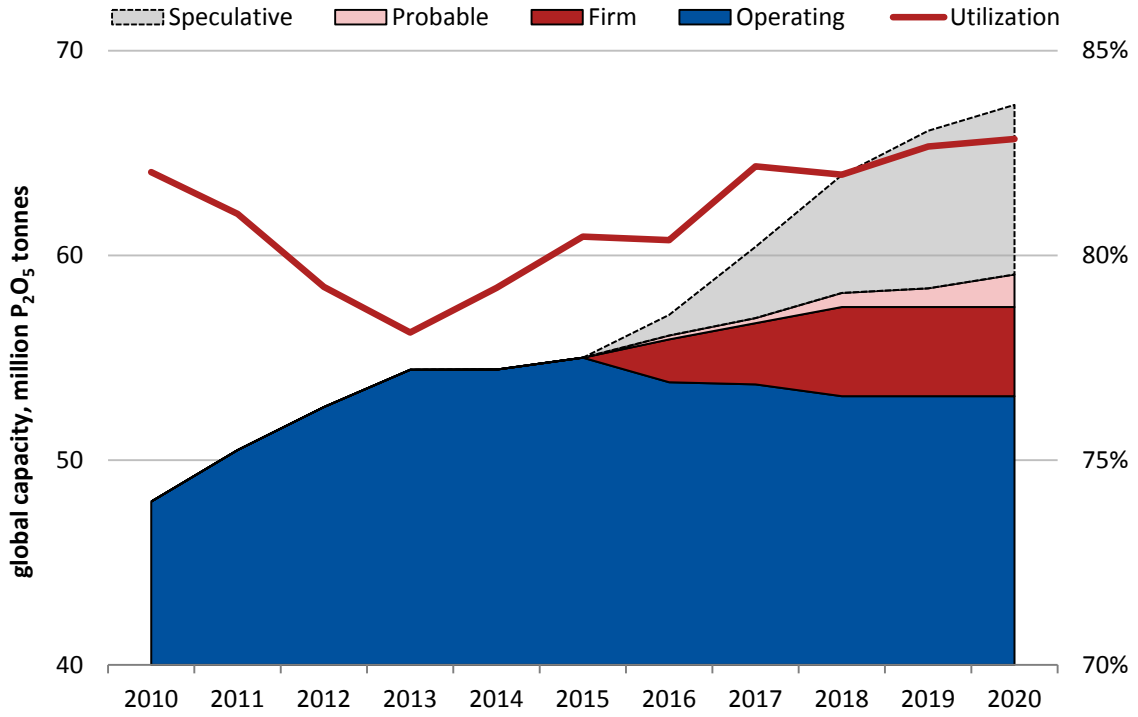
In **Europe**, concentrated phosphate fertilizer production in 2015Q3 is estimated by CRU to have remained flat y-o-y at a combined 230,000 P_2O_5 tonnes despite an estimated 18% y-o-y decline in phosphoric acid production over the same comparative period at around 300,000 P_2O_5 tonnes; most of which was directed towards NPK or other demands outside the production of concentrated phosphate fertilizer.

CRU estimates that phosphoric acid production in **South East Asia** and **Oceania** through 2015Q3 increased by 71% y-o-y to reach over 300,000 P_2O_5 tonnes. This was due to the ramping up of production of Vinachem DAP II and DLC, both in (Lao Cai) Vietnam, and the commissioning of a 200,000 P_2O_5 tonnes/year phosphoric acid train at PKG - Gresik in Indonesia. Accordingly, concentrated phosphate fertilizer production increased by an estimated

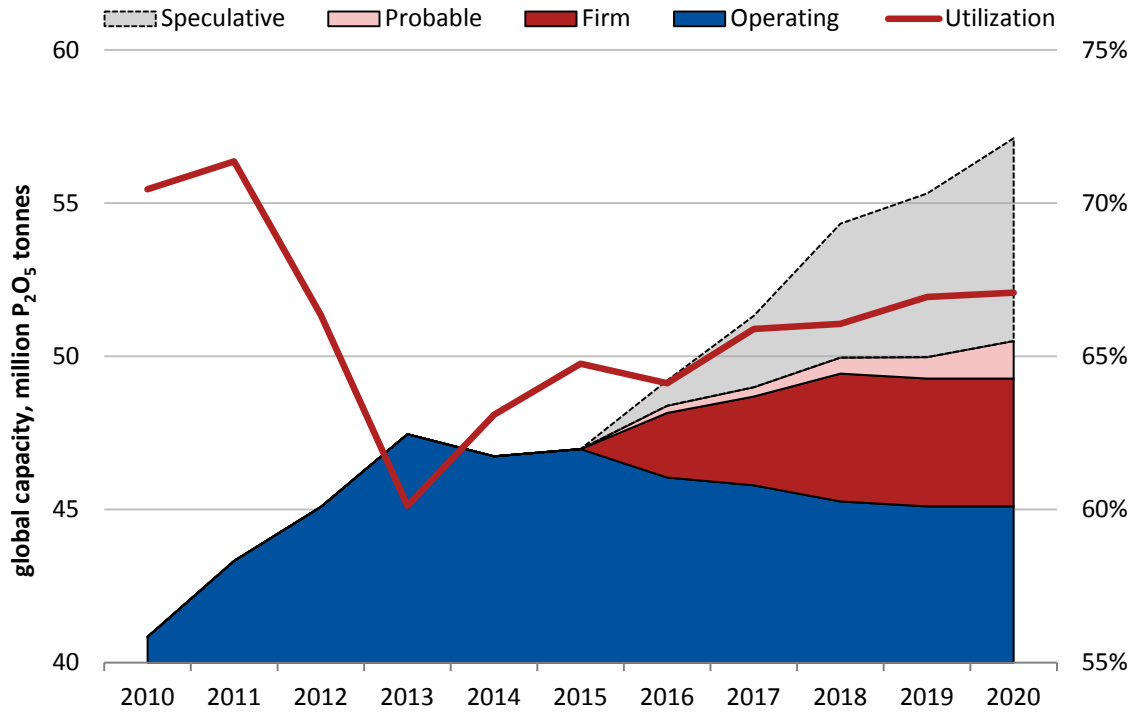
126% y-o-y at over 200,000 P_2O_5 tonnes for the same reasons and also because of increased MAP utilization at Incitec Pivot in Australia.

Global phosphate supply outlook 2009-2020

Phosphoric acid capacity forecast by category, million P_2O_5 tonnes



DAP, MAP & TSP Capacity forecast by category, million P_2O_5 tonnes



Data: CRU, AFA, ANDA, ANSD, Azotecon, CFMW, CPIA, FAI, GTIS, IFA, INEGI, NFDC, TFI, co. reports, port data

The only significant **PGS** changes applied by CRU to the **base-case medium term forecast** are as follows:

i. The **Anglo American - Catalão phase II** expansion in **Brazil**, previously categorized as *probable*, has been removed from the base-case. This has developed as the company considers the sale of its combined phosphates and niobium assets and consequently put-off the development of the project. It will not be re-introduced into the base-case forecast until the future of the company is determined.

ii. Since construction of the **Sukulu** project in **Uganda** re-commenced in 2015Q4 there has been a revision to the capacity to be commissioned; annual phosphoric acid capacity has been increased from 50,000 P_2O_5 tonnes to 120,000 P_2O_5 tonnes and 300,000 tonnes of annual TSP capacity has been added.

Table 2.1: Base case capacity[1] forecast 2015-2020, '000 tonnes P_2O_5

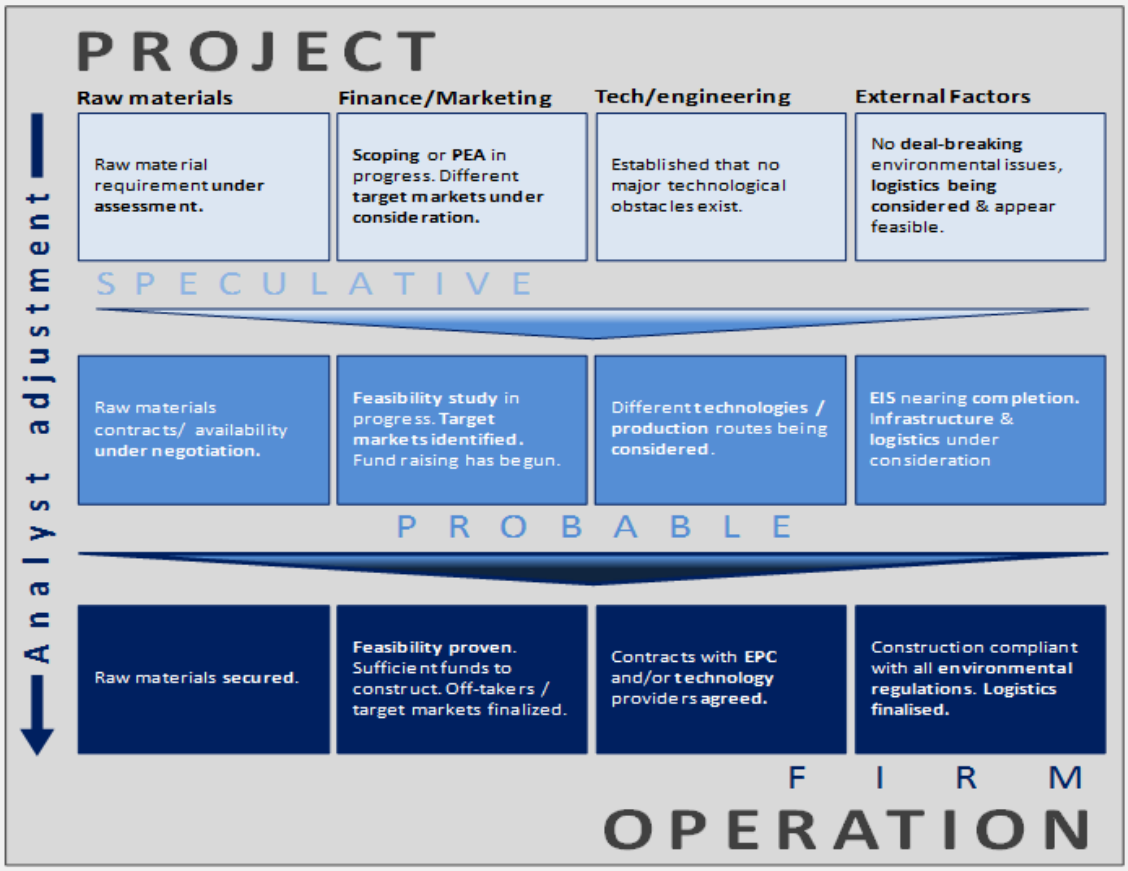
Project	Country	Category	Start-up	MGA	DAP	MAP	TSP
Dadi Yuntian - Chifeng		Firm	2016	300	300	0	0
Kailin - Dashui Ind. Zone Phase III		Firm	2016	500	300	0	0
Shenzhen Batian - Weng'an		Firm	2016	300	0	0	0
JPMC - Aqaba de-bottlenecking		Firm	2016	0	92	0	0
OCP - Jorf Lasfar Hub 2		Firm	2016	450	45	270	90
OCP - Jorf Lasfar Hub 3		Firm	2016	450	225	180	0
OCP - Jorf Lasfar Hub 4		Firm	2016	450	180	180	45
GCT - Mdhilla II		Firm	2016[3]	200	0	0	175
MWSPC - Wa'ad Al-Shamal (MIC)[2]		Firm	2017	1520	1380	150	0
TOTAL FIRM				**4,170**	**2,522**	**780**	**310**
Si'erte - Xuancheng City		Probable	2016	100	0	100	0
Kazphosphate - Taraz		Probable	2016	150	0	150	0
Govt. Uganda - Sukulu Ind. Complex		Probable	2017	120	0	0	138
Galvani-Yara - Serra do Salitre		Probable	2018	200	0	100	50
Kaltim-Jordan Abadi - Bontang		Probable	2018	200	0	0	0
OCP - Jorf Lasfar Hub 5		Probable	2019	450	184	52	115
OCP - Jorf Lasfar Hub 6		Probable	2020	450	184	52	115
OCP - Jorf Lasfar Hub 7		Probable	2020	450	184	52	115
TOTAL PROBABLE				**2,170**	**575**	**506**	**483**

Data: CRU; **Notes**: [1] this refers to annual capacity of project once completed; [2] refers to the **Ma'aden Wa'ad Al-Shamal Phosphate Co.** JV project, which is split over two sites – **Wa'ad Al-Shamal** and **Ras Al-Khair**; [3] timing is being re-assessed pending the environmental report on **Sfax** due for publication in April 2016

2.2 Regional overview of concentrated phosphate fertilizer supply

The Project Gateway System (PGS); forecasting capacity at CRU

CRU classifies potential capacity additions according to the PGS; the basis of our capacity forecast. This uses criteria across key categories to assign each project to one of three possible groups: ***firm***, ***probable*** or ***speculative***. Our base-case forecast includes *firm* and *probable* projects only:



- ***Firm*** projects are either close to completion or solid in their set-up and not prone to any severe, possible shocks in the development process. Firm capacity needs not to be scheduled for commissioning within the five-year forecast period.

- ***Probable*** projects represent advanced projects which are still missing some of the necessary features, but which are actively progressing towards their achievement.

- ***Speculative*** projects are either projects at the early stages of development, or projects for which information is either not available or contradictory.

With the aim of classifying projects according to the aforementioned categories, the PGS evaluates each project according the following categories:

- Official **approval** from the company's Board of Directors.
- **Raw materials** and **feedstock** covering the sources of required production inputs.
- **Finance and marketing** covering the status of capital raising and agreements for the injection of production into the market, as well as **feasibility studies** and sustainability simulations.
- **Technology and engineering** covering the status of design and construction of the project.
- **External factors** which include the status of compulsory permits (e.g. **Environmental Impact Assessments**), of **logistics** (development of infrastructures, or access to existing ones), and **social impact** (stakeholder engagement, public perception of the project).

When reviewing this, note that the role of the analyst has not been reduced to the mere application of this methodology. Additional factors play an important role when judging each project. These include:

- Type of project – **greenfield** vs. **brownfield**; the latter usually requires less capital investment and is more likely to award environmental permissions.
- Position of the company in the industry; **junior**, **major** or **state-owned** enterprises.
- Past success history of the company and **historical record** of **comparable projects**.
- **Economic support** of the project's scope from CRU's forecasts.
- Publicly available **information** and media news about the project.

Some general precautions need to be taken into account when evaluating available information. For example, major companies generally release less project information into the public domain than junior companies, which are trying to raise external financing, while state-owned enterprises release even less.

Less strict criteria on demonstrating availability of necessary financing is applied to major companies that can fund projects through free cash flow, particularly in the case of brownfield expansions. Whenever possible, indirect sources have been cross-checked and assessed, capitalizing on CRU's experience and direct contacts in the industry.
All of the categorizations are made to the best of CRU's knowledge, and are regularly monitored, assessed and updated.

2.2.1 North America

North America phosphate fertilizer supply metrics

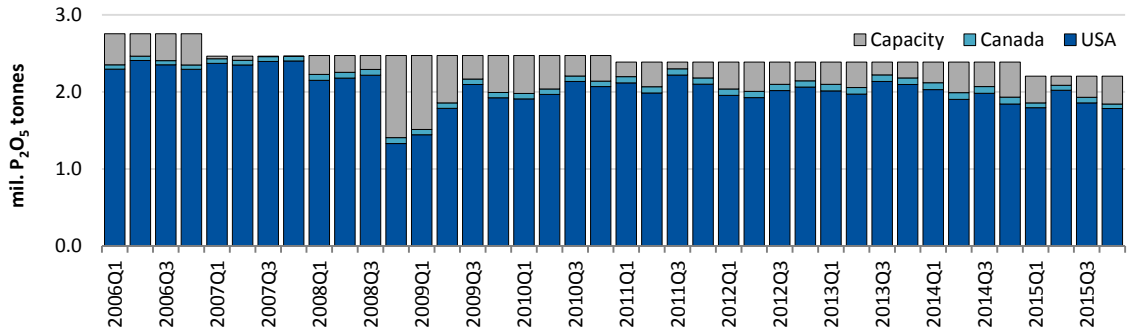
Overview/outlook:

Concentrated phosphate fertilizer production through 2015 has held up relatively well in North America, with CRU estimating 2015Q3 phosphoric acid output to have only declined by 6% y-o-y at around 1.9 million P_2O_5 tonnes. Phosphoric acid utilization rates across North America remain higher y-o-y and continue to increase. Likewise, despite 10% y-o-y decline in DAP production through 2015Q3 at an estimated 1.2 million tonnes, utilization rates have increased over the same comparative period. However, the prioritization of MES production by Mosaic, which will be more evident with the 2016 expansion of capacity at New Wales, and the closure of capacity at PotashCorp's White Springs facility has resulted in 2015Q3 MAP production in North America declining by an esitmated16% y-o-y at around 1.3 million tonnes.

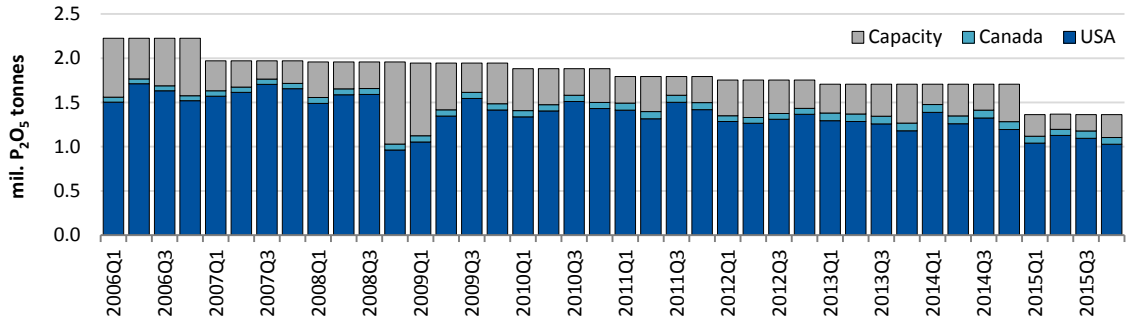
Company tracker:

Mosaic	As previously announced, operating rates in 2015Q3 were reduced to 83% for the quarter; marginally lower than the 85% in 2014Q3 and the 86% in the previous quarter.
PotashCorp	Total phosphate production in 2015Q3 was reported at 442,000 P_2O_5 tonnes, reflecting a 2% y-o-y and 16% q-o-q increase.
Agrium	Utilization rates at Conda increased from 78% in 2015Q2 to 97% in the following.
Simplot	On December 3rd the EPA announced a settlement to resolve alleged Clean Air Act violations related to modifications at five of its sulphuric acid plants.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:

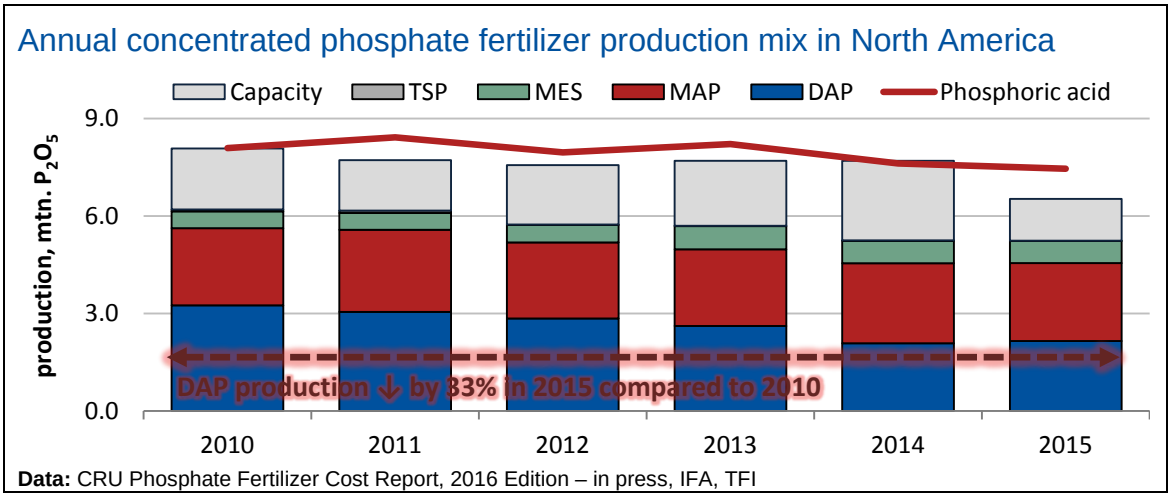


Medium-term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	9,547	8,816	8,816	8,816	8,816	8,816	8,816	↔
Production; phosphoric acid	7,927	7,718	7,935	8,030	8,017	7,940	7,944	↑
Operating rate	83%	88%	90%	91%	91%	90%	90%	↑
Capacity; DAP, MAP & TSP	6,827	5,654	5,321	5,321	5,321	5,321	5,321	↓
Production; DAP, MAP & TSP	4,863	4,866	4,755	4,841	4,827	4,775	4,779	↓
Operating rate	71%	86%	89%	91%	91%	90%	90%	↑

Data: CRU, GTIS, IFA, TFI, company reports

Production of concentrated phosphate fertilizer has held up well in the **United States** considering closures and increases in MES production, and remained flat y-o-y at an estimated 4.9 million P_2O_5 tonnes, within 97% of our forecast in the *Phosphate Fertilizer Market Outlook January 2015*. A combined DAP/MAP capacity of 380,000 P_2O_5 tonnes closed at MissPhos in 2014 and 874,000 P_2O_5 tonnes of MES capacity at Mosaic (Riverview, Faustina and Bartow) has been reallocated from MAP/DAP in our models. **Mosaic** phosphate fertilizer (DAP, MAP and MES) production in the first nine-months of 2015 increased by an estimated 4% y-o-y at a reported 6.7 million tonnes. The phosphate segment achieved $892 million EBITDA earnings over the same period, up 11% y-o-y. Despite annual increases during this period, the phosphate segment has performed less well and both international and domestic DAP/MAP sales volumes in 2015Q3 fell by 7% and 12% y-o-y respectively; however, MES sales volumes grew by 9% at 389,000 tonnes, reflecting its first quarterly increase since 2014Q2. This materialized despite lower operating rates for the quarter than the previous year. Conversely, **Agrium** raised its operating rates from 78% in 2015Q2 to 97% in 2015Q3 and its phosphate sales increased marginally over the same period at a reported 269,000 tonnes.

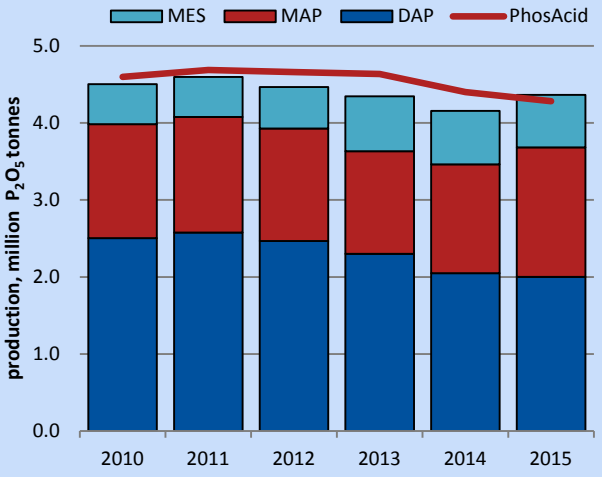


Data: CRU Phosphate Fertilizer Cost Report, 2016 Edition – in press, IFA, TFI

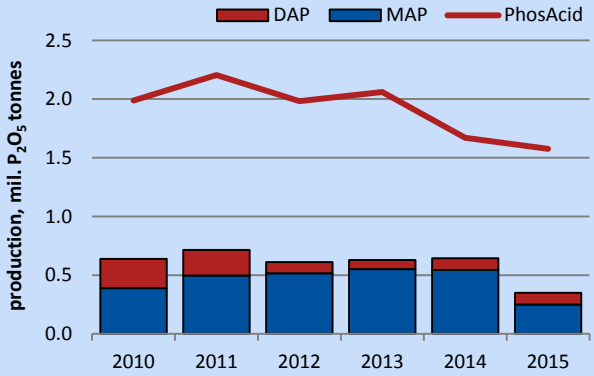
On December 3rd the EPA announced a settlement with **Simplot** to resolve alleged *Clean Air Act* violations related to modifications at five of its sulphuric acid plants. Accordingly, the company will invest an estimated US$42 million on pollution controls to significantly reduce sulphur dioxide emissions; US$15 million alone will be directed to its Pocatello plant. In 2016 CRU forecasts that phosphoric acid utilization rates across North America will continue to increase, but that concentrated phosphate fertilizer production will remain flat y-o-y at around 4.8 million P_2O_5 tonnes, despite the push by Mosaic for greater MES production. Over the medium-term, we expect that phosphoric acid production will remain flat around 7.9 million P_2O_5 tonnes, with concentrated phosphate fertilizer falling marginally but remaining around 4.8 million P_2O_5 tonnes.

Concentrated phosphate fertilizer product mix in North America

Although MES production at **Mosaic** fell marginally y-o-y to an estimated 621,000 tonnes, it is expected to rise significantly in the medium-term with the planned commissioning of new capacity at **New Wales** in 2016. This is part of a company-wide switch away from DAP production, which CRU estimates to have fallen by 2% y-o-y to around 4.3 million tonnes, in favour of MAP and MES. The former was prioritized at **Riverview**, which raised overall MAP production by 19% y-o-y at an estimated 3.2 million tonnes. Phosphoric acid production fell by around 3% y-o-y to an estimated 4.3 million P_2O_5 tonnes.



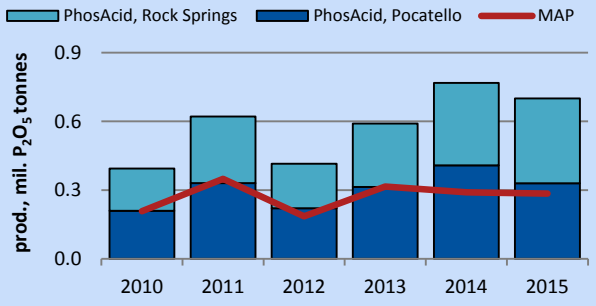
Data: CRU, Mosaic, TFI



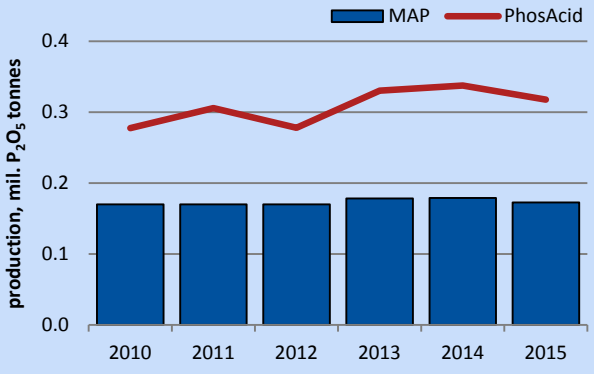
Data: CRU, PotashCorp, TFI

Phosphoric acid production at **PotashCorp** is estimated to have declined by 6% y-o-y to below 1.6 million P_2O_5 tonnes. This resulted from lower demand with the closure of MAP capacity at **White Springs**. Consequently, MAP production fell by an estimated 54% to around 480,800 tonnes. DAP production is estimated to have remained flat at around 217,400 tonnes; **Aurora** is now the company's only DAP/MAP facility.

Despite the rock quality issues that constrained SPA production at **Simplot** through 2015H1, combined phosphoric acid production at its **Rock Springs** and **Pocatello** plants is estimated to have declined by just 9% to around 700,000 P_2O_5 tonnes. Over the same comparative period, MAP production at **Pocatello** is estimated to have declined marginally at around 548,000 tonnes.



Data: CRU, TFI



Data: CRU, Agrium, TFI

Agrium is estimated to have produced around 318,000 P_2O_5 tonnes phosphoric acid, reflecting a 6% y-o-y decline in output. This decline was mostly due to lower utilization rates of 87% in 2015Q2 but did not impact MAP production at **Conda**, which is estimated to have remained flat at around 332,700 tonnes. The facility has now adapted to the imported rock blend (Bou Craa and Khouribga), and it is expected that a large maintenance project will be undertaken in 2016 to increase the turn-around period to four years.

2.2.2 East Asia

East Asia phosphate fertilizer supply metrics

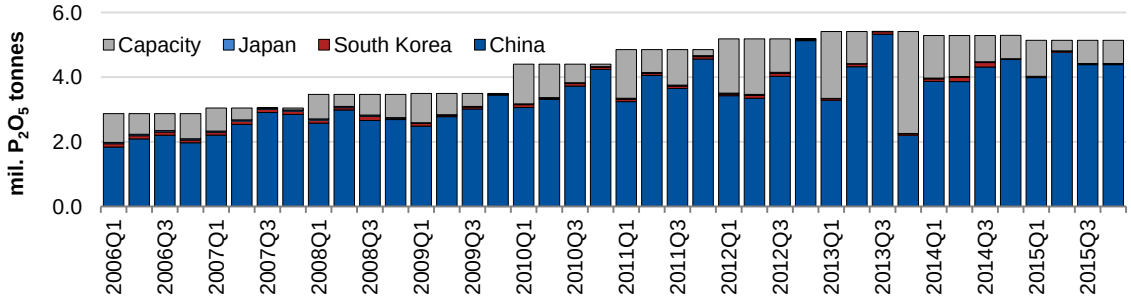
Overview/outlook:

Major phosphate producers in China continue to prioritize DAP production and the CPIA reported that in 2015Q3 this increased by 8% y-o-y at around 4.6 million tonnes. The contribution of the BIG4 in China to domestic DAP output has exceeded 50% throughout the year and the ramping up of utilization at Yihua – Hubei Chuxing. Consequently, there was a 6% y-o-y decline in MAP production at about 3.2 million tonnes over the same comparative quarter. Likewise, TSP production in 2015Q3 is estimated by CRU to have increased by 20% y-o-y at around 340,000 tonnes. The growth of DAP and TSP production for the quarter has exceeded falls in MAP and CRU estimates that phosphoric acid production in China through 2015Q3 increased by up to 15% y-o-y to reach 4.9 million P_2O_5 tonnes.

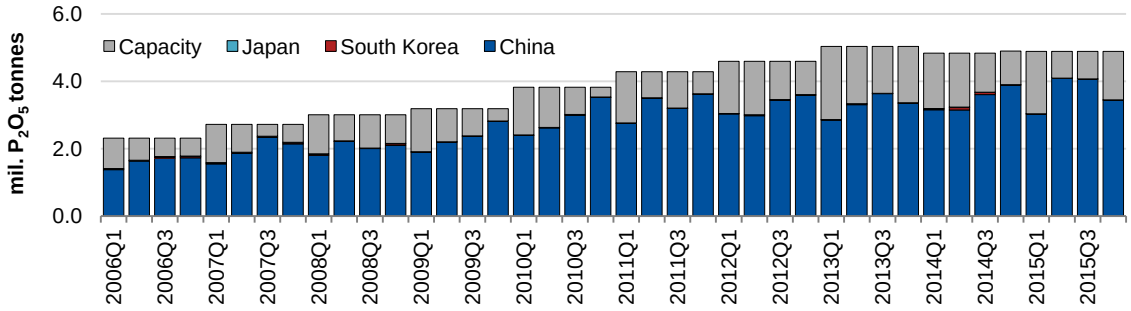
Company tracker:

YTH	DAP production in the first nine-months of 2015 increased by 6% y-o-y to 1.6 million tonnes; MAP production has decreased by 9% to 988,000 tonnes over the same period.
Wengfu	The company recorded a 30% y-o-y increase in DAP production for the first nine-months of 2015 at a reported 1.7 million tonnes; MAP production fell by 39% y-o-y to 284,000 tonnes.
Kailin	Both DAP and MAP production in the first nine-months of 2015 increased by 20% and 19% y-o-y to an estimated 1.9 million tonnes and 443,400 tonnes respectively.
Yihua	DAP production increased by 44% y-o-y in the first nine-months of 2015 to 1.5 million tonnes, whilst MAP production fell by 61% y-o-y to 26,000 tonnes over the same period.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



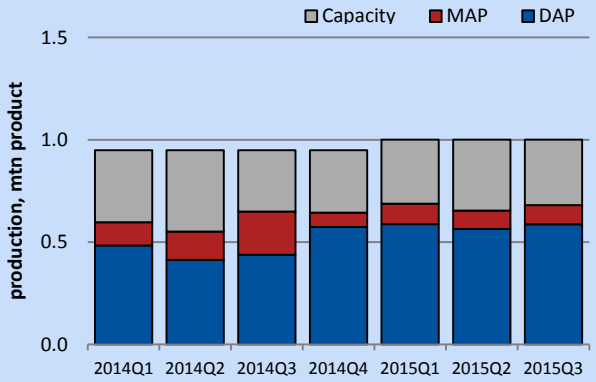
Medium term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-20
Capacity; phosphoric acid	20,415	19,988	20,171	19,671	19,171	19,171	19,171	↓
Production; phosphoric acid	18,214	18,432	17,775	17,631	17,465	17,436	17,484	↓
Operating rate	89%	92%	88%	90%	91%	91%	91%	↓
Capacity; DAP, MAP & TSP	19,337	19,540	20,629	19,979	19,529	19,529	19,529	↓
Production; DAP, MAP & TSP	13,009	14,650	13,857	13,692	13,487	13,370	13,330	↓
Operating rate	67%	75%	67%	69%	69%	68%	68%	↓

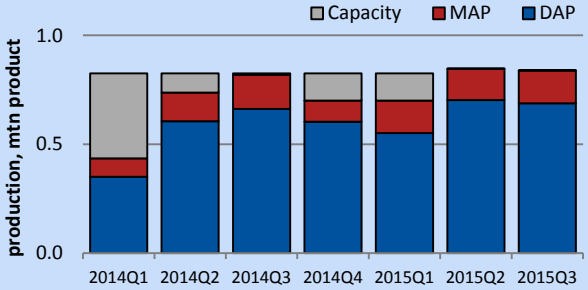
Data: CRU, CFMW, CPIA, GTIS, IFA, KOSIS, company reports

DAP/MAP production by the BIG4 in China

As with most of the large phosphate producers in China, **Wengfu** has seen MAP production fall in the first nine-months by an estimated 39% y-o-y at around 284,000 tonnes. However, the prioritization of DAP production, aided by the 56% expansion in DAP capacity at its **Zijin** plant earlier in the year, has resulted in an estimated 30% to over 1.7 million tonnes. The plant has not fully ramped up, so it should be expected that quarterly output will exceed 600,000 tonnes in the next year.



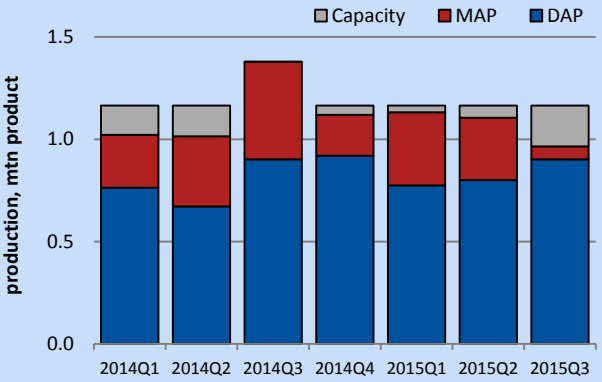
Data: CRU, CPIA



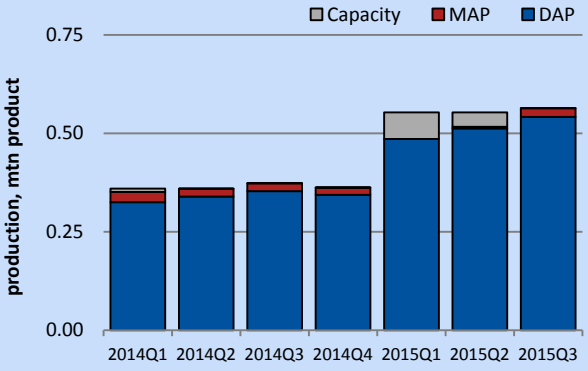
Data: CRU, CPIA

Kailin is the only *BIG4* producer to have increased MAP output in 2015 with cumulative production for the first nine-months estimated to have increased by 19% y-o-y at around 443,000 tonnes. Over the same comparative period, its **Xifeng** and **Dashui** plants have increased DAP production by an estimated 20% y-o-y to around 1.9 million tonnes.

Whilst DAP production at **Yuntianhua** (**YTH**) remained flat y-o-y around 900,000 tonnes in 2015Q3, MAP production declined by an estimated 32% y-o-y for the same period at around 325,000 tonnes. This has resulted from the prioritization of DAP production, which increased cumulatively by 6% y-o-y for the first nine-months of 2015 at around 2.5 million tonnes. Consequently, MAP production has declined by an estimated 8% y-o-y at around 990,000 tonnes over the same comparative period.



Data: CRU, CPIA



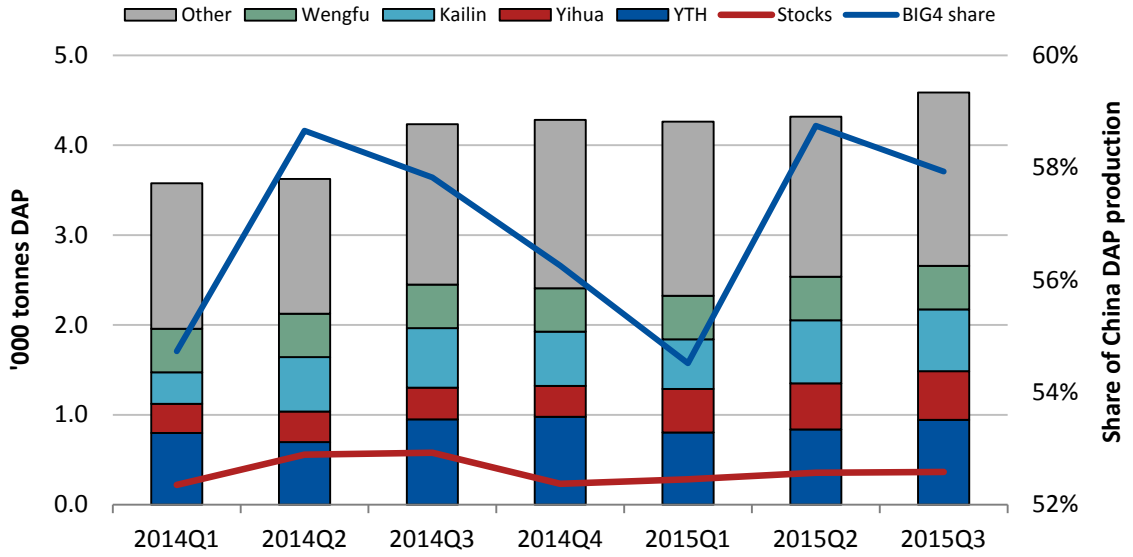
Data: CRU, CPIA

Whilst MAP production in 2015Q3 was flat y-o-y at around 22,000 tonnes, cumulative production for **Yihua** over the first nine-months fell by an estimated 61% y-o-y to just 26,000 tonnes. This resulted from the prioritization of DAP production, which increased by 51% y-o-y for the first nine-months of 2015 at an estimated 1.5 million tonnes. The commissioning of 700,000 tonnes annual DAP capacity at **Chuxing, Hubei** in 2015Q1 has contributed to this, with utilization rates having finally picked up in 2015Q3.

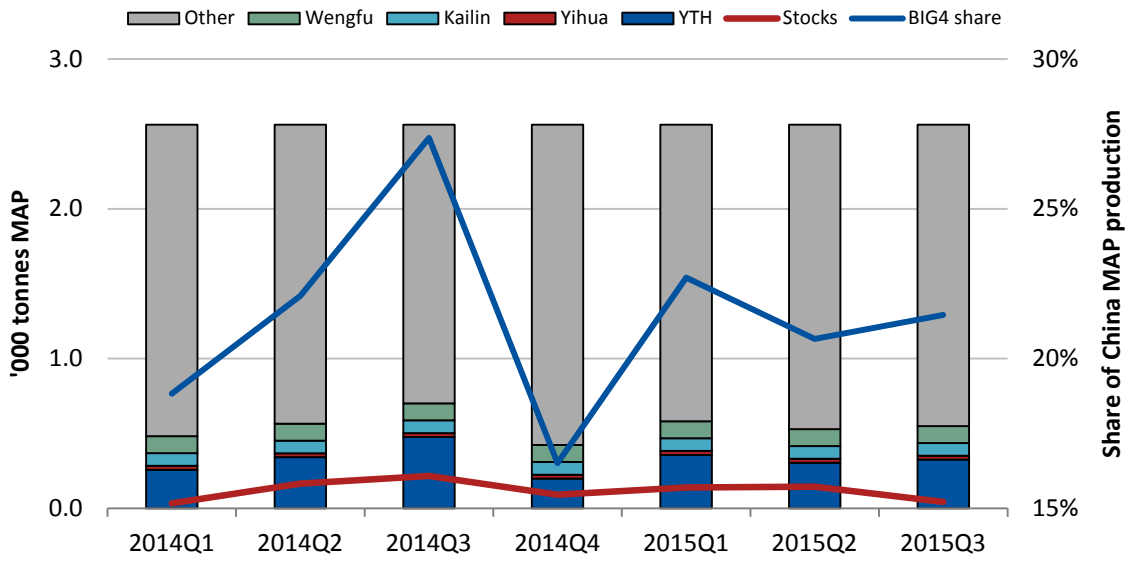
The **Chinese Phosphate & Compound Fertilizer Industry Association** (**CPIA**) reported both DAP and MAP production over the first nine-months of 2015 to have increased by 15% and 11% to 13.2 and 9.0 million tonnes respectively. **China Fertilizer Market Weekly** (**CFMW**) reported DAP and MAP stocks for the main exporting ports around 37% and 80% below volumes at the end of 2014Q3 at 365,000 tonnes and 43,000 tonnes respectively. For MAP producers, off-take was low in 2015Q4 and the combination of higher inventories – reported by CFMW at 140,000 tonnes at the main exporting ports in China – and low demand from NPK blends has resulted in low prices and a poor outlook heading into the New Year.

Quarterly DAP/MAP production in China

Commissioning of DAP capacity at Yihua – Hubei Chuxing has helped raise Yihua output



BIG4 share in MAP production continues to be heavily outweighed by DAP contribution



Data: CRU, CFMW, CPIA

Considering the estimated 27% y-o-y decline in combined DAP/MAP exports in 2015Q4 of around 942,000 P_2O_5 tonnes, phosphoric acid production in **China** through 2015Q4 is forecast to have declined relatively little, at 4% y-o-y to below 4.4 P_2O_5 million tonnes. However, the increase in downstream production this year, particularly combined DAP/MAP for export, has resulted in annual phosphoric acid production growth of an estimated 1% to around 18.2 million P_2O_5 tonnes.

Following two consecutive years of phosphoric acid production growth in **China**, CRU forecasts that the combined effect of a less positive domestic macro-economic outlook and the prospect of lower annual demand for imports of DAP to India, will result in phosphoric acid production falling by around 4% y-o-y to 17.5 P_2O_5 million. Over the medium-term, CRU forecasts this figure to remain between 17.2-17.4 million P_2O_5 tonnes.

With the aforementioned decline in DAP/MAP exports from **China**, production of both DAP and MAP through 2015Q4 is estimated to have declined by around 6% and 7% y-o-y at 4.0 million tonnes and 3.3 million tonnes respectively. This has resulted in both estimated DAP and MAP production for the year having increased by 17% and 7% respectively to around 18.0 million tonnes and 12.8 million tonnes each.

In the medium-term, the lower demand for DAP imports to India that helped push Chinese output in 2015 is likely to squeeze DAP production in **China**. CRU forecasts DAP production in 2016 to fall by 8% y-o-y to around 16.6 million tonnes with output being maintained between 16.5-16.7 million tonnes thereafter. However, a more positive outlook for MAP import demand to Brazil this year will likely act as a buffer for MAP production in China, which we estimate to decline in 2016 by 2% at around 12.6 million tonnes.

Elsewhere, in **South Korea** we understand that **DongBu** completed its first full year (in 2015) without the production of DAP or phosphoric acid, instead opting to import and re-sell product or blend it. Consequently, **NamHae Chemical Co.** is the only phosphoric acid producer dedicated to phosphate fertilizer production. We understand that both companies are the only NPK manufacturers and combined production for the first nine-months of 2015 is estimated to have exceeded 1.2 million tonnes. This is only within 76% of volumes reached over the same period the previous year.

2.2.3 Africa

Africa phosphate fertilizer supply metrics

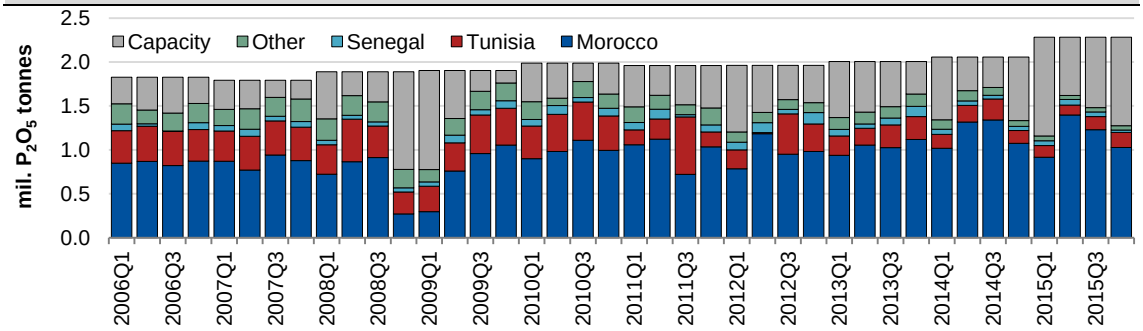
Overview/outlook:

In Africa, ICS was the only producer to raise y-o-y phosphoric acid production for 2015Q3 as overall output in Africa for the quarter is estimated by CRU to have declined by 15% y-o-y to below 1.5 million P_2O_5 tonnes. Whilst GCT in Tunisia finally realized its first q-o-q increase in phosphoric acid production in a calendar year, the low demand for MAP imports to Brazil negatively impacted integrated demand for phosphoric acid for MAP production. This had the most impact on continental MAP output, which CRU estimates to have declined in 2015Q3 by 36% y-o-y at around 462,000 tonnes. Likewise, continental DAP production for 2015Q3 declined by an estimated 15% y-o-y at around 491,000 tonnes despite the marginal y-o-y increase in OCP production for the period following good US import demand.

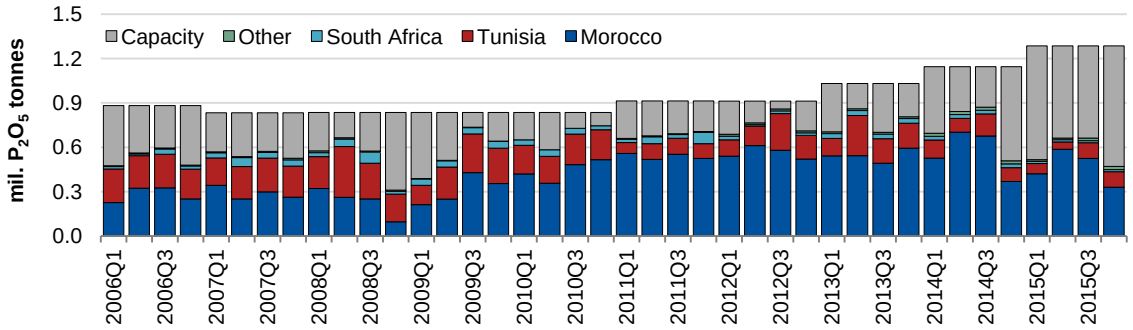
Company tracker:

OCP	On November 7th 2015 the company announced plans to invest US$1.9 billion in a new phosphate fertilizer and industrial complex with subsidiary Phosboucraa.
GCT	Annual utilization rates were reported at 40% for 2015.
Foskor	In November 2015 a reported 400 workers went on strike for three weeks, which ended on December 2nd and resulted in 90% of the **Richards Bay** plant operations being halted.
ICS	Refurbishments to its **Darou** plant are expected to have been completed in October 2015.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:

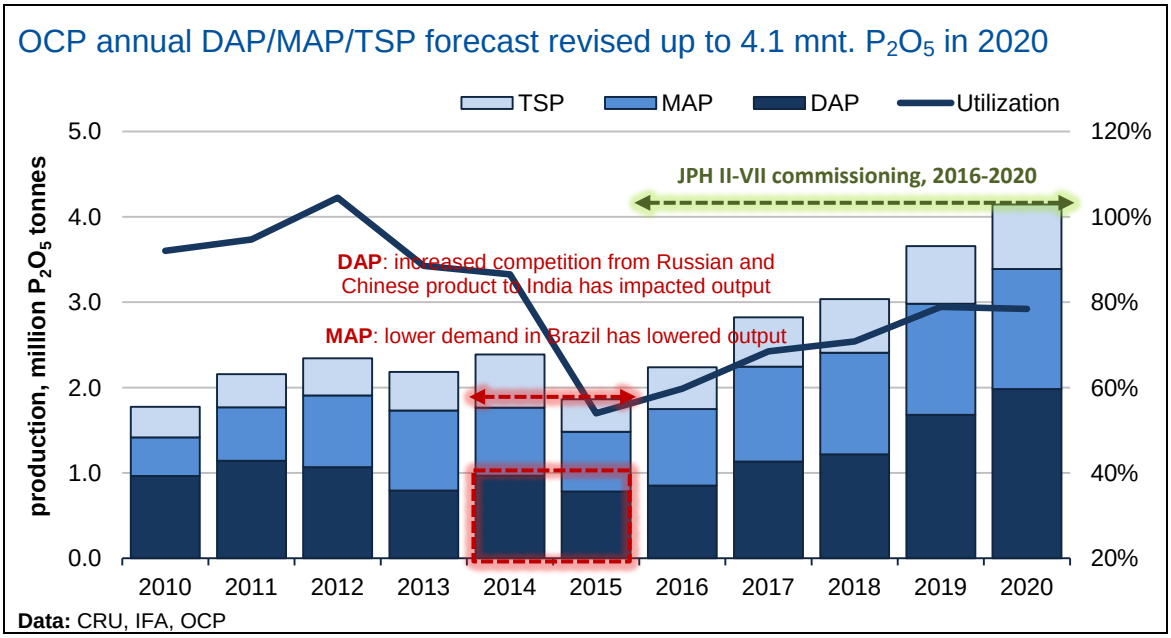


Medium term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-20
Capacity; phosphoric acid	8,229	9,129	9,779	10,289	10,573	10,798	11,473	↑
Production; phosphoric acid	6,253	5,540	6,173	7,194	7,194	7,625	8,057	↑
Operating rate	76%	61%	63%	70%	68%	71%	70%	↑
Capacity; DAP, MAP & TSP	4,578	5,140	5,720	6,194	6,466	6,641	7,168	↑
Production; DAP, MAP & TSP	3,069	2,311	2,885	3,574	3,940	4,607	5,097	↑
Operating rate	67%	45%	50%	58%	61%	69%	71%	↑

Data: CRU, AFA, ANP, ANSD, FertASA, GTIS, IFA, company reports

In **Morocco**, CRU estimates that **OCP** annual production of phosphoric acid remained flat y-o-y at around 4.5 million P_2O_5 tonnes; following an upwards revision of 2014 annual production and a marginal y-o-y increase in exports of over 2.0 million P_2O_5 tonnes. However, this has resulted in lower production of concentrated phosphate fertilizer in Morocco, with combined annual DAP/MAP/TSP production estimated to have fallen by 22% y-o-y to its lowest levels since 2010 at under 1.9 million P_2O_5 tonnes. The largest declines were estimated by CRU to have occurred in TSP and DAP production, with has fallen of 39% and 19% respectively y-o-y, to an estimated 830,000 and 1.6 million tonnes each for the year. Nevertheless, MAP production is also understood to have declined, by an estimated 13% y-o-y at 1.3 million tonnes.



This all-round y-o-y decline in concentrated phosphate fertilizer production at OCP has mostly materialized through, as mentioned in the previous Phosphate Fertilizer Market Outlook October 2015 Edition, lower demand for DAP and MAP production for export and because of increasing competition from Russian MAP into Brazil and Russian and Chinese DAP into India. However, with the commissioning of the **JPH II-VII** projects, we expect a much more positive outlook for OCP production in the medium-term. OCP is commissioned its **JPH I** project in November 2015 and with **JPH II-IV** expected to be commissioned within the next 12-18 months, CRU estimates that combined DAP/MAP/TSP production in 2016 will improve by 20% y-o-y to over 2.2 million P_2O_5 tonnes and then a further 26% y-o-y to around 2.8 million P_2O_5 tonnes in 2017. When incorporating the second wave of projects, **JPH V-VII**, in the medium-term, CRU forecasts OCP concentrated phosphate fertilizer production to increase by 24% CAGR over the next five years to a combined 4.1 million P_2O_5 tonnes by the end of the decade.

Consequently, phosphoric acid production is forecast to increase by 7% CAGR over the same period to over 6.2 million P_2O_5 tonnes, as OCP increases captive consumption at the expense of MGA sales – mostly to India.

Elsewhere in **Northern Africa**, January 14th marked the five-year anniversary of the Tunisian uprising and over 3,000 people demonstrated in **Sfax** for the closure of the **Groupe Chimique Tunisien** (**GCT**) plant. Following the agreement with Chinese company ECEC for the construction of **Mdhilla II** (commenced in 2010) at a reported TND632 million (c. US$308 million) on December 27th, there has been some speculation as to when the switch from Sfax to Mdhilla II will occur. The publication of an environmental impact study due in April 2015 to be considered by the National Coastal Protection Agency will likely determine this.

Extremely limited phosphate rock availability has resulted n lower phosphoric acid production, which CRU estimates to have declined by 44% y-o-y at around 570,000 P_2O_5 tonnes. Consequently, there has been lower granulation output and DAP production is estimated by CRU to have fallen by 74% y-o-y to around 202,000 tonnes. Only TSP production is estimated by CRU to have remained flat y-o-y at around 491,000 tonnes. Indeed, **GCT** utilization rates for 2015 were reported at 40% for the year. In **2016** CRU forecasts that a more reliable supply of phosphate rock will raise **GCT** phosphoric acid, and consequently DAP production, by an estimated 23% and 83% y-o-y at around 700,000 P_2O_5 tonnes and 370,000 tonnes respectively.

In **Western Africa**, phosphoric acid production for October-November 2015 at **Industries Chimiques du Sénégal** (**ICS**) in **Senegal** totalled a reported 58,700 P_2O_5 tonnes, reflecting a 22% y-o-y increase for total 2014Q4 production. The refurbishments to its **Darou** plant were completed in October 2015 and we expect that annual phosphoric acid production will reach around 200,000 P_2O_5 tonnes. In 2016 CRU estimates output will remain around this level, with production growing to around 400,000 P_2O_5 tonnes in the medium-term.

In **South Africa**, a reported 400 staff at **Foskor** were on strike for between three-four weeks in November until December 2nd, resulting in a 10% utilization rate of its **Richard Bay** plant. Chronic power outages and infrastructure problems over 2015 have resulted in CRU estimating a 60% y-o-y decline in annual phosphoric acid production at around 184,000 P_2O_5 tonnes. Consequently, CRU estimates that MAP production has also been adversely affected, with output declining by 62% y-o-y at around 114,300 tonnes. In the medium-term CRU forecasts that without the necessary investments in infrastructure or a reliable power source, phosphoric acid production and MAP production at **Foskor** will be limited to around 300,000 P_2O_5 tonnes and 210,000 respectively.

2.2.4 Middle East

Middle East phosphate fertilizer supply metrics

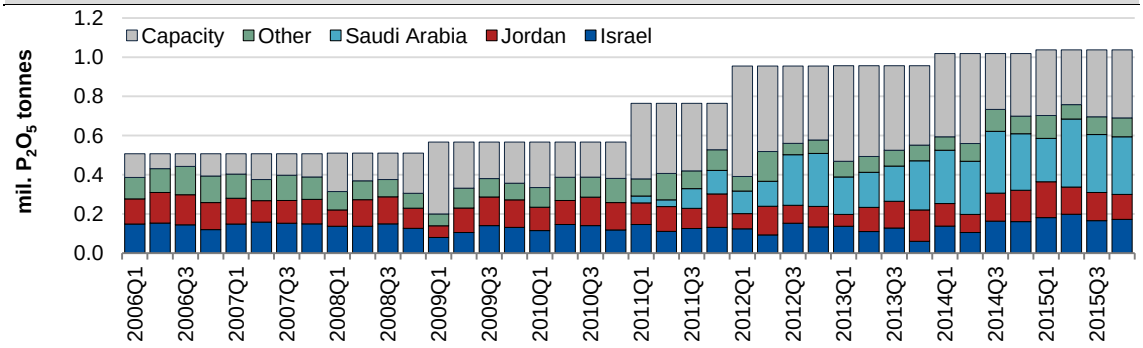
Overview/outlook:

Despite the closure of capacity in Iraq and the limited availability of phosphate rock in Syria, the estimated 5% y-o-y decline in phosphoric acid production for 2015Q3 in the Middle East has been quite dispersed, despite ICL reporting record quarterly output. This was also apparent in concentrated phosphate fertilizer production in the Middle East, which CRU estimates to have declined by 10% y-o-y at a combined 528,000 P_2O_5 tonnes. This was most noted in the estimated 23% y-o-y decline in DAP production, which fell to around 740,000 tonnes for the quarter, with only RPC in Iran recording a y-o-y quarterly production increase. Whilst TSP output increased at LCC in Lebanon and Gubretas in Turkey, production in the Middle East through 2015Q3 is estimated to have declined overall by 14% y-o-y at around 230,000 tonnes.

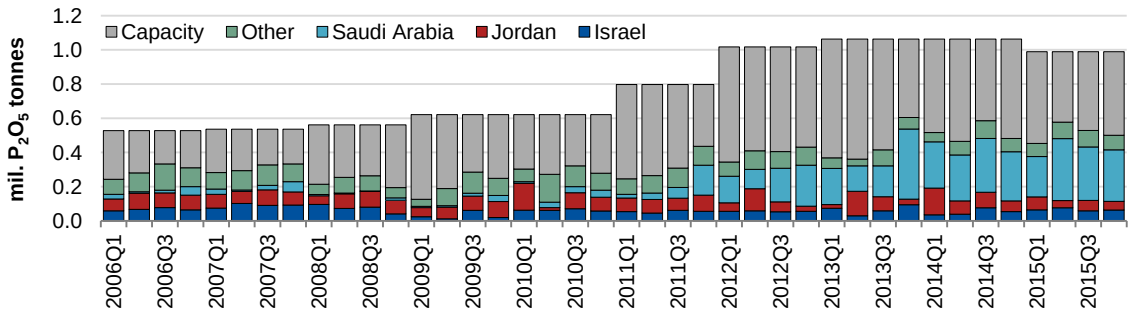
Company tracker:

Ma'aden	On January 7th JV-subsidiary **MWSPC** was approved for a US$1.07 billion loan to complete the construction of its **Wa'ad Al Shamal** and **Ras Al Khair** projects.
ICL	In 2015Q3 the company reported record quarterly phosphoric acid production.
Gubretas	The **Yarimca** plant reported a 24% y-o-y increase in TSP production of 106,140 tonnes for the first nine-months of 2015.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



Medium term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	4,074	4,149	4,095	4,541	5,681	5,681	5,681	↑
Production; phosphoric acid	2,648	2,847	2,928	3,177	3,960	4,295	4,493	↑
Operating rate	65%	69%	72%	70%	70%	76%	79%	↑
Capacity; DAP, MAP & TSP	4,252	3,956	3,941	4,325	5,591	5,591	5,591	↑
Production; DAP, MAP & TSP	2,065	2,051	2,091	2,289	3,064	3,352	3,547	↑
Operating rate	49%	52%	53%	53%	55%	60%	63%	↑

Data: CRU, AFA, GTIS, IFA, company reports

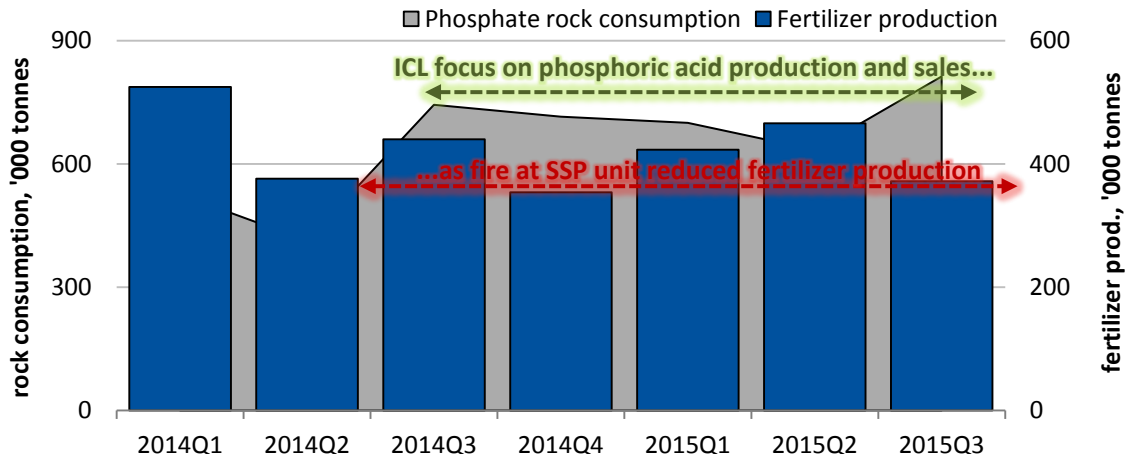
Phosphoric acid production through 2015Q3 at **Ma'aden** in **Saudi Arabia** is estimated by CRU to have declined by 6% y-o-y to around 296,000 P_2O_5 tonnes, as demand for DAP production was squeezed by competitive phosphoric acid prices to India taking precedence over DAP arrivals for the quarter. Consequently, CRU estimates that DAP production in Saudi Arabia also declined by 17% y-o-y to around 520,000 tonnes. However, a strong output performance over 2015H1 and an estimated marginal y-o-y increase in production for 2015Q4 has resulted in CRU estimating a 9% annual growth in production at over 2.4 million tonnes.

Following the construction progress update in August 2015 **Ma'aden** announced on January 7th the approval for a US$1.07 billion loan for the construction of its JV-subsidiary **Ma'aden Wa'ad Al Shamal Phopshate Co.** (**MWSPC**), which CRU continues to categorize as a *firm* project for commissioning in 2017Q4. In the medium-term, CRU forecasts that this new capacity will help combined phosphoric acid and DAP production in **Saudi Arabia** to double by 2019 at over 2.4 million P_2O_5 tonnes and nearly 4.8 million tonnes respectively.
In **Jordan**, the combination of maintenance at the **Jordan-India Fertilizer Co.** (**JIFCO**) in September and the ongoing de-bottlenecking at the **Jordan Phosphates Mining Co.** (**JPMC**) **Aqaba** plant throughout the year, has resulted in CRU estimating a 10% y-o-y decline in annual phosphoric acid production of 590,000 P_2O_5 tonnes and a 40% decline in annual DAP production of around 440,000 tonnes.

However, CRU forecasts that combined phosphoric acid production from **Jordan** in 2016 will increase by 38% y-o-y to over 820,000 P_2O_5 tonnes before reaching 900,000 P_2O_5 tonnes the following year and remaining flat through the rest of the medium-term. Likewise, CRU forecasts a recovery of 46% y-o-y growth in annual DAP production at **JPMC** in 2016 at 650,000 tonnes, with output expected to reach around 900,000 tonnes over the medium-term.
In 2015Q3 **Israel Chemicals Ltd.** (**ICL**) reported record quarterly phosphoric acid that resulted in a 27.6% y-o-y increase in captive phosphate rock consumption for the first nine-months of 2015 at over 2.1 million tonnes. Despite lower y-o-y fertilizer production, ICL has focused on phosphoric acid sales, as reflected by CRU estimates of a 33% y-o-y increase in cumulative phosphoric acid production for the first nine-months of 2015 at around 545,000 P_2O_5 tonnes. Consequently, CRU estimates that TSP production for in 2015Q3 also declined by around 25% y-o-y to around 124,000 tonnes.

CRU forecasts that in 2015 **ICL** will reach record annual phosphoric acid production in excess of 700,000 P_2O_5 tonnes, but that this will normalize at around 550,000 P_2O_5 tonnes in 2016 and the rest of the medium-term as SSP production comes back online and begins to consume rock again. Likewise, CRU also forecasts a 25% y-o-y increase in annual TSP production for 2015 at over 550,000 tonnes, with output remaining just over 500,000 tonnes in the medium-term.

Quarterly rock consumption and fertilizer production at ICL



Data: CRU, ICL

In **Turkey**, NPK production is reported to have increased by 13% y-o-y in the first nine-months of 2015 to nearly 1.3 million tonnes. **Gubretas** has produced 31% of this volume at a reported 402,809 tonnes, and it has also shown a 24% y-o-y increase in TSP production at **Yarimca** over the same period at a reported 106,140 tonnes. **Toros Tarim** has not enjoyed as much success and reported 526,000 tonnes of compound fertilizer output for the same period, reflecting an 11% y-o-y decline in NPK production. Its DAP/NPK utilization rates at the **Samsun** plant have averaged 45% in the first nine-months of this year, down from 89% over the same period last year and DAP production over the same period fell by 49% y-o-y to around 154,000 tonnes.

In **Iran**, Gubretas subsidiary **Razi Petrochemical** (**RPC**) is reported to have produced 64,112 tonnes of DAP in the first nine-months of this year, up from 19,202 tonnes for the same comparative period last year. Likewise, RPC subsidiary **Arya Phosphoric Jonoub Co.** is reported to have increased its phosphoric acid production by 61% y-o-y to a reported 55,187 tonnes P_2O_5 over the same period, reflecting 48% utilization rates.

Elsewhere, in the **Middle East**:

- In **Iraq**, the **Al Qaim** MAP/TSP plant, previously operated by the **State Enterprise for Phosphates**, remains offline following damage in an air strike earlier in the year

- Likewise, in **Syria**, demand from the **General Establishment of Chemical Industries** (**Geci**) is likely to be under pressure as civil war continues to plague the nation; however

- A major consumer of Syrian phosphate rock, **Lebanon Chemical Co.** (**LCC**), has been able to switch to other sources effectively and maintain steady y-o-y TSP production.

2.2.5 Central & South America

Central & South America phosphate fertilizer supply metrics

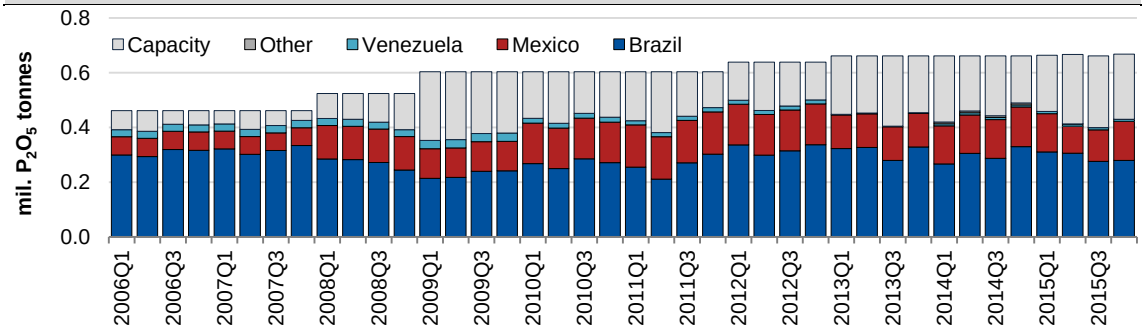
Overview/outlook:

Concentrated phosphate fertilizer production in Central & South America through 2015Q3 is estimated by CRU to have declined by 5% y-o-y to a combined 321,000 P_2O_5 tonnes, mostly because of limited phosphoric acid availability in Brazil following repairs at Anglo American and maintenance at Vale. In Mexico, greater y-o-y DAP and TSP production was offset by a decline in MAP output at Fertinal. In Brazil, a 12% y-o-y decline in quarterly TSP production of around 190,000 tonnes offset the marginal y-o-y increase in MAP production over the same period at around 265,000 tonnes.

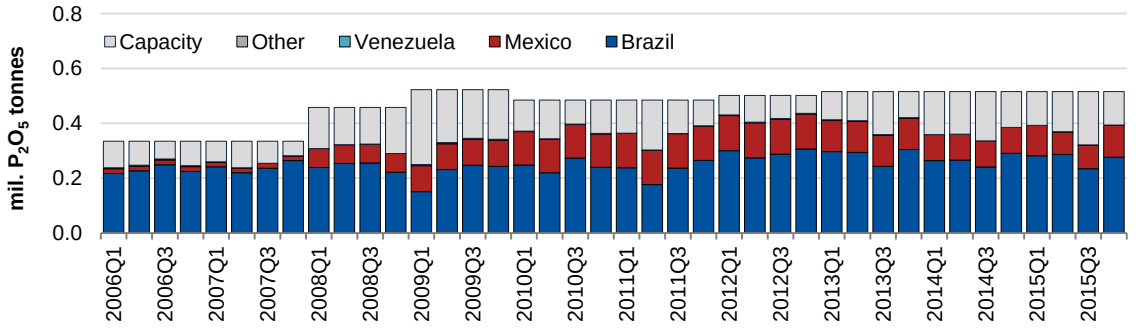
Company tracker:

Vale	Phosphoric acid production is estimated to have increased by 5% y-o-y for the first nine-months of 2015 at over 900,700 P_2O_5 tonnes.
Anglo American	A number of candidates, including some outside of the fertilizer industry, are understood to be considering the acquisition of the company's combined phosphates and niobium assets, valued at US$1 billion.
Fertinal	It is understood that Pemex has agreed to acquire Fertinal for US$680-690 million, with the payment expected in January 2015.
Innophos	Lim Ann Mink was appointed as CEO as of December 14th 2015.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



Medium-term forecast:

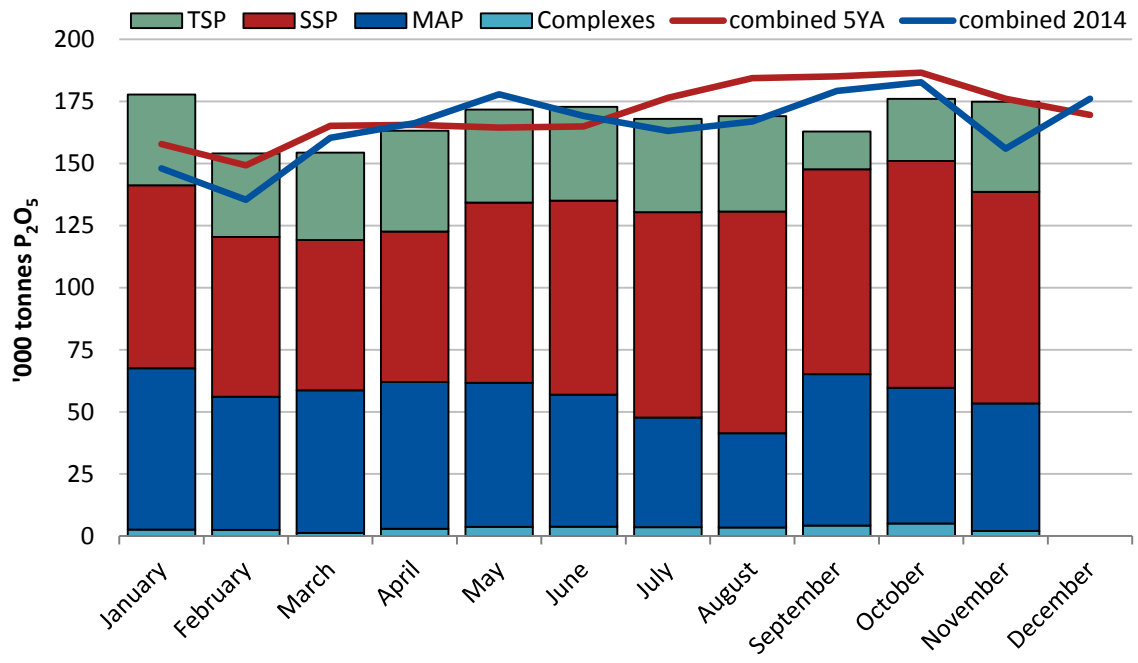
000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	2,646	2,646	2,646	2,646	2,826	2,826	2,826	↑
Production; phosphoric acid	1,619	1,709	1,702	1,696	1,784	1,841	1,912	↑
Operating rate	61%	65%	64%	64%	63%	65%	68%	↑
Capacity; DAP, MAP & TSP	2,062	2,062	2,062	2,062	2,212	2,212	2,212	↑
Production; DAP, MAP & TSP	1,517	1,476	1,494	1,503	1,602	1,659	1,732	↑
Operating rate	74%	72%	72%	73%	72%	75%	78%	↑

Data: CRU, ANDA, GTIS, IFA, INEGI, company reports, port data

In the first eleven months of 2015 **ANDA** reported combined phosphate fertilizer production in **Brazil** at over 1.8 million P_2O_5 tonnes, reflecting an 8% y-o-y decline.

This is primarily due to a 7% decline in TSP production to around 790,000 tonnes. Vale produced 83% of this volume in the first nine-months alone and until that point had shown flat y-o-y production, despite limited rock availability in 2015Q1 and phosphoric acid availability in 2015Q3. This suggests that other producers are likely to have yielded lower y-o-y production. CRU estimates that annual TSP production in Brazil remained flat y-o-y around 900,000 tonnes. Over the same comparative period, the production of MAP is estimated to have totalled 1.1 million tonnes, conveying a marginal y-o-y increase attributed to Vale's 4% y-o-y increase in production over the first nine-months at a reported 820,000 tonnes, which materialized despite limited phosphoric acid availability in 2015Q3.

Monthly phosphate fertilizer production in Brazil



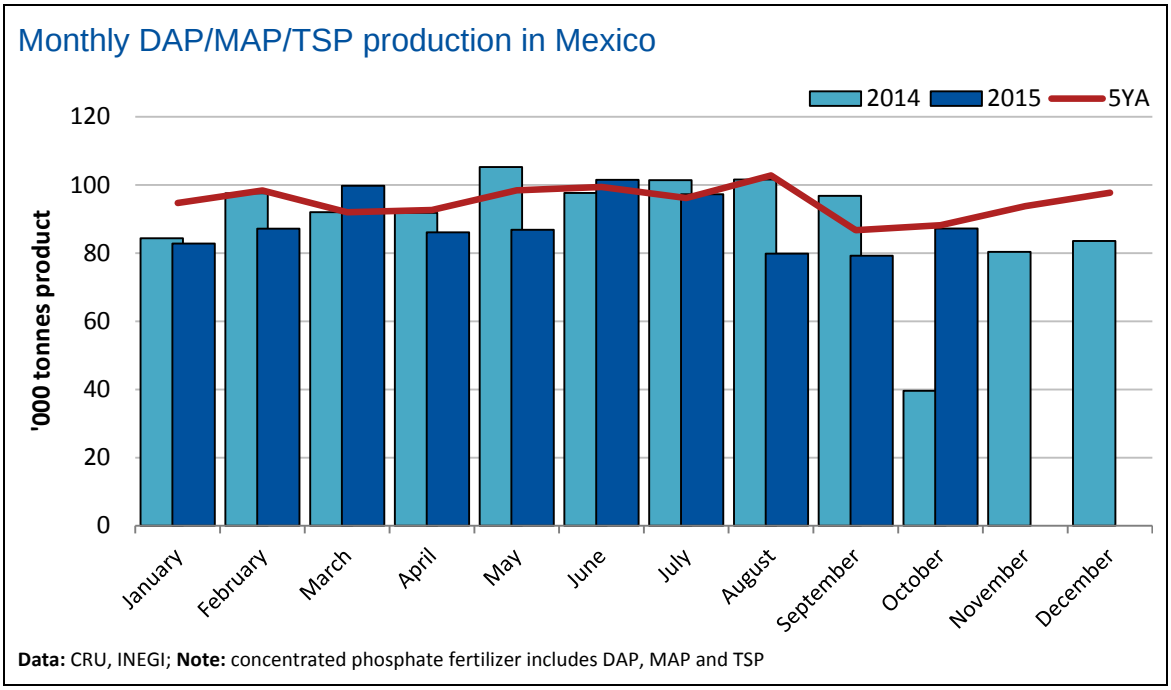
Data: CRU, ANDA; **Note:** phosphate fertilizers include MAP, complexes, SSP, and TSP

In the **medium-term** CRU forecasts that phosphoric acid production in **Brazil** will remain flat up until the commissioning of the **Galvani-Yara – Serra do Salitre** project in 2018 and its subsequent ramp up. We estimate that this will raise domestic output by around 2%CAGR between now and the end of the decade to around 1.3 million P_2O_5 tonnes. Likewise, we expect that MAP production will grow by a similar rate over the period to reach 1.3 million tonnes.

The production of concentrated phosphate fertilizers in **Mexico** for the first ten months of 2015 is reported by **INEGI** to have totalled over 887,000 tonnes, within 98% for the corresponding period the previous year.

There were changes in ownership or management at both Innophos and Fertinal in 2015Q4; following several speculative reports, on December 14th **Pemex** was reported to have agreed to acquire **Fertinal** for US$680-690 million, with the payment expected by the end of January. Also on December 14th, though announced in November, **Innophos** appointed Lim Ann Mink as new CEO following the retirement of Randy Gress. This was soon followed by the resignation of Robert Harrer as CFO and the appointment of Mark Feuerback as an interim replacement. On January 11th both Peter Thomas and Robert Zatta were also were appointed to the company's board of directors. The company's TSP production in 2015 is expected to decline y-o-y as a result of increased competition from Chinese specialty phosphate products – Innophos TSP production is based on the slag co-production of PWA production for specialty phosphates – that are squeezing prices and lowering output in a market with declining demand.

CRU estimates that annual 2015 phosphoric acid production in Mexico fell by 3% y-o-y to just below 500,000 P_2O_5 tonnes, mostly due to reduced captive demand because of a 24% y-o-y decline in annual MAP production at Fertinal of around 330,000 tonnes and a combined marginal y-o-y decline in TSP output from Fertinal and Innophos. This was partially offset by an 8% growth in DAP production at Fertinal of around 260,000 tonnes.



Data: CRU, INEGI; **Note:** concentrated phosphate fertilizer includes DAP, MAP and TSP

2.2.6 Commonwealth of Independent States (CIS)

CIS phosphate fertilizer supply metrics

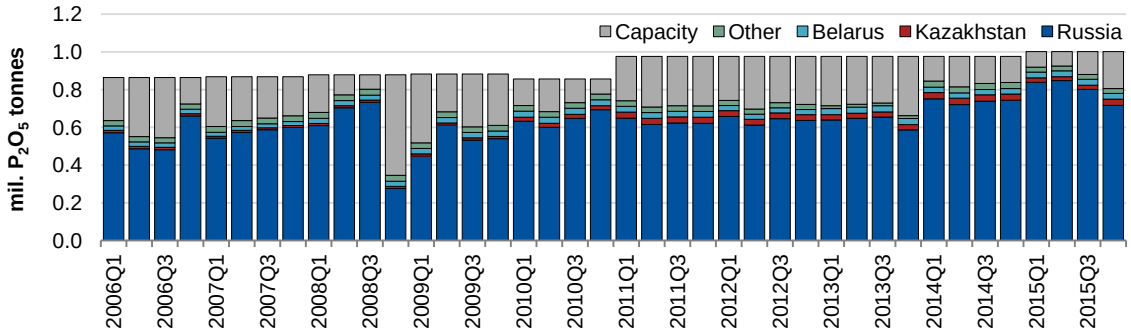
Overview/outlook:

Phosphoric acid production in the CIS is estimated to have increased by 5% y-o-y in 2015Q3 to 880,000 P_2O_5 tonnes This is attributed to growth in Russia, with relatively flat y-o-y production elsewhere in the region. Whilst 2015Q3 DAP production is estimated to have nearly doubled y-o-y at around 185,000 tonnes, this was offset by a 16% y-o-y decline in regional MAP production for the quarter at around 730,000 tonnes.

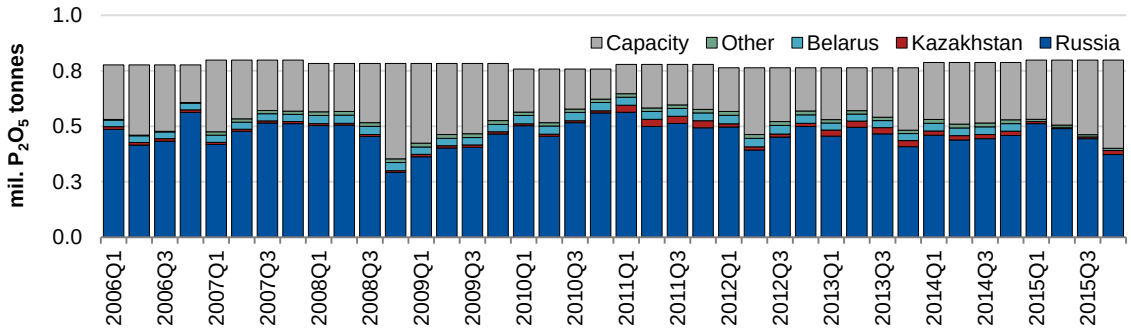
Company tracker:

PhosAgro	A five-year liquid sulphur contract was agreed with Gazprom in mid-December, following a disagreement that resulted in limited phosphoric acid availability at its Balakovo plant.
EuroChem	Sales volumes of DAP/MAP in 2015Q3 increased by 10% y-o-y to a reported 464,000 tonnes.
Belfert	Combined TSP/SSP/NPK production at subsidiary Gomel Chemical remained flat for the first nine-months of 2015 at a reported 149,100 P_2O_5 tonnes.
Ammofos Maxam	A new NPK plant with an annual capacity of 160,000 tonnes is expected to be commissioned this year.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



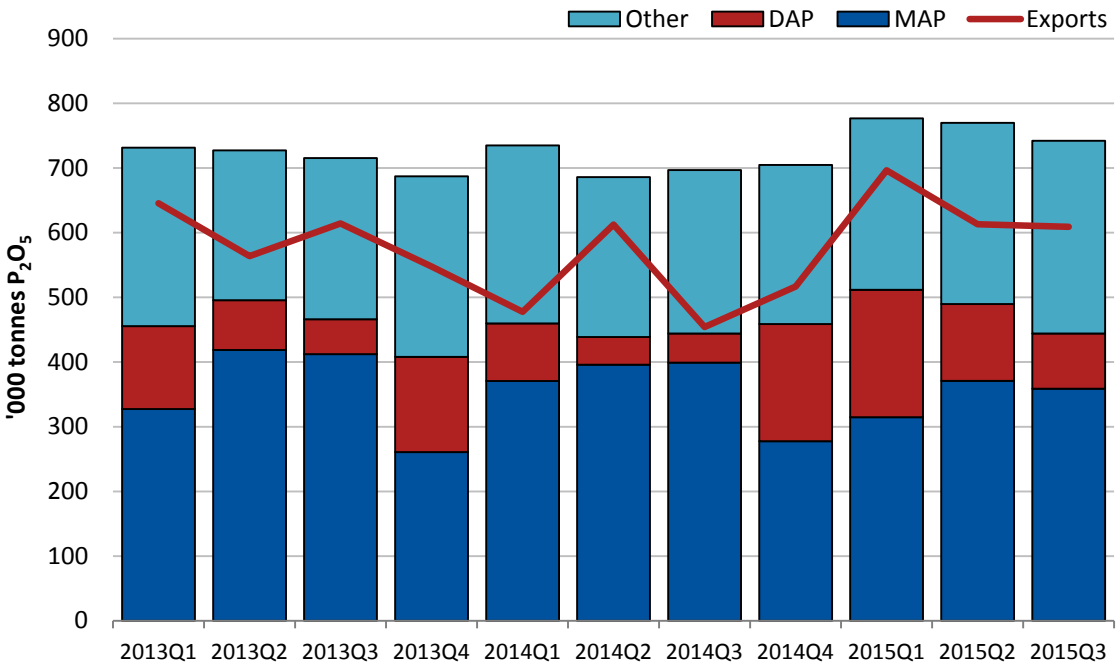
Medium-term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	3,905	4,005	4,155	4,155	4,155	4,155	4,155	↑
Production; phosphoric acid	2,961	3,530	3,638	3,677	3,690	3,639	3,589	↑
Operating rate	76%	88%	88%	88%	89%	88%	86%	↓
Capacity; DAP, MAP & TSP	3,149	3,191	3,341	3,341	3,341	3,341	3,341	↑
Production; DAP, MAP & TSP	1,922	1,900	2,001	2,068	2,079	2,024	1,975	↑
Operating rate	61%	60%	60%	62%	62%	61%	59%	↓

Data: CRU, Azotecon, BelStat, GTIS, IFA, company reports

Azotecon data for 2015Q3 showed that combined phosphate fertilizer in **Russia**, though up by 6% y-o-y reflected a 4% q-o-q decline at a reported 743,600 P_2O_5 tonnes for the quarter. The only notable y-o-y decline in production was the 10% fall in MAP output at an estimated 689,800 tonnes for the quarter. Although DAP production increased by a reported 89% y-o-y, it declined by 28% q-o-q decline in 2015Q3 of an estimated 185,650 tonnes.

Quarterly phosphate fertilizer production in Russia



Data: CRU, Azotecon; **Note:** phosphate fertilizer includes DAP, MAP, SSP, and all complex fertilizer

This y-o-y decline resulted from lower sulphur deliveries from Gazprom to **PhosAgro**, which paralyzed sulphuric acid units at its **Balakovo** plant, consequently limiting phosphoric acid availability for MAP production. As with the previous year, PhosAgro is understood to have prioritized MAP production at its Balakovo plant; considering that MAP production declined by a reported 60% y-o-y for the first nine-months of 2015 at its **Cherepovets** plant, where the company now focuses on DAP production, a significant increase in the contribution of DAP to the PhosAgro product mix should be expected in 2015 – particularly for the last quarter.

Gazprom and PhosAgro agreed a contract for liquid sulphur in mid-December 2015 up until December 31st 2020 to supply the Balakovo and Cherepovets plants; however, MAP production curtailments were expected to have occurred up until this point. Overall, combined DAP/MAP production for the first nine-months of 2015 increased by 14% y-o-y to a reported 1.14 million tonnes. PhosAgro's NPK production also increased by 8% y-o-y over the same period to 1.5 million tonnes.

Over the same nine month period, combined DAP/MAP production at **EuroChem** is understood to have increased by 1.2% y-o-y and its sales have increased by 1.3% at a reported 1.46 million tonnes. This has been supported by a 5.3% increase in MAP production from its **Kingisepp** plant, which offset a 1.4% y-o-y decline in output from its **Belorechenskiye** plant.

Uralchem produced 8,000 tonnes of MAP in 2015Q3 and 139,000 tonnes of NPK for the quarter, raising MAP production by 24% y-o-y for the first nine-months of 2015 at 31,000 tonnes. Complex fertilizer production also increased by 31% y-o-y at a reported 495,000 tonnes in the same period.

Acron reported a 25% increase in NPK production in 2015Q3 to 653,300 tonnes; however, NPK output for the first nine-months fell by 8% y-o-y to 1.8 million tonnes.

CRU estimates that whilst annual phosphoric acid production in **Russia** increased for 2015 by an estimated 25% y-o-y to around 3.2 million P_2O_5 tonnes, an increasing proportion of this was utilized for NPK and other phosphate fertilizer production compared with 2014 and so combined DAP/MAP production is expected to have remained flat y-o-y at around 1.8 million P_2O_5 tonnes. Whist CRU forecasts that both MAP and DAP production in Russia will remain above 2.5 million tonnes and 1.0 million tonnes respectively throughout the medium-term both will come under increasing pressure from export competition to the major markets of Brazil and India. Consequently, phosphoric acid production may also decline slightly in the medium-term, but CRU forecasts annual output to remain above 3.1 million P_2O_5 tonnes.

Elsewhere in the **CIS**:

- In **Kazakhstan**, the commissioning of **EuroChem – Taraz** is expected to raise annual phosphoric acid and MAP production in 2016by 33% and 97% y-o-y at around 130,000 P_2O_5 tonnes and 160,000 tonnes respectively.

- Combined TSP/SSP/NPK production at **Belfert** subsidiary **Gomel Chemical** remained flat for the first nine-months of 2015 at a reported 149,100 P_2O_5 tonnes.

- The production of phosphate fertilizer in **Uzbekistan** between January-October 2015 to have totalled 117,400 tonnes product **according to Uzkimyosanoat**. The industry will continue to expand over the next year as the new **Samarkandkimyo** NPK plant with an annual capacity of 250,000 tonnes is commissioned in January 2016 and **Maxam-Ammofos** plan to commission a new NPK plant with an annual capacity of 160,000 tonnes.

2.2.7 South Asia

South Asia phosphate fertilizer supply metrics

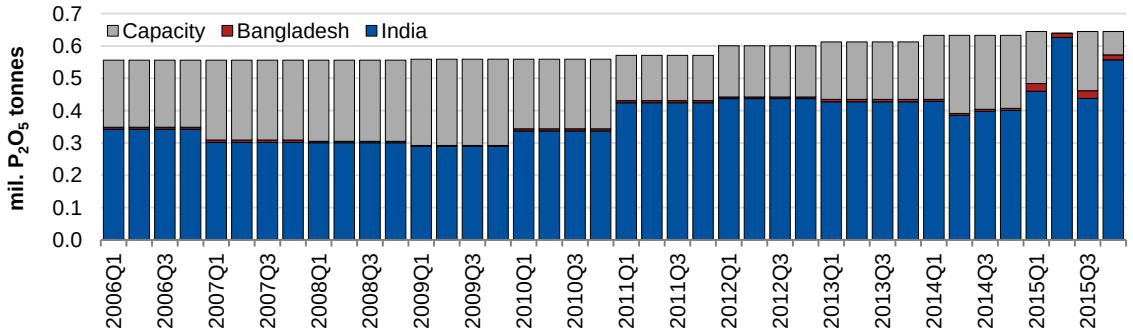
Overview/outlook:

Low phosphate rock prices for buyers in Southern Asia support CRU estimates of 2015Q3 phosphoric acid production on the subcontinent increasing by 14% y-o-y to around 460,000 P_2O_5 tonnes. This, in combination with low DAP prices for importers, resulted in a regional 2% y-o-y decline in DAP production at just above 1.0 million tonnes; mostly attributed to the decline in India.

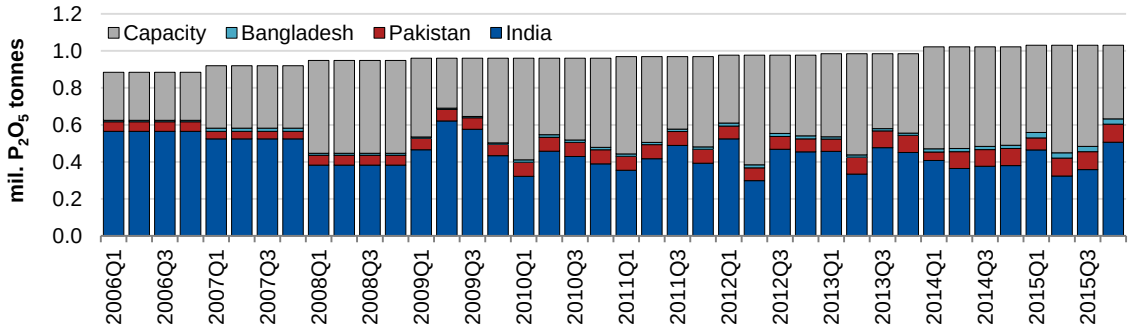
Company tracker:

Zuari	Since gaining a controlling stake in the UB Group-backed MCFL, the company plans to double phosphate fertilizer capacity at the Mangaluru plant, which currently has an annual capacity of 300,000 tonnes of phosphate fertilizer product.
FACT	Following six-months of maintenance, a financial injection from the Central government resulted in the re-commencement of ammonia production in January 2016.
FBBL	DAP production in 2015Q3 increased by around 8% y-o-y at a reported 211,000 tonnes.
BCIC	On December 1st dealers suspended unloading both DAP and TSP (among other fertilizer) from subsidiaries in protest against the introduction of polypropylene bags instead of jute for the distribution of fertilisers.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



Medium-term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	2,531	2,578	2,578	2,578	2,578	2,578	2,578	↔
Production; phosphoric acid	1,482	2,331	2,292	2,292	2,417	2,442	2,417	↑
Operating rate	59%	90%	89%	89%	94%	95%	94%	↑
Capacity; DAP, MAP & TSP	4,089	4,122	4,122	4,122	4,122	4,122	4,122	↔
Production; DAP, MAP & TSP	1,893	2,124	2,210	2,261	1,992	1,815	1,747	↓
Operating rate	46%	52%	54%	55%	48%	44%	42%	↓

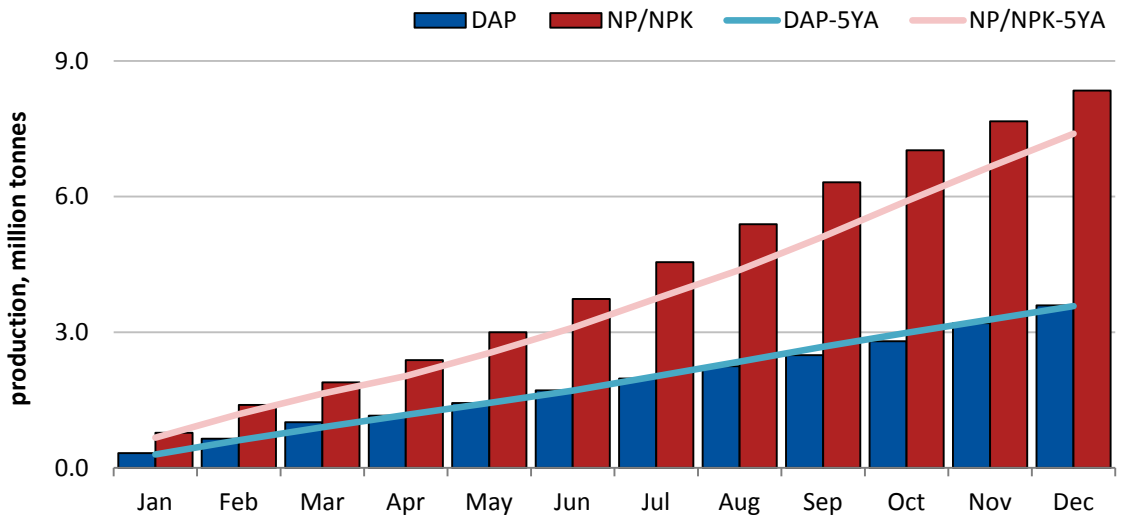
Data: CRU, FAI, GTIS, IFA, NFDC, company reports, port data

A higher MGA price of around CFR US$810/tonne in 2015H2 favoured the production of NP/NPKs to reduce cost due to their lower phosphoric acid requirements.However, large producers continued to produce DAP, in part for social obligation, but also to maintain market share. Annual DAP production in 2015 was reported by the Fertilizer Association of India (FAI) to have remained at the five-year-average of just below 3.6 million tonnes, but approximately 8% up on 2014 annual production, creating higher availability of DAP when combined with increased import volumes. However, annual NP/NPK production remained considerably above five-year-averages, particularly in 2015H2 and 13% up y-o-y at around 8.4 million tonnes.

The MGA contract price fell further in 2016 and settled at CFR US$715/tonne for 2016Q1, reflecting a US$95/tonne decline compared with 2015H2, and is expected to encourage more domestic DAP and NP/NPK production. However, the desired effect may not materialize as usually larger producers enter annual maintenance periods by the end of the financial year (2016Q1) or early Q2, which will limit production. Furthermore, producers are likely to until the new NBS rates are announced, which is expected by the end of March or early April 2016.

In the **medium-term**, CRU forecasts that DAP production will increase a further 8% y-o-y to around 3.9 million tonnes in 2016 and reach 4.0 million tonnes the following year, before declining by an estimated 9% CAGR down to 2.9 million tonnes by the end of the decade.

Cumulative monthly DAP/NPK production in India through 2015CY



Data: CRU, FAI

In **Pakistan**, **Fauji Fertilizer Bin Qasim** is understood to have recorded its highest quarterly DAP output in 2015Q3 at a reported 211,000 tonnes. This 8% y-o-y increase in production is reflective of the 14% overall increase in DAP production in the first nine-months of 2015 at a combined 563,000 tonnes.

2.2.8 Europe

Europe phosphate fertilizer supply metrics

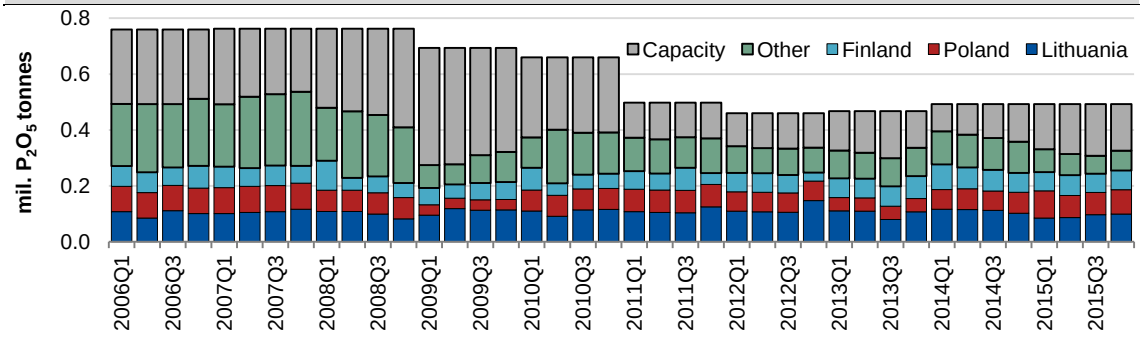
Overview/outlook:

Concentrated phosphate fertilizer production in 2015Q3 is estimated by CRU to have remained flat y-o-y at a combined 230,000 P_2O_5 tonnes despite an estimated 18% y-o-y decline in phosphoric acid production over the same comparative period at around 300,000 P_2O_5 tonnes.

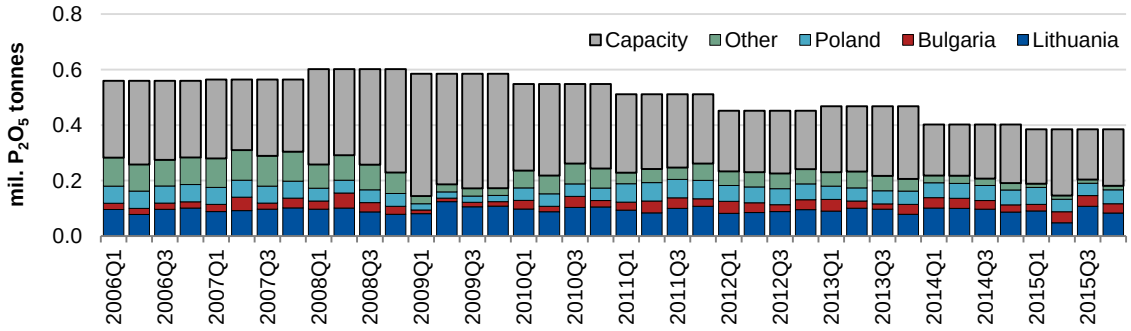
Company tracker:

AB Lifosa	The EuroChem subsidiary has reported flat y-o-y DAP production volumes for the first eleven-months of 2015 at around 730,000 tonnes.
Grupa Azoty	Combined phosphate and compound fertilizer production is estimated to have totalled 469,000 P_2O_5 tonnes in 2015.
Prayon	In December 2015 it was concluded by the regional Wallone government that the company can continue to store gypsum from phosphoric acid production until 2035.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



Medium-term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	1,970	1,970	1,970	1,970	1,970	1,970	1,970	↔
Production; phosphoric acid	1,281	1,279	1,409	1,392	1,373	1,367	1,364	↑
Operating rate	65%	65%	72%	71%	70%	69%	69%	↑
Capacity; DAP, MAP & TSP	1,609	1,539	1,539	1,539	1,539	1,539	1,539	↔
Production; DAP, MAP & TSP	705	718	793	810	785	780	776	↑
Operating rate	44%	47%	51%	53%	51%	51%	50%	↑

Data: CRU, GTIS, GUS, IFA, LS, company reports, port data

2.2.9 Oceania & South East Asia

Oceania & South East Asia phosphate fertilizer supply metrics

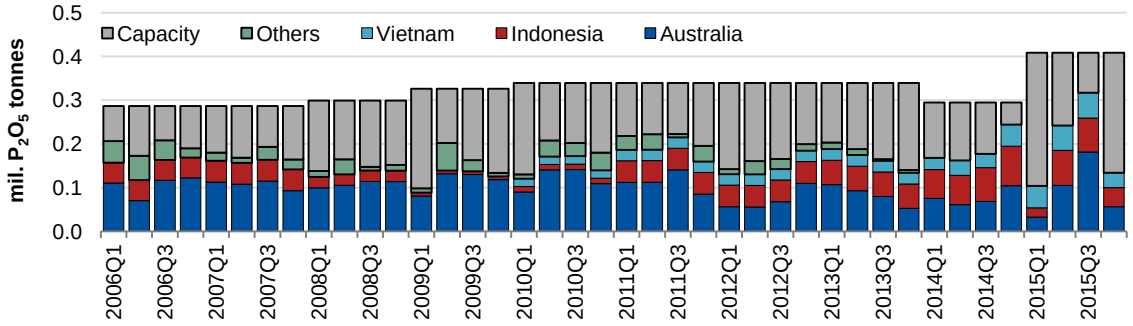
Overview/outlook:

CRU estimates that phosphoric acid production in SE Asia and Oceania through 2015Q3 increased by 71% y-o-y to reach over 300,000 P_2O_5 tonnes; due to the ramping up of production of Vinachem DAP II and DLC, both in Vietnam, and likewise in Indonesia the ramping up of PJA and the commissioning of a new phosphoric acid train for PKG. Accordingly, concentrated phosphate fertilizer production increased by an estimated 126% y-o-y at over 200,000 P_2O_5 tonnes for the same reasons and also because of increased MAP utilization at Incitec Pivot in Australia.

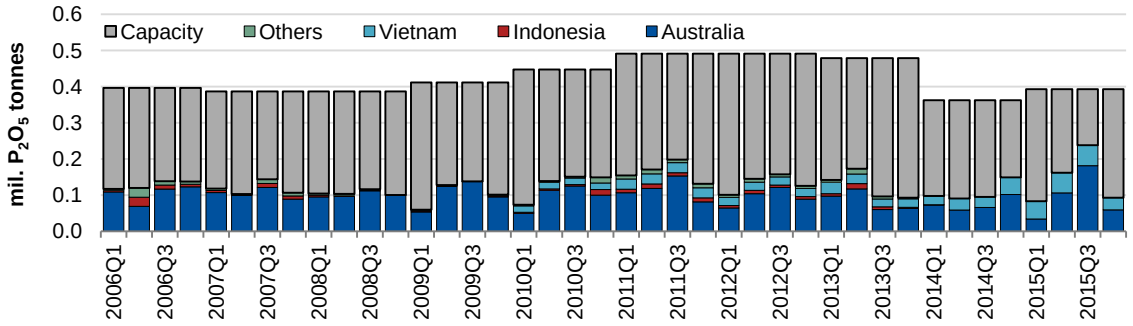
Company tracker:

Incitec Pivot	The derailment of a train loaded with sulphuric acid near Julia Creek on December 27th is reported to have cost the company US$14 million. Despite the logistical issue concerning the only rail access to the Phosphate Hill plant, the company is still confident of reaching 950,000 tonnes of fertilizer production for the financial year.
PKG	A new phosphoric acid train with an annual capacity of 200,000 P_2O_5 tonnes was commissioned in 2015H2.
Vinachem	On October 22nd 2015 the company announced plans to raise annual DAP production to 311,000 tonnes for 2015.

Phosphoric acid – quarterly regional production/capacity:



DAP/MAP/TSP – quarterly regional production/capacity:



Medium-term forecast:

000 tonnes P_2O_5	2014	2015	2016	2017	2018	2019	2020	Δ 2015-2020
Capacity; phosphoric acid	1,179	1,633	1,683	1,683	1,783	1,883	1,883	↑
Production; phosphoric acid	781	797	1,071	1,235	1,278	1,257	1,247	↑
Operating rate	66%	49%	64%	73%	72%	67%	66%	↑
Capacity; DAP, MAP & TSP	828	1,002	1,002	1,002	1,002	1,002	1,002	↔
Production; DAP, MAP & TSP	547	576	684	688	700	684	679	↑
Operating rate	66%	57%	68%	69%	70%	68%	68%	↑

Data: CRU, FIFA, GTIS, IFA, company reports, port data

Chapter 3
Trade, balance & prices

3.1 Recent developments and forecast for trade

3.1.1 Phosphoric acid

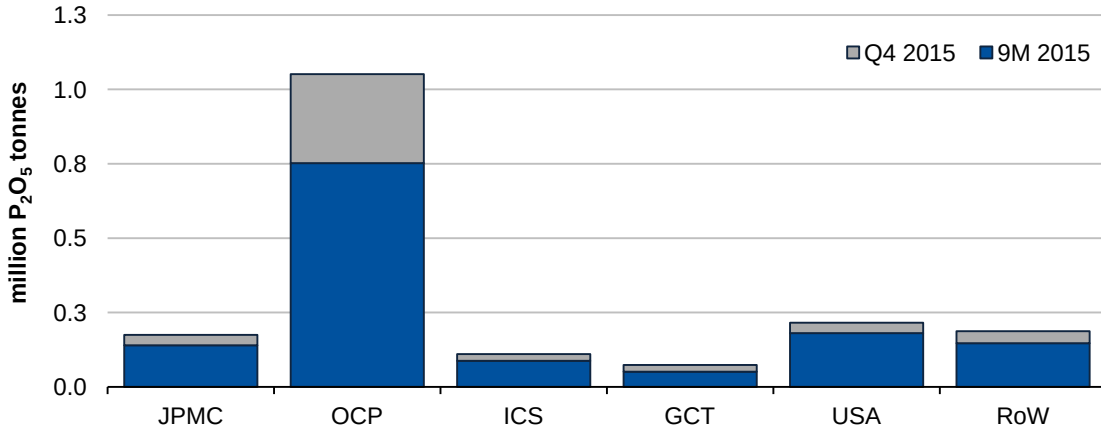
With most customs bureaux having reported nine-months of trade, we are now starting to form a clearer picture for seaborne volumes in 2015. It is estimated that just below 3.2 million P_2O_5 tonnes of was shipped in the form of MGA over this period, compared to 2.9 million P_2O_5 tonnes during the corresponding months the previous year. This is impressive, considering large the premium that had been in existence for the product over concentrated phosphate fertilizers during the past 18 months.

In **India**, the country where granulators are arguably most exposed to high feedstock prices, seaborne purchases rose to 1.3 million P_2O_5 tonnes during the first-nine-months in 2015, from 1.1 million P_2O_5 tonnes in 2014, as buyers looked to not only switch product mix (away from DAP to NPK), but also their sources of supply. Between January and September, less product was purchased from **OCP** as non-JV operators in particular looked to diversify away from the Moroccan exporter. Instead, larger volumes were shipped from **PotashCorp**, **ICL**, **JIFCO**, **ICS**, **Foskor** and prominently also **Duc Giang** in Vietnam, following the commissioning of its Lao Cai plant in late 2014.

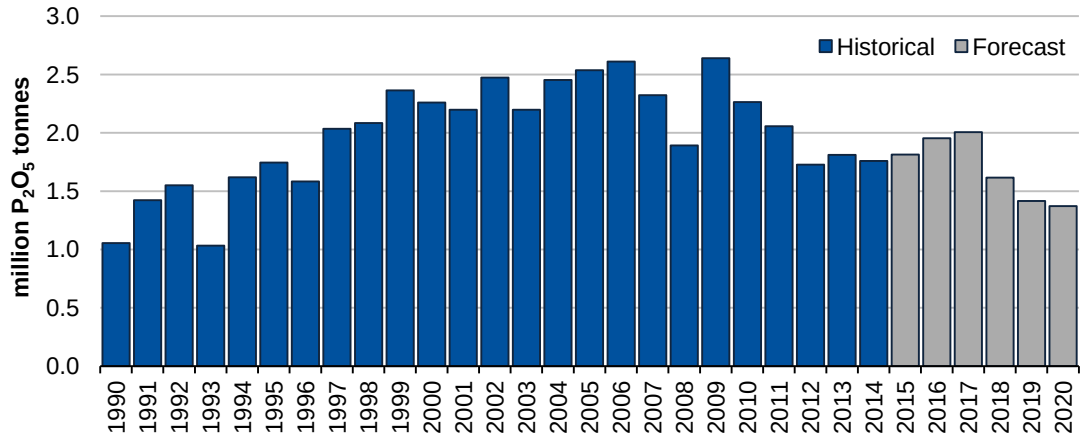
Based on trends during the first-nine-months of the year, we estimate that calendar year shipments will total 1.8 million P_2O_5 tonnes, an increase of 95,000 P_2O_5 tonnes y-o-y. *In addition to adjusting our short-term import expectations, we have also made important changes to our medium-term forecast for India. Imports of MGA are forecast to fall to 1.3 million P_2O_5 tonnes in 2020, some 400,000 P_2O_5 tonnes below the total estimate for 2015. This compares to our previous estimate of 1.8 million P_2O_5 tonnes in 2020, published in the PFMO October 2015 Edition. The key reason driving this change is an anticipated intensification of competition. We expect that non-JV operators importing phosphoric acid or rock will struggle to compete against the likes of **Ma'aden**, **OCP** and **China.** As such, domestically manufactured product is likely to be replaced by lower-cost imported fertilizer.*

Indian MGA import profile

MGA imports to India by exporter, 9M2015 and 2015CY



Annual MGA imports to India, 1990-2020



Data: CRU, Fertilizer Week, GTIS, IFA, Port Data

In **Pakistan**, **Fauji** imported 288,000 P_2O_5 tonnes between January and September from OCP. Over the past couple of years OCP has started the process to convert the original Jorf Lasfar acidulation units to run on wet rock stemming from its new pipeline. This has had some unexpected benefits, one of which has seen the PMP unit's capacity increase to 400,000 P_2O_5 tonnes, up from its original capacity of 375,000 P_2O_5 tonnes. Our estimate for the 2015 calendar year stands at 350,000 P_2O_5 tonnes, which includes a small cargo from China. *This is well above the corresponding 336,000 P_2O_5 tonnes imported in 2014, but our forecast sees this falling back to between 330-340,000 P_2O_5 tonnes between 2016 and 2020. Although Fauji does have access to below-market priced MGA (through its JV with OCP), we do feel that with the sheer volume of new export focused granulation capacity expected on stream in the next few years, it will be difficult to raise its DAP production further.*

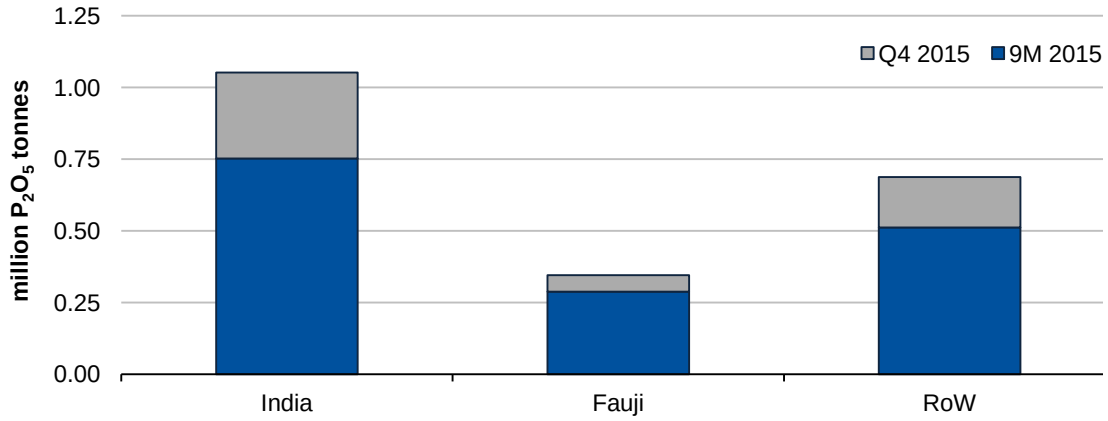
Elsewhere, growth was also recorded into parts of the **Middle East** and **Europe**.

In the case of the Middle East, this has been driven by improved demand for merchant grade product in **Turkey** and **Saudi Arabia**. The commissioning of new DAP/NPK capacity in by **Gubretas** ay **Yarimca** in April saw Turkish purchases during the first-nine-months of 2015 total 216,000 P_2O_5 tonnes, with **OCP** supplying 78,000 tonnes, **JPMC** 68,000 tonnes, **GCT** 39,000 tonnes and **ICL** 17,000 tonnes – all in P_2O_5 terms. With 15,000 P_2O_5 tonnes having arrived in October, we estimate that calendar year imports will reach 276,000 P_2O_5 tonnes, despite the pressure caused by the devaluation of the Turkish Lira and the resultant squeeze on farming margins. The latter may well pose some issues for 2016, although this is not currently included in our base-case as the continued ramping up of granulation in Yarimca should help to support imports in the short-term. *That said, further increases are unlikely as the non-integrated Turkish industry could struggle to remain cost competitive as new export focused capacity comes into production.*

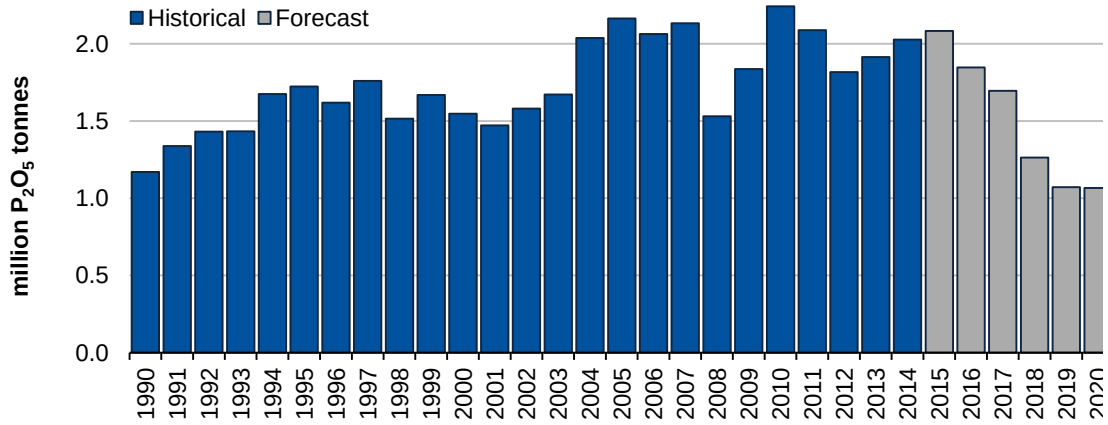
In the case of **Western Europe**, imports are believed to have grown in France, Netherlands and Spain. **French** purchases are estimated at 167,000 P_2O_5 tonnes during the first-nine-months. Both **OCP** and **ICL** sold more into the country during the first-nine-months, whereas **Prayon** volumes were flat and less was sourced from **GCT**, which we understandd to be due to a lack of availability. For the calendar year, the country is estimated to have imported around 230,000 P_2O_5 tonnes of phosphoric acid, which is well above the 190,000 P_2O_5 tonnes that the country has bought on average for the past 10 years. *While we have been bearish over the future of some non-integrated producers, our expectations is that these imports will hold up as the product is used to make industrial as well as feed grade phosphate, both of which are non-bulk commodities, in addition to fertilizer.* **Spanish** imports through September totalled 110,000 P_2O_5 tonnes, which puts it on course to purchase 146,000 P_2O_5 tones for the calendar year. Here again, **Fertiberia** uses MGA for the production of NPK and animal feed. Meanwhile, Dutch imports are believed to have reached 220,000 P_2O_5 tonnes in 2015, given that they totalled 180,000 P_2O_5 tonnes in the first-nine-months. **ICL** and **OCP** are set to have supplied equal quantities, with the latter increasing its sales from 70,000 P_2O_5 tonnes in 2014 to around 100,000 P_2O_5 tonnes in 2015.

Morocco MGA export profile

OCP MGA exports, 2015H1 and 2015CY



Annual OCP MGA exports, 1990-2020



Data: CRU, Fertilizer Week, GTIS, IFA, ANP

On the **supply** side of the market, **OCP** exported more than 570,000 P_2O_5 tonnes during 2015Q3, taking its year to date (September) total to 1.5 million P_2O_5 tonnes. Gains y-o-y were made by selling more into **Western Europe**, the **Middle East** and **Pakistan**. In Europe, the company enjoyed a combination of organic growth, but was also able to drive down sales of its competition in key markets. For example, OCP exports to **France** were around 18,000 P_2O_5 tonnes higher y-o-y in the first-nine-months of 2015, as the company benefitted from winning some of **GCT**'s business to supply **Roullier** fertilizer and feed plants. In **Spain,** gains were also made at the expense of **GCT**, while in the **Netherlands**, an increase corresponded with lower volumes from **Foskor** and **Prayon**. Shifting over to Asia through the nine-months to September 2015, **OCP** sold more to **Sabic** y-o-y for their NPK unit in **Al-Jubail**, and to **Fauji Fertilizer** in **Pakistan,** following the debottlenecking of the **PMP JV** in **Morocco**. Taking this all into account, we estimate that **OCP** sales surpassed 2.0 million P_2O_5 tonnes in 2015, which is slightly above the volume recorded for 2014.

Our medium-term outlook sees these falling back to 1.2 million P_2O_5 tonnes in 2020, which is in line with their strategy to concentrate more heavily on the downstream value chain. While exports will be lower, the company's overall production will be higher in 2020.

Table 3.1: MGA trade matrix – 9M2015, '000 P_2O_5 tonnes

Exporters → ↓ Importers	BEL	CHN	ISRL	JOR	MOR	SEN	SAF	TUN	USA	ROW	TOTAL
Belgium	0	4	5	0	68	0	3	0	0	13	**92**
France	39	0	36	0	68	0	8	0	16	0	**167**
Netherlands	9	0	86	0	84	0	2	1	0	0	**181**
Spain	2	2	47	0	39	0	0	0	6	16	**110**
UK	8	19	6	0	4	0	0	0	0	0	**37**
Canada	1	3	0	0	0	0	0	29	0	0	**33**
USA	19	20	4	0	0	0	0	0	0	13	**56**
Mexico	0	1	0	0	0	0	0	65	0	0	**66**
Brazil	0	2	0	0	25	0	0	52	0	1	**81**
Saudi Arabia	0	1	0	11	48	0	10	0	0	0	**71**
Turkey	1	9	17	68	78	0	4	0	39	0	**216**
India	0	2	36	140	752	87	49	181	51	59	**1,358**
Pakistan	0	2	0	0	288	0	0	0	0	0	**290**
Indonesia	0	15	0	39	20	0	0	0	0	6	**81**
Thailand	0	39	0	0	0	0	0	0	0	0	**39**
South Korea	0	50	0	0	0	0	0	0	0	1	**51**
Taiwan	0	29	0	4	0	0	0	0	0	0	**34**
RoW	45	89	26	7	78	0	2	4	2	49	**302**
Total	**126**	**287**	**263**	**269**	**1,551**	**87**	**76**	**333**	**114**	**159**	**3,266**

A number of other suppliers also fared well during the January-September 2015 period. In fact the largest gains during 2015 were made in **Jordan** – where the **JIFCO JV** continues to ramp up. Through September, Jordanian export volumes were estimated at 270,000 P_2O_5 tonnes– despite the maintenance down time that occurred in 2015Q3. While most of the company's MGA was shipped to **India**, **JPMC** also made inroads into **Indonesia**, where it grew its market share to 48% (from under 1% in 2014) at the expense of **OCP** and **Foskor**, and **Turkey**, which as previously mentioned, imported a lot more MGA y-o-y in 2015. Although GTIS mirror trade shows that just 8,000 P_2O_5 tonnes was shipped in October, our view is that an average of 35,000 P_2O_5 tonnes was shipped in November and December, taking the calendar year to 340,000 tonnes *P_2O_5. Although, JPMC is set to ship around 490,000 P_2O_5 tonnes in 2016, this is expected to moderate to 400,000 P_2O_5 tonnes in 2017 and 2018 as more produce is consumed domestically for the production of granular fertilizer. However, by the end of the forecast period in 2020, exports are set to be back around 450,000 P_2O_5tonnes.*

Across the border in **Israel**, **ICL** appears to have sold 265,000 P_2O_5 tonnes on the merchant market through to September. Following the fire at its **Mishor Rotem** SSP granulation unit,

ICL has been unable to produce SSP, forcing additional sales of MGA. *As granulation capacity is repaired and re-commissioned these exports are set to fall back to average of around 267,000 P_2O_5 tonnes through to the end of the forecast period in 2020.*

In the **USA**, **PotashCorp**'s MGA exports from Morehead city rose from 87,000 P_2O_5 tonnes in 2015Q1 to an average of 123,000 P_2O_5 tonnes in 2015Q2 and 2015Q3. This was entirely driven by an improvement of sales to **India** and **Brazil**. For 2015Q4, Indian port data shows two further shipments, totalling 34,000 P_2O_5 tonnes arriving in Kandla, bound for IFFCO's granulation unit. Meanwhile GTIS recorded 35,000 P_2O_5 tonnes of product sold to Canada, Mexico and Brazil during October 2015. Accounting for the two months of missing data, our estimate for the calendar year stands at 420,000 P_2O_5 tonnes, which is 20,000 P_2O_5 tonnes above the estimate for 2014.

Finally, 2015 also saw the first exports of product by **Duc Giang** in **Vietnam** to **India**, where its shipments are exempt of any import tariff (usually 5%). We estimate that a total of 95,000 P_2O_5 tonnes were shipped this year from Vietnam. *We forecast these to grow further in 2016 and 2017, before moderating towards the end of the forecast period, as their main target market (India) comes under pressure from competition in the downstream concentrated fertilizer sector.*

3.1.2 Concentrated Phosphate Fertilizer

As is the case with MGA, more concentrated phosphate (DAP, MAP & TSP) was traded in 2015 than in 2014. For the first-nine-months of the year, we estimate that 10.4 million P_2O_5 tonnes was shipped in the form of concentrated phosphate fertilizer. This is 12% higher than during the corresponding period in 2014, and is almost entirely explained by the much larger shipments of DAP made to the **Indian** market in 2015. Through September, India imported 2.5 million P_2O_5 tonnes of DAP, an increase of 1.5 million P_2O_5 tonnes over 2014. In contrast, less concentrated phosphate was shipped to **Brazil** in 2015, due to the country's growing macroeconomic troubles and the resultant impact on the farming community (described in *Chapter 1*). While the slowdown has not been welcomed by suppliers – especially the likes of **OCP**, **Mosaic** and the **Russian** exporters – most were able to offset losses in Brazil will gains in India.

Chinese exporters again appear to be the stand out performers of 2016, having increased their concentrated phosphate exports in 2015 after shipping record volumes in 2014. During the first-nine-months we estimate in excess of 3.8 million P_2O_5 tonnes of concentrated phosphates were exported from the country, compared to what now seems like a modest 2.3 million P_2O_5 tonnes

in 2014. While the 2015Q4 totals are set to be lower in 2015 than in 2014, we have revised China's 2015 total to 5.0 million P_2O_5 tonnes, to reflect the prevailing trend.

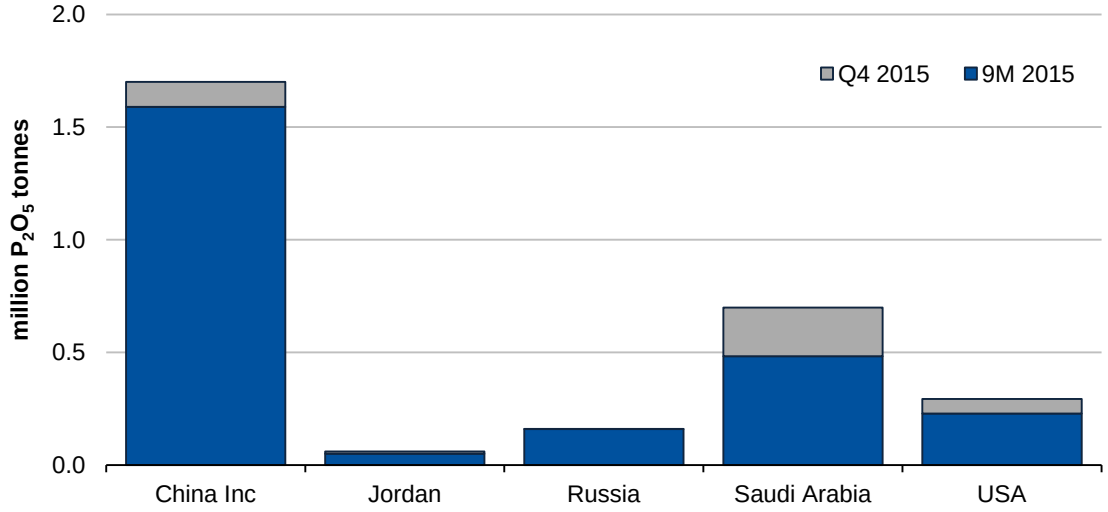
While we now have calendar year trade data from the FAI for 2015, establishing the real volume of imports into **India** has been a challenge. Indeed, the FAI reported DAP imports at 5.8 million product tonnes, which in our view appears a modest estimate. GTIS for example shows 5.9 million product tonnes entered the country between January and October. Similarly, actual port arrivals – reported by *Fertilizer Week* – show that 6.3 million product tonnes arrived during 2015. If **China**'s official estimate of exports to India is correct, or alternatively **Russian** sales to India are treated as DAP instead of NPK/NPS (as they are in Russian export data), then the volume could well be higher for the calendar year. Our estimate is most closely aligned to the port arrival data, which reflects DAP arrivals of slightly in excess of 6.3 million tonnes.

With respect to the distribution of product in **India**, nineteen companies imported DAP into the country from five different countries; **China**, **Jordan**, **Russia**, **Saudi Arabia** and the **United States**. Just three of the nineteen, however – **IPL**, **IFFCO** and **Chambal –** accounted for 56% of total purchases in 2015. In **IPL**'s case, 600,000 tonnes DAP arrived from **China**, 283,000 tonnes from **MPC** in **Saudi Arabia** and 244,000 tonnes from the **Mosaic** in the **US**. Smaller volumes were shipped from **Russia** and **Jordan** (**JPMC**). **IFFCO** purchases in 2015 were concentrated between April and October. Here again the greater majority of product stemmed from **China** (857,000 tonnes DAP), with the remainder arriving from **Russia** and **Saudi Arabia**. In **Chambal**'s case, product arrived from **China** (73%), **Saudi Arabia** (24%) and the **US** (3%).

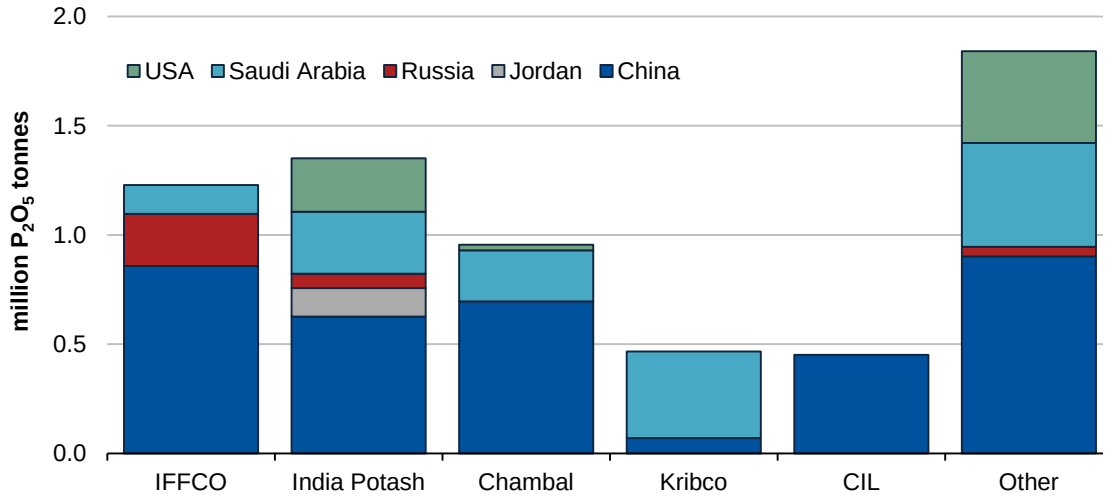
*It's notable that **OCP** remains absent from this market, despite its ramping up of downstream capacity. This will have to change going forward, if it is to operate anywhere near its nameplate capacity volumes, which is likely to lead to an intensification of competition with **OCP, Ma'aden** and **China** all fighting to gain market share. As a consequence, Indian imports of DAP are set to rise – both from an organic growth perspective but also due to increasing substation (over MGA). It is our view that of concentrated phosphates will therefore grow from their current levels to 4.1 million P_2O_5 tonnes in 2020 (an increase of 1.2 million P_2O_5 tonnes).*

Indian DAP, MAP & TSP import profile

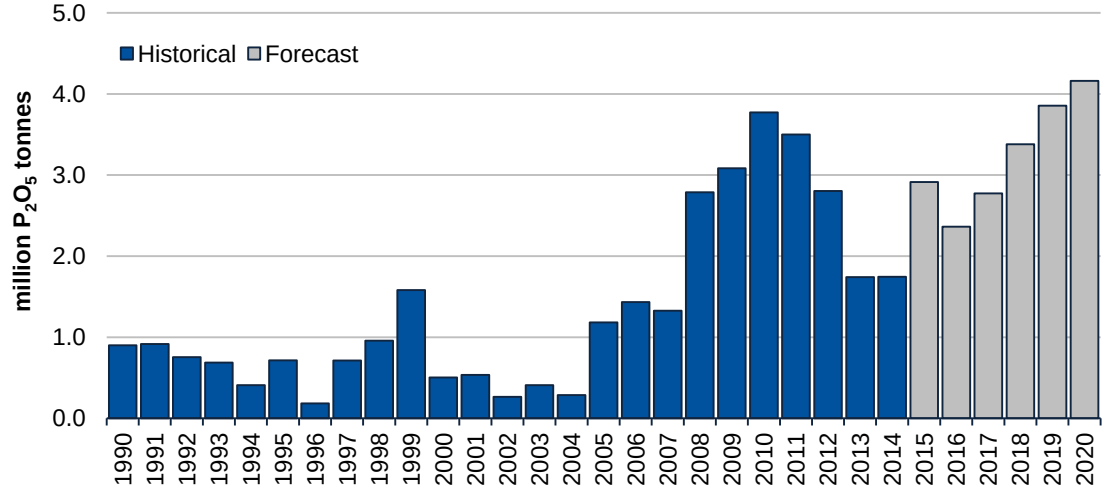
Indian imports by major purchaser, 2015



Indian imports of DAP, MAP & TSP, 2015



Indian imports of DAP, MAP & TSP, 1990-2020



Data: CRU, Fertilizer Week, FAI, GTIS, IFA, port data

Brazilian imports of concentrated phosphate fertilizer fell from 2.1 million P_2O_5 tonnes in 2014 to 1.9 million P_2O_5 tonnes in 2015, with sales in 2015Q3 being particularly weak (reasons for this are described in some detail in *Chapter 1*). With credit in short supply, Chinese product has gained in popularity – particularly in the case of TSP. During the first-nine-months, 126,000 P_2O_5 tonnes of TSP was shipped from China to Brazil. This compares with just 38,000 P_2O_5 tonnes in 2014. Notably, this has largely come at the expense of **OCP** and **GCT**. Furthermore, much less DAP – popular with corn plantings – was imported in 2015, which hurt **Mosaic** and **OCP** the most. Their sales of DAP were down by 57,000 tonnes and 86,000 tonnes respectively between January and September 2015 relative to 2014. Based on available data, full year concentrated phosphate imports are estimated at 2.2 million P_2O_5 tonnes, a y-o-y reduction of almost 300,000 P_2O_5 tonnes.

*Although conditions are unlikely to improve immediately, the outlook for Brazilian imports remains strong through the medium-term forecast. Both **Yara** and **Mosaic** have invested heavily into building distribution networks in the country and we expect them to offer support to farmers where needed, in order to build their business. Moreover, with **Anglo Fosfatos** being put up for sale, the expansion at Catalao has been downgraded to speculative, lowering domestic production expectations. As such, we see Brazilian concentrated phosphate imports rising from 2.2 million P_2O_5 tonnes this year to 2.7 million P_2O_5 tonnes in 2020.*

Although **US** concentrated phosphate imports were estimated flat y-o-y for the first-nine-months of 2015 at 530,000 P_2O_5 tonnes, the product make up was different. More DAP was imported from **China**, **Russia** and **OCP**, at the expense of less MAP and TSP. Here again, **China** is believed to have made further gains over 2014, supplying the US with 147,000 P_2O_5 tonnes of concentrated phosphate during the first-nine-months, compared to 98,000 tonnes in 2014. However, we believe that this trend slowed down in 2015Q4, with less than 70,000 P_2O_5 tonnes of arriving from China in 2015compared to 125,000 P_2O_5 tonnes in 2014. Instead more MAP and TSP is estimated to have arrived from **OCP** in **Morocco** and the **Russian** exporters (**EuroChem** and **PhosAgro**).

*Our forecast sees US concentrated phosphate imports decline during the forecast from 740,000 P_2O_5 tonnes in 2015 to 633,000 P_2O_5 tonnes in 2020. While Morocco will undoubtedly look to export more to this market, once production starts up at **Wa'ad Al-Shamal**, **Mosaic** may look to supply **India** from **Saudi Arabia**. Instead more concentrated fertilizer will be available for sale in domestically in the US.*

Bangladeshi imports during the first-nine-months of 2015 increased by 8.8% y-o-y to 356,000 P_2O_5tonnes. While shipments from **OCP** and **IPL** (**Australia**) both held up, Tunisian supplies

of DAP and TSP fell by half during this period, to be replaced by **Chinese DAP**. Our view is that total DAP and TSP imports total 510,000 P_2O_5 tonnes for the calendar year, rising further through the forecast to 550,000 P_2O_5 tonnes by 2020. Meanwhile, in **Vietnam**, concentrated phosphate imports continued to grow sharply in 2015 reaching 390,000 P_2O_5 tonnes through September. This is 100,000 P_2O_5 tonnes more than during 2014 and is largely explained by an increase of DAP stemming from **China**. Our view is that full year imports totalled 500,000 P_2O_5tonnes, with 83% arriving from China. Despite the ramping up of capacity in the country, we are of the opinion that concentrated phosphate imports will remain above 500,000 P_2O_5 tonnes, through to the end of the forecast period.

Table 3.2: DAP, MAP & TSP trade matrix – 2015Q3, '000 P_2O_5 tonnes

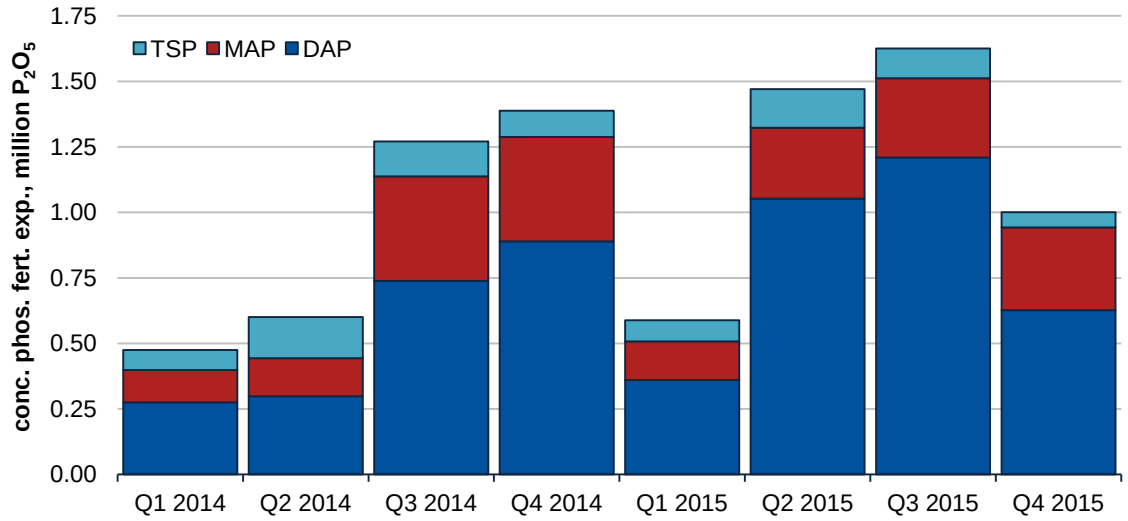
Exporters → ↓ Importers	CHN	JOR	ISRL	LIT	MEX	MOR	RUS	SAUDI	TUN	USA	*RoW*	**Total**
France	0	0	14	21	0	45	49	0	4	0	6	140
Germany	0	6	7	42	0	6	32	0	0	0	34	126
Italy	1	3	5	12	0	25	16	0	20	0	8	91
UK	0	2	0	17	0	28	25	0	1	0	5	78
USA	147	0	16	1	13	256	99	0	0	0	1	533
Canada	0	0	0	6	0	0	9	0	0	236	0	252
Mexico	44	0	0	0	0	5	0	0	0	96	11	156
Brazil	462	0	94	0	6	482	343	67	7	372	61	1,893
Iran	1	0	0	0	0	0	0	0	70	0	72	143
India	1,590	50	0	0	0	0	160	483	0	229	0	2,511
Pakistan	88	0	0	0	0	0	0	109	0	0	56	253
Bangladesh	109	0	0	0	0	111	0	14	57	0	65	356
Indonesia	197	0	0	0	0	0	0	0	0	0	18	215
Thailand	174	0	13	0	0	0	0	19	0	0	14	220
Vietnam	330	6	0	0	0	0	0	10	0	0	45	391
RoW	720	107	43	129	205	385	544	174	41	603	132	3,084
Total	**3,864**	**174**	**192**	**228**	**224**	**1,343**	**1,277**	**876**	**200**	**1,536**	**528**	**10,441**

Data: CRU, ANDA, Azotecon, CFMW, FAI, Fertilizer Week, IFA, GTIS, TFI, Company Reports

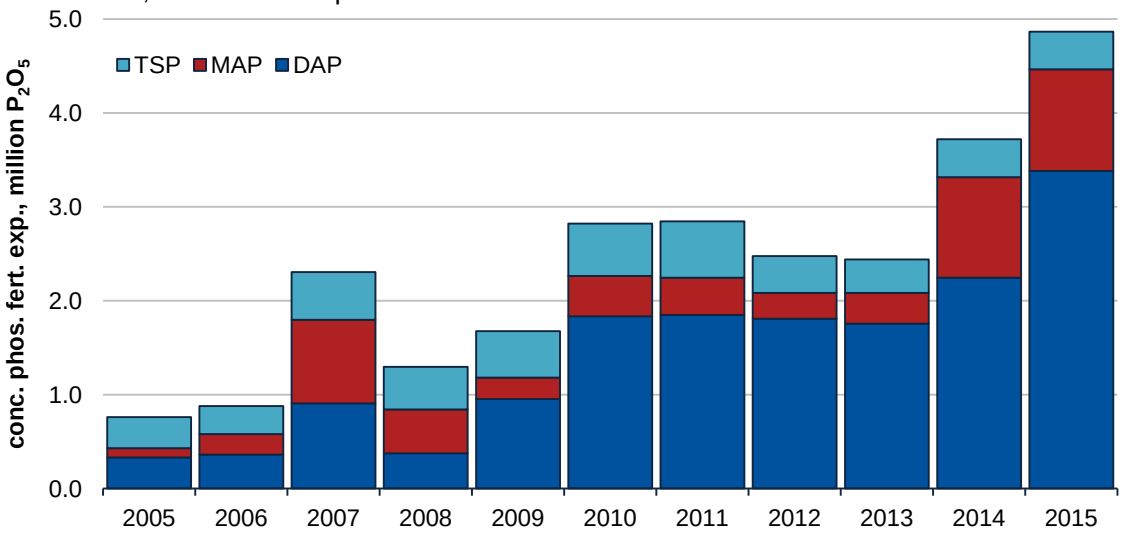
Shifting over to exports, the growth of **Chinese** shipments during 2015 have again been the major development in the traded market. Through September, exports of DAP, MAP and TSP amassed 3.8 million P_2O_5 tonnes, which exceeds the 2014 record of 2.3 million P_2O_5 tonnes by 1.6 million P_2O_5tonnes. Most of the additional product was shipped in the form of DAP targeting **India**. However, 15% more MAP y-o-y and 7% more TSP y-o-y was also shipped in 2015.

Chinese DAP, MAP and TSP exports, 2014 vs. 2015 forecast

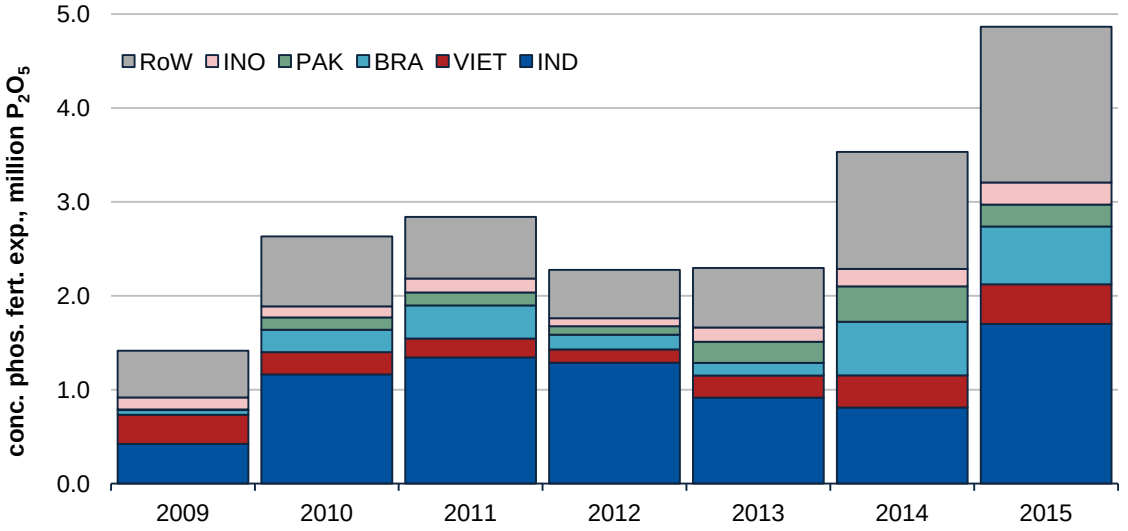
Quarterly DAP, MAP & TSP exports



Annual DAP, MAP & TSP exports



Annual DAP, MAP & TSP exports, by major market



Data: CRU, ANDA, CFMW, CIAFA, FAI, Fertilizer Week, GTIS, IFA, NFDC, TFI, company reports, port data

Chinese shipments to **India** had been on a downward trajectory since 2011, but following the introduction of the NBS reforms in 2014, they stood at 810,000 P_2O_5 tonnes, compared to 1.3 million P_2O_5 tonnes in 2011. However, following a renewed surge of purchases, this number now stands at.1.7 million P_2O_5 tonnes for 2015. Around 1.2 million tonnes of DAP was shipped from the **Guangxi** ports of **Fangcheng** and **Beihai** to **India**. While the former had previously been used by **Wengfu** and **Kailin** to house/ship product, today it is only used by **YUC**. By contrast, **Beihai** is only utilized by **Wengfu**, handling around 66% of its exports. A further 1.1 million tonnes DAP was shipped to India from ports in **Hubei** along the **Yangtze** River. Whereas many producers/traders use **Nantong**, **Nanjing** is primarily used by **Yihua** and **Wengfu**. Elsewhere product was also shipped from **Zhanjiang** (760,000 tonnes DAP from **Kailin**/ **Zhanua**), **Xiamen** (30,000 tonnes DAP from **Wengfu**), as well as various locations in **Jiangsu** and **Shandong**.

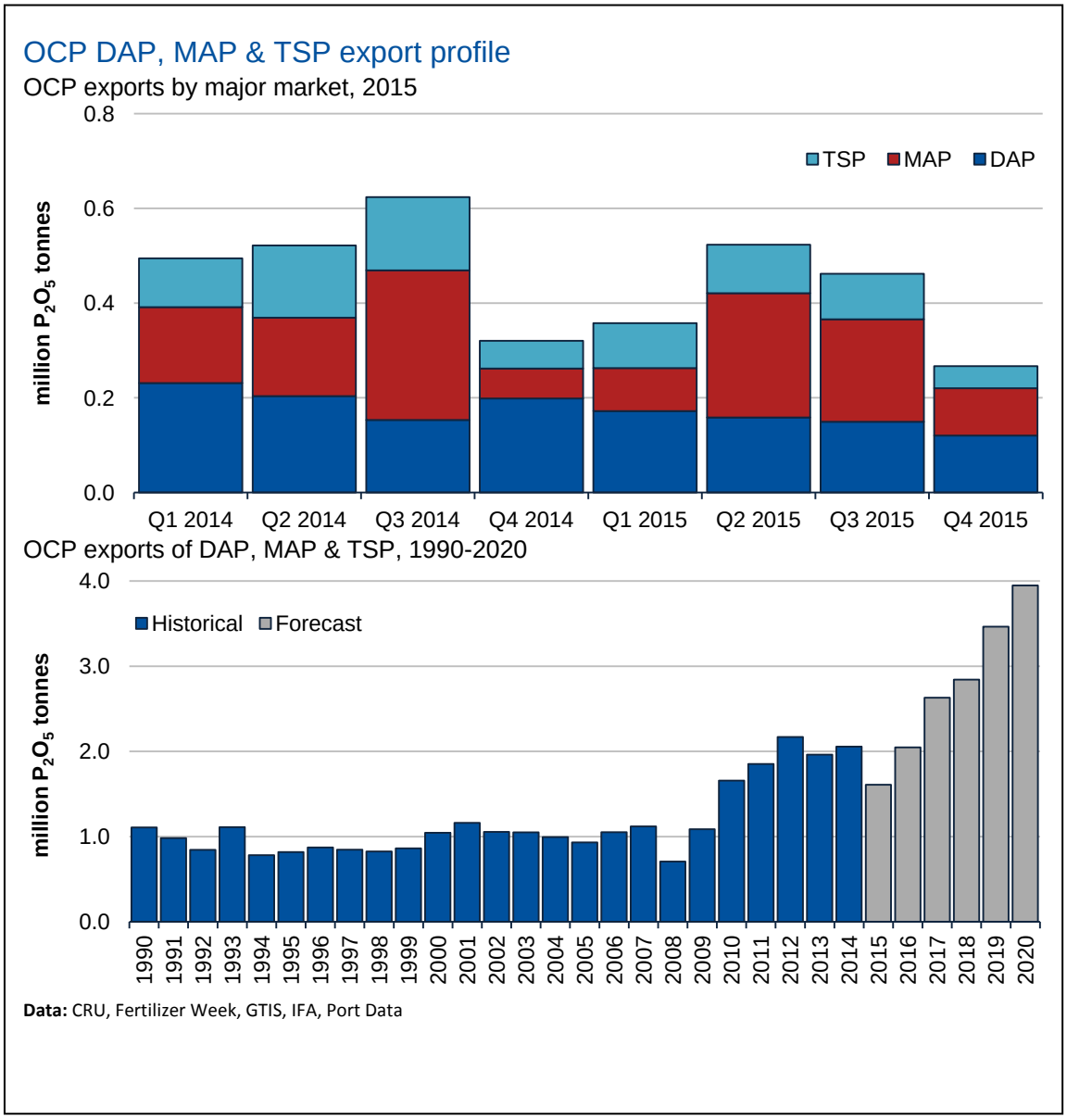
China's second largest market by volume is **Brazil**. During the first-nine-months of 2015 it shipped 462,000 P_2O_5 tonnes of in the form of concentrated phosphates. We estimate that this rose to 616,000 P_2O_5 tonnes for the calendar year as sales of MAP accelerated in 2015Q4. Since 2009, its shipments have risen by 566,000 P_2O_5 tonnes, as exporters have tried to diversify away from India. Elsewhere, China exported 421,000 P_2O_5 tonnes to **Vietnam** in 2015, and in excess of 200,000 P_2O_5 tonnes to each of the following: **Indonesia**, **Pakistan**, **Thailand** and the **US**. Only exports to **Pakistan** fell noticeably, by 142,000 P_2O_5 tonnes, due to a general reduction of imported DAP demand in favour of MGA for domestic DAP production.

In the future, Chinese exports of concentrated phosphates are set to fall gradually as competition from new export focused capacity intensifies. *It will be difficult to maintain their sales to Brazil and India given the additional product that will be targeting this market from Saudi Arabia, Morocco and the US. In general, the **BIG4** should be able to compete, if not on a cost basis, then on a social benefits basis, but the mid-tier and smaller scale producers are set to suffer. As such, by 2020 exports are estimated at 3.7 million P_2O_5 tonnes.*

US shipments of DAP, MAP & TSP during the first-nine-months of 2015 totalled 1.5 million P_2O_5 tonnes, compared to 1.6 million P_2O_5 tonnes in 2014. More DAP was placed into its largest export market, India, but less was sold to across the Americas. In **Brazil**, for example, its DAP sales were down by 125,000 product tonnes. Similarly, sales of MAP into **Canada** fell to 403,000 product tonnes from close to 500,000 tonnes in 2014.

Although the above estimates do not include NP+S exports, which for the first-nine-months of the year were estimated at 657,000 tonnes product (250,000 P_2O_5 tonnes) compared to 573,000 product tonnes (220,000 P_2O_5 tonnes) during the corresponding period in 2014, even when

included exports remain below those recorded in 2014. As such, we have revised our calendar year estimate for DAP, MAP and TSP below 2.0 million P_2O_5 tonnes, compared with 2.3 million P_2O_5 tonnes in 2014. Full year NP+S exports are estimated at around 760,000 product tonnes, compared 738,000 tonnes in 2014. *Our forecast sees exports falling gradually during the forecast. Shipments to from Florida to India are likely to be replaced by sales from the new JV in Saudi Arabia once up and running. While* ***Mosaic*** *is in a comparatively strong position in Brazil, owning and operating distribution assets, the intensity of competition will hurt. Sales to other areas in Latin America made moderate, but these should be offset to some extent by better domestic deliveries, which includes NP+S.*



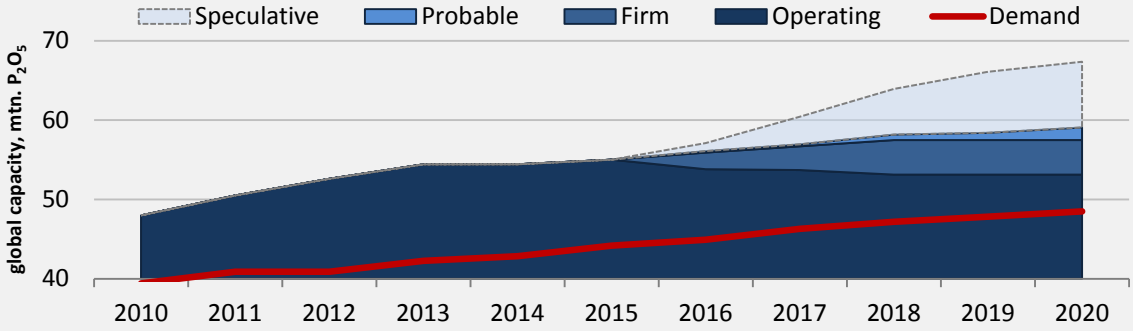
Moroccan shipments of concentrated phosphate fertilizer were down sharply during the first-nine-months of 2015, from 1.6 million P_2O_5 tonnes in 2014 to 1.3 million P_2O_5 tonnes. Here again the biggest losses were felt in **Brazil**, where DAP sales were lower and TSP sales were

shifted over to China. **OCP** has also not sold as much into the **US** as it would have hoped since **MissPhos** closed at the end of 2014. Indeed, its shipments through September 2015 were lower y-o-y as less MAP and TSP was required. As was the case of US exports, however, the concentrated phosphate fertilizer totals don't include NP+S, which in Morocco's case contain a higher P_2O_5 content and therefore does have an important impact. Through September 2015, around 190,000 P_2O_5 tonnes of NP+S had been shipped, mainly to Ethiopia and Brazil. So bearing this in mind when looking at the calendar year estimate, the y-o-y reduction is not quite as severe, standing at 1.8 million P_2O_5 tonnes, some 200,000 P_2O_5 tonnes lower than in 2014. *In 2015Q4 the first of the new integrated projects were commissioned. Three more are set to follow adding a total of 4.0 million tonnes of DAP equivalent capacity over the next 18 months. Therefore OCP will have to start to ramp up their exports if they hope to run the operations anywhere near nameplate capacity. Achieving success in large consumption markets will be a key component of this strategy, so we do expect a ramping up of sales to **India** and **Brazil**. By the end of the forecast period, their exports of concentrated fertilizer are set to be almost double what they were in 2015.*

Two other countries are estimated to have shipped in excess of a million tonnes of concentrated phosphate on a P_2O_5 basis in 2015: Russia and Saudi Arabia. **Russian exporters** capitalized on a much improved cost position, by growing their exports to 1.5 million P_2O_5 tonnes, an increase of 186,000 P_2O_5 tonnes. Although less was sold into the Americas y-o-y, PhosAgro's return to India saw the shipment of 160,000 P_2O_5 tonnes to the country, having been absent from it for some time. Similarly, MPC exports to India totalled 700,000 P_2O_5 tonnes, taking their annual volumes to 1.1 million P_2O_5 tonnes, compared to 1.0 million P_2O_5 tonnes in 2014. *While both exporters enjoyed growth in 2015, the future holds different outcomes for the tow countries. Russian exports are expect to moderate somewhat. Not only are we expecting more product to be sold domestically in the CIS, but despite their low site cost position, they too will be affected by the intensification of competition. In the case of Saudi Arabia, the new Wa'ad Al-Shamal project is expected on-stream in 2017Q4, which will double its export availability. While its cost position has been eroded due to lower raw materials prices around the world, it will continue to be one of the lowest cost operations around, with convenient access to one of the largest target markets around the world: India. As such we expect its exports to rise to 2.5 million P_2O_5 tonnes by the end of the forecast period.*

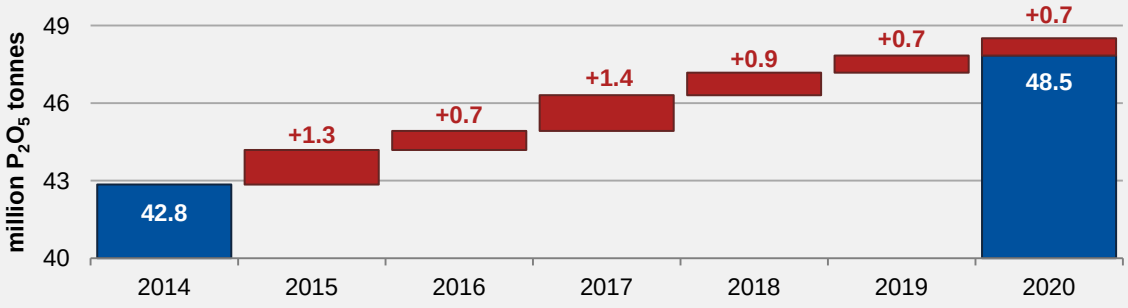
3.2 Global supply/demand position

Phosphoric acid supply/demand position, 2010-2020



- Global phosphoric acid capacity in 2015 totalled an estimated 54.9 million P_2O_5 tonnes, exceeding global consumption of 44.2 million P_2O_5 tonnes by 10.7 million P_2O_5 tonnes.
- Excluding 2007, phosphoric acid capacity has increased annually since 2002. Investment levels are high and utilisation rates have averaged at 78% in the last fifteen years. In 2015 global utilisation rates reached an estimated 80% and are forecast to reach 83% by 2020.
- CRU has identified fifty-six phosphoric acid projects (including expansions), which if they were all to be commissioned by 2020, could increase global capacity by close to 14.2 million P_2O_5 tonnes.
- When considering the seventeen *firm* and *probable* projects, which contribute to our base-case capacity forecast, 5.9 million P_2O_5 tonnes is expected to be on-stream by 2020, close to 12 % of estimated capacity in 2015. *Firm* capacity additions (4.4 million P_2O_5 tonnes) will be processed in captive operations largely confined to North Africa, the Middle East and China. Morocco's OCP will therefore have the flexibility to export more product volumes should it be required.

Global phosphoric acid consumption forecast components, 2014-2020



- Global phosphoric acid demand is forecast to reach 48.5 million P_2O_5 tonnes by 2020 and with the continued investment in phosphoric acid facilities; total capacity will exceed the global requirements by an estimated 18%. This disparity is projected to remain at around 10.0 million P_2O_5 tonnes by 2020.
- Growth in global crop area, infrastructure investment to support agriculture expansions in South America, and China's shift away from agricultural self sufficiency targets will all support growth in global phosphate fertilizer demand through to 2020.

Data: CRU

3.3 Medium-term outlook for phosphate fertilizer prices

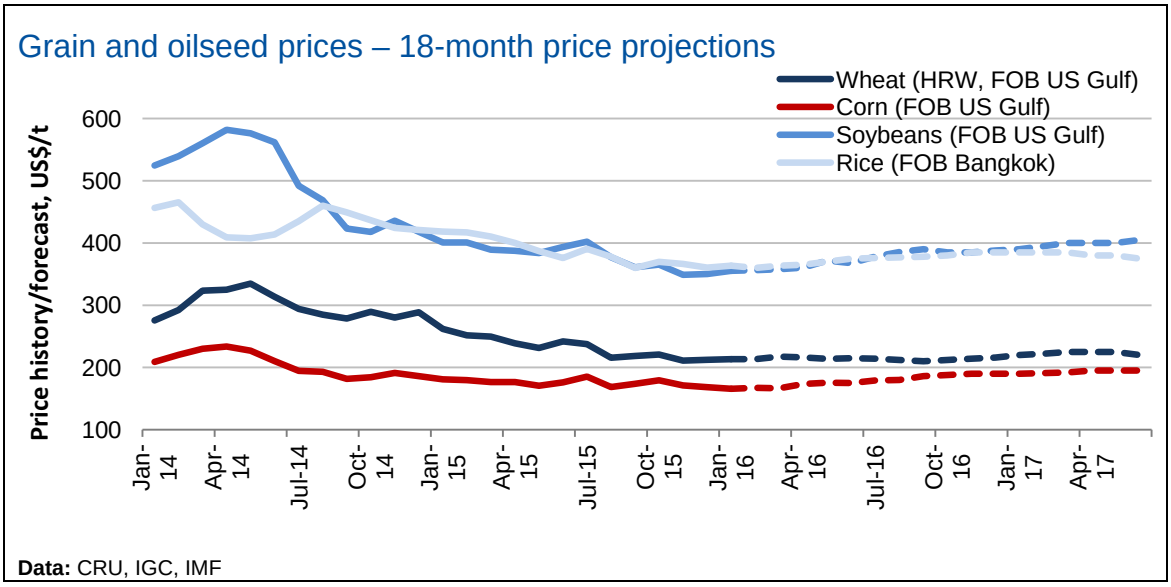
3.3.1 Introduction and methodology

The basis for CRU's price analysis for the phosphate industry is the price assessment conducted by CRU's **Fertilizer Week**. DAP remains the predominant phosphate fertilizer product, accounting for an estimated 16.4 million P_2O_5 tonnes of demand in 2015. In addition, due to DAP tending to be far more standardised than MAP, it is the most traded phosphate product in the global marketplace. A typical unit of granular DAP contains 18% N and 46% P_2O_5, whereas MAP grades vary between 10-13% N and 42-61% P_2O_5. From a geographical perspective, DAP producers based in Florida have historically played an important role in phosphate production and trade for many decades. Although their influence has waned in recent years, they remain important players and the FOB Tampa price remains a benchmark for world DAP prices. In *Phosphate Fertilizer Market Outlook January 2016 Edition* the MAP, TSP and phosphoric acid prices are all derived from the Tampa DAP price.

3.3.2 The underlying drivers

Crop prices

High inventory levels mean there are only modest gains in grain and oilseed prices to be expected over the coming eighteen months. Wheat is expected to suffer an extended period of weakness due to a very competitive export market. This is dependent on the absence of any significant weather events occurring and causing crop losses.



Data: CRU, IGC, IMF

Longer-term prospects are more favourable, particularly for corn and soybean prices as demand increases and inevitable crop losses occur. The last two years of agricultural production have been characterised by a lack of supply shocks, which often support prices. These events are impossible to factor into price forecasts, and if a drastic climatic event were to occur in a major crop production region, prices would respond. However, the high stock situation within the grains and oilseed market should cap any sharp price spikes over eighteen month outlook.

Prices towards the end of the five year outlook period will be supported by increasing populations and calorie requirements. Commodities used for animal feed production, mainly corn and soybeans; have more price upside, as diets in developing countries evolve to include more animal protein.

Raw material prices

Phosphate Rock: OCP succeeded in raising the **FOB MOROCCO 68-72% BPL** price in September from US$115/tonne to US$123/tonne. Prices had remained unchanged at US$115/tonne since 2014Q3. Aside from this change, phosphate rock prices remained relatively unchanged in 2015. JPMC raised its low-grade (68-72% BPL) price by US$3/tonne and its high-grade (73-75% BPL) price by US$1/tonne in May. **CFR India** (71-75% BPL) prices edged up as OCP increased prices in September, increasing by US$3/tonne on average to US$146/tonne.

CRU has been arguing for some time that rock prices have been undervalued at US$115/tonne **FOB MOROCCO**, as prices have been low compared to phosphoric acid prices at above US$800/tonne, as they were in 2015. However, this price drop alters this situation. We expect DAP price falls to put pressure on phosphoric acid prices in 2016. Phosphate rock prices are likely to be affected too. Non-integrated MAP/DAP producers that import rock will be increasingly incentivised by the new pricing landscape to substitute rock for finished product for re-sale, or simply to reduce operating rates. This demand side pressure is likely to push prices down and DAP price falls affecting rock demand will also be exacerbated by the fact that DAP stocks in India are understood to be high – above 2 million tonnes. We are forecasting a 5.2% price fall for phosphate rock **FOB MOROCCO** by 2016Q2.

Higher quality rock markets are expected to perform better in the short-term. OCP has increased prices for its higher quality rock from Bou Craa. Though we expect prices to fall, they will fall from this elevated level, and therefore reach the low US$130/tonne level last seen in 2014, whereas 68-72% BPL prices are expected to be below 2014 levels by that point. This also goes for igneous rock exports from Russia, prices for which have also increased in 2015H2.

However, we expect Russian prices to fall further as new rock capacity will come online at PhosAgro and Acron's mines in 2016 and 2017.

Over the medium-term, there are considerable downside risks to phosphate rock prices from DAP price falls. We do not expect DAP prices to recover from Q4 2015 and 2016 levels, and expect further prices falls in 2018 and 2019. However, we are currently forecasting healthy rock prices relative to end product prices. This expectation is based on our assumption that OCP will look to protect rock prices and will scale back export volumes as prices are threatened, instead focusing on establishing market share in fertilizer markets. This achieves maintenance of rock prices, OCP's historical core business, allows the company to focus on its new products and also has the ancillary benefit of narrowing the margins and reducing the competitiveness of non-integrated competitor fertilizer producers.

However, we do expect rock prices to fall in 2018, as considerable new capacity is added in that year. Most significantly, we are forecasting the addition of 4.1 million tonnes of capacity at the Hinda project in Republic of Congo, all of which will be sold on the traded market. OCP is also introducing new rock capacity in that year, as is EuroChem in Kazakhstan.

Sulphur/sulphuric acid: sulphuric acid prices have been hit by a combination of reduction in demand from the copper sector and increased supply as smelters return from extended maintenance. Prices in Chile have been concluded in the US$50-60/tonne CFR range for annual contracts, which is a significant reduction on the US$70-80/tonne achieved in 2015. Whilst demand for imported acid in the US Gulf and Brazil increased in 2015, prices remained weak. The weakness was, in part, driven by the high availability of sulphuric acid from El Boleo sulphur burner, which forced many exporters to discount prices. Into 2016, Mexican acid availability is expected to have a less of an impact on prices, but the return of supply from the PASAR smelter in the Philippines and the contraction of import markets in Cuba, Namibia and India are expected to keep prices depressed.

Sulphur prices have begun the expected move downwards as global supply has increased. The major driver of new sulphur production is the increase in capacity in the Middle East. The weakness in the phosphates sector is also having a negative effect on price levels, which has been illustrated by the sharp drop in the Tampa sulphur benchmark. In early 2016, supply increases in the UAE and Saudi Arabia are taking longer than expected to reach capacity which is triggering some tightness in the market. However, the planned commissioning of further capacity in Qatar, Kazakhstan and China will cause the tightness to be short lived.

Ammonia: demand weakened further and faster than previously anticipated in 2015Q4. This, combined with stable Caribbean output, boosts in North African supply and falling marginal costs, triggered an ammonia price collapse that saw Black Sea prices fall from US$395/tonne at the beginning of October to US$275/tonne at the turn of the year. Downwards pressure continues to be felt in 2016Q1 and we are expecting prices to remain weak in the near-term with Mosaic's phosphate production cutbacks and reduced ammonia buying at Tampa causing the most concern for ammonia producers. Black Sea prices at current levels barely cover production costs in Ukraine and we would expect to see reduced output from the country's ammonia producers (OPZ and Dneipro), should prices fall further.

There are few signs of rebounding ammonia prices in the short-term as supply continues to outweigh weak demand. While expectations were for the onset of the direct application season in the US to provide some outlet for excess supply, a positive response in prices has not yet materialized, despite what looks to be a better-than-normal application season.

Weak oil prices continue to reduce producer costs in Europe, but not fast enough to offset the impact of recent ammonia price falls on producer margins in East Europe; as mentioned, prices below US$250/tonne FOB look unprofitable for the Ukrainians this year. Our outlook for the year is for an improvement in prices from current lows, as the market is not far from balancing, should ammonia producers in Eastern Europe throttle production in response to low prices. The outlook for 2017 is more bleak, as new merchant ammonia capacity from Donaldsonville and Dyno Nobel in the US and Novgorod and Cherepovets in Russia will erode market fundamentals and deepen oversupply if we do not see a recovery in ammonia demand from the industrial (capro, ACN, etc.) and phosphate markets.

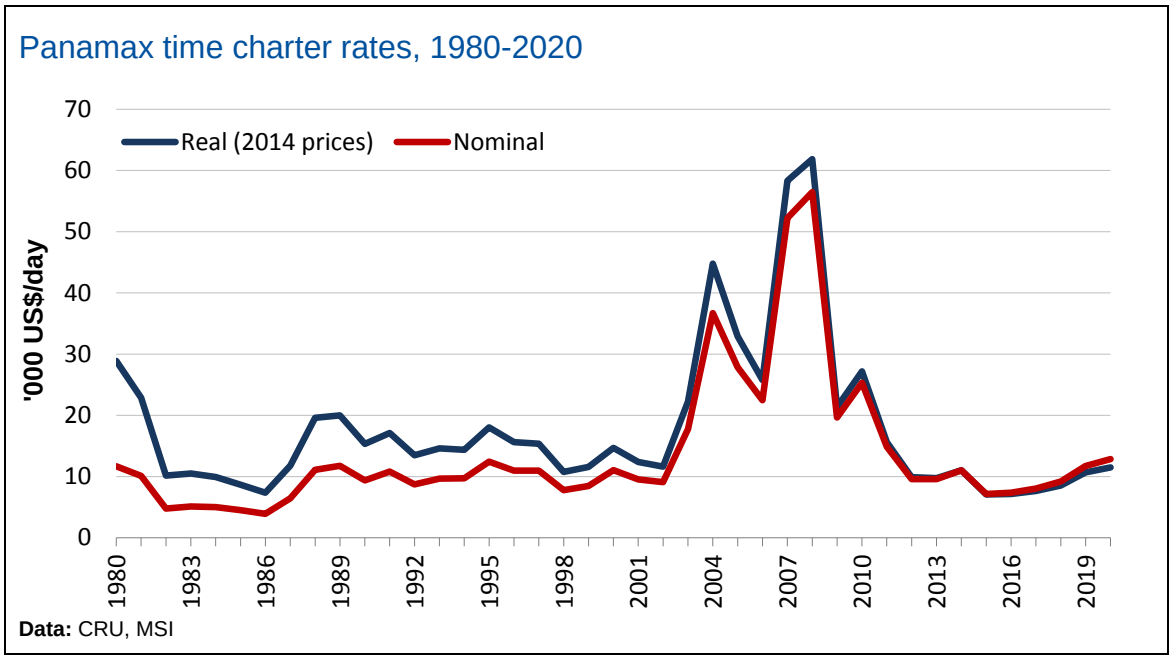
The outlook for freight rates

The **Baltic Dry Index** fell below 500 in November, which was a new record low. Prospects for ship owners continue to look bleak as prices look set to bounce along the bottom for some time yet. The market is oversupplied and there are not many ships which are obvious candidates for demolition. Low metals prices make scrapping less attractive and low oil prices reduce the incentive to scrap the less fuel efficient ships. With 2016 set to see the addition of more than 70 million *Dwt* of capacity, the problem of oversupply shows no sign of abating soon.

Enduring overcapacity means prices are broadly set to stay low into 2016. Not only is there an oversupply of ships, demand has remained somewhat sluggish of late, with GRIs having only a transient effect on prices. Against this backdrop, *Drewry's Global Freight Rate Index* – a weighted average of freight rates on major shipping routes – hit a record low in October.

Exports to Europe from Asia, Australia and Brazil are giving carriers cause for concern but demand from the US looks healthier.

The combination of oversupply and weak demand means firms are being forced to take more extreme measures to try and turn a profit. For example, Maersk Line has recently announced plans to reduce investment and staff numbers by at least 4,000 employees in the next couple of years as it looks to cut costs. Alliances between firms on shipping routes have become common as another method of saving money.



Furthermore, a number of shipping lines are currently engaged in merger discussions. Notable amongst such talk is the announcement from French firm CMA CGM that it will purchase Singaporean firm NOL, as well as a potential merger between COSCO and China Shipping. Given the market fundamentals, container rates are set to remain under pressure for some time. For the Trans-Pacific round-trip, we expect the average rate to pick up only slightly from an average rate near US$2,000/TEU in 201,5as demand sees modest improvement to US$2,200/TEU in 2016.

The outlook for exchange rates

Policy normalization will propel the dollar higher: since the end of 2014, the US dollar has appreciated by 8.7% on a trade-weighted basis, with gains concentrated against emerging market currencies. As the Fed moves to raise interest rates while other major central banks continue to pursue accommodative policies, the US dollar is more likely to appreciate. Despite its rise already in 2015, we expect additional US dollar appreciation of 5% to 6% in 2016.

South American currencies unlikely to gain much ground: most of the region's currencies have lost significant ground against the US dollar due to a combination of weak commodity prices, anticipation of higher US interest rates and a loss of export prospects to China. The recent elections in Argentina all but guarantee a much weaker peso in 2016 as the country moves to open its markets and rejoin the international community. In Venezuela, where the opposition has gained control, we could see the beginning of the end of the unrealistic exchange rate regime currently in place. Given that we do not see significant gains in commodity prices in 2016, or a marked acceleration in Chinese growth prospects, the region's currencies are unlikely to make significant gains against the US dollar.

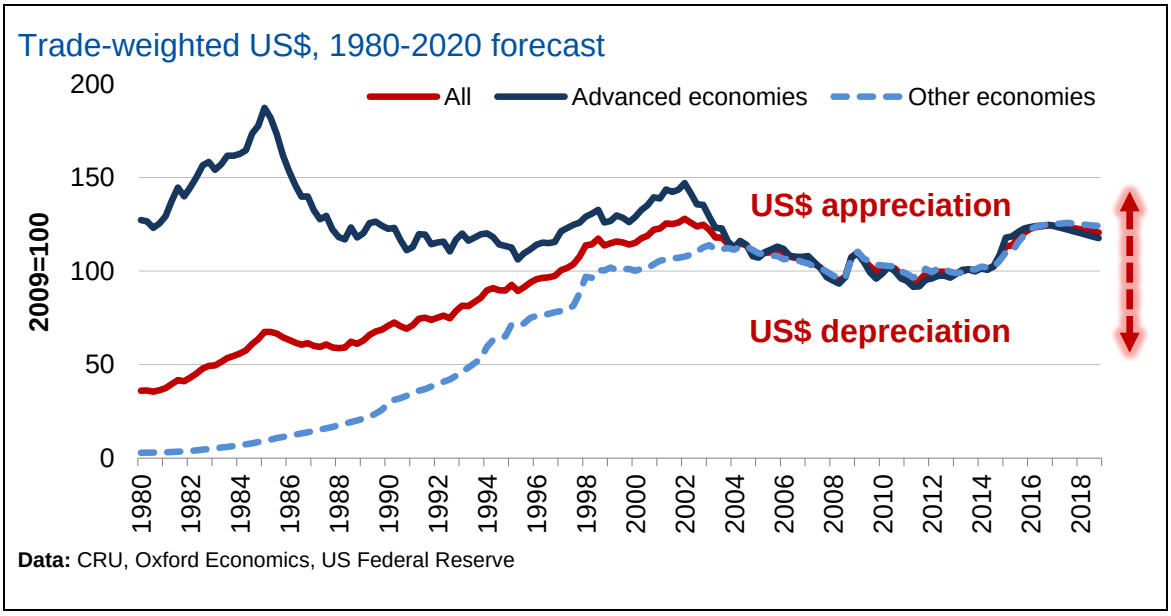
RMB to ease further in 2016: capital outflows rose sharply in November, partly driven by expectations of further RMB depreciation after the currency joined the IMF's SDR Basket. Indeed, the RMB has been depreciating against USD since early November. To provide support for the RMB the PBoC has resumed selling FX. We are unlikely to see a signification depreciation of the RMB given the government's objective of promoting international use of the currency. However, we still expect the RMB to drift lower and average 6.56 against the US dollar in 2016 as US rates rise and those in China fall further.

Rock steady for the Indian rupee: CRU expects the rupee to trade near its current level of 66 to the US dollar into next year as the market has already priced in much of the effect of US interest rate moves in the near term. In addition, as the central bank is keen to meet short-term inflation targets, it is unlikely to allow the rupee to slide much from its current level. Risks to our forecast are primarily from domestic issues rather than the US. Investors have kept faith in the government, which is taking steps to facilitate capital inflows and has talked of reforms aimed at improving potential growth in the country. However, next year's State elections could undermine these efforts and see capital leave the country, potentially weakening the rupee in the process.

US Fed and domestic politics pull currencies in South East Asia: subdued commodity prices were a significant reason for weakness in the Indonesian rupiah (IDR) and Malaysian ringgit (MYR) in 2015, but anticipation of US monetary policy has contributed to increased volatility. Whilst CRU believes US rate moves to be largely priced in already, there seems little prospect of material appreciation in the MYR in the near term given Malaysia's domestic issues. As regards the IDR, Indonesian interest rates will likely be brought down next year as inflation weakens. CRU expects this to contribute to modest weakening of the IDR in 2016H1 but ultimately we see it broadly appreciating into the medium-term.

ECB sends euro on a rollercoaster ride: in November, strong hints by Mario Draghi pointing to further easing by the ECB pushed the euro down to 1.06 (€ per $), the lowest level since April. However, markets overestimated the extent to which the ECB would ease monetary policy and there has been a sharp correction to 1.09 as a result. Nonetheless, the easing by the ECB was considerable and with the US Federal Reserve set to raise interest rates in December, the monetary policy divergence between the Eurozone and the US is a major factor driving the exchange rate. CRU expects the euro to reach a low point of 1.05 in 2016H2. Thereafter, we are forecasting a gradual appreciation to 1.14 by 2020.

Rand searching for bottom: low commodity prices, the prospect of rising US interest rates and a combined fiscal and current account deficit are all contributing to current rand weakness which will continue in the short-term as these three factors are likely to persist. However, once a bottom has been reached, which CRU expects in 2016H1, the rand should begin to appreciate since interest rates are set to rise in South Africa, whilst CRU commodity price forecasts suggest the price of several key South African exports will start to improve. Nevertheless, recent political developments have caused a loss in confidence that adds significant downside risks to our forecast and may undermine more fundamental factors. While our shorter-term currency forecasts are influenced by cyclical factors, our longer-term forecasts are predicated on equilibrium rates, estimates for which are derived from analysis of structural factors.



Data: CRU, Oxford Economics, US Federal Reserve

Our equilibrium exchange rates evolve over time according to relative inflation rates and the relative pace of economic development, as measured by whole economy productivity growth. These two drivers can pull in opposite directions. Namely, relatively high inflation versus the US causes depreciation against the US$ while, in general for developing economies, relatively rapid economic development causes appreciation against the US$. The net outcome for the

forecast depends on the balance of these two factors. Although most of the emerging market economies are projected to experience relatively rapid productivity growth, in a number of cases this appreciating effect is more than offset by relatively high inflation. Consequently, Brazil, Russia and South Africa, for example, are all projected to see trend depreciation in their nominal exchange rate. However, in the case of China, productivity growth is the more dominant factor and the respective nominal exchange rates are projected to show trend appreciation.

For Europe and the UK both inflation and productivity growth rates are assumed to be similar to those of the US, meaning that long-term nominal exchange rates are broadly flat versus the US$. In Japan, inflation is projected to remain relatively low compared to that in the US and this drives a gradual appreciation of the yen in nominal terms.

3.3.3 The outlook for phosphate prices through to 2020

Recent price developments

At the time of writing, the **FOB TAMPA DAP** price stood at US$375/tonne, a US$60/tonne reduction on prices from October 2015. **FOB** prices in **NORTH AFRICA** have again held up better at US$445/tonne as sales into Europe have been prioritized over other destinations. That said, their grip over MGA markets seems to be weakening, as the **CFR INDIA MGA** benchmark fell by US$95/ tonne P_2O_5 to US$715/tonne P_2O_5 for 2016Q1. The **CFR BRAZIL MAP** benchmark was assessed at US$365/tonne at the end of January as traders have opted to wait it out for further price reductions. Developments during the past quarter are described in more detail below:

DAP prices continued to slide through November as demand for phosphate fertilizer started to weaken. With concerns growing over rising stock levels, deliveries into India all but dried up, totalling 180,000 product tonnes for the month compared to an average of 790,000 product tonnes /month between April and October. The moderation quickly put pressure on the **CFR INDIA DAP** benchmark, which fell to US$418/tonne by month-end from an average of US$448/tonne in October, as well as other DAP benchmarks. Meanwhile, the **MAP CFR BRAZIL** benchmark, which has been expected to show some resilience through November and December, fell as MAP supplies to Brazil (outside of China) failed to recover earlier lost ground. Instead, any remaining optimism turned sour as dryness delayed the *safrinha* soya plantings, while the lack of available credit continued to hurt the farming community. Although demand in the aforementioned markets was not particularly strong through November, perhaps the most significant impact on pricing was felt as result of the commissioning of new capacity. During November 2015 OCP finally started up granulation at the first of its four new projects in

Jorf Lasfar – JPH1. Also known as the Africa Unit, JPH1's focus is understood to be supplying the continent with NPS and NPK, which should offer some support for traditional DAP/MAP markets. However, given that it is capable of producing 1.0 million tonnes of DAP equivalent each year, it will also have to place product elsewhere.

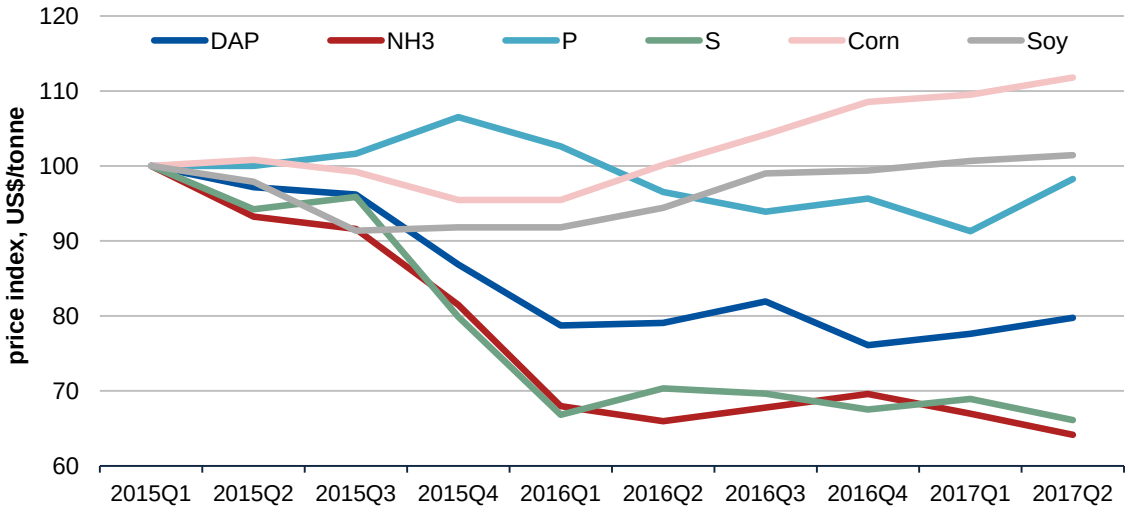
December is usually a slow month for demand and 2015 was no different. In China, local demand for the upcoming spring application season was estimated weaker through December than in recent years, as lower crop prices started to squeeze farming budgets. While stocks were not yet a serious concern, with DAP stocks believed to be around 25-30% of their potential, there did not appear many potential outlets. In India, for example, port arrivals show that just 222,000 tonnes DAP arrived in the country through December, it itself struggled to cope with its own stocks. According to the FAI, Indian port stocks were close to 600,000 tonnes DAP and 1.0 million tonnes NPK at the end of December 2015, well in excess of corresponding volumes in 2014 0f 167,000 tonnes DAP and 468,000 tonnes NPK. As such, DAP benchmarks came under renewed pressure through the month. The **CFR INDIA DAP** benchmark fell by a further US$12/tonne m-o-m to an average of US$411/tonne, while the **FOB TAMPA DAP** benchmark fell below US$400/tonne for the first time since December 2013. Notably, **MGA CFR INDIA** price for 2016Q1 was also agreed lower in December at US$715/tonne P_2O_5, a reduction of US$95/tonne P_2O_5. This was important for two reasons; one, it is the first q-o-q reduction for phosphoric acid prices since October 2013 when they fell by US$106/tonne P_2O_5 to US$609/tonne P_2O_5, and two, it was agreed only for one quarter, as opposed the half yearly agreement that had become the norm in recent years. One reason for this may have to do a loosening of MGA availability outside of Morocco. Indeed, the high MGA prices that have prevailed in recent years have attracted the attention from a few newcomers, including Duc Giang in Vietnam, which is now making regular deliveries into India, and possibly China. In the case of the latter, they had not shipped any MGA to India yet, but with the Chinese authorities announcing that that they would remove the RMB300/tonne solution (US$45/tonne) tariff on phosphoric acid exports for the 2016 calendar year, it may well be on the radar.

Following the price reductions in November and December, there was a feeling that phosphate prices may have fallen to a level that would encourage renewed purchases through January 2016. However, even with the **CFR BRAZIL MAP** benchmark falling to US$365/tonne in January, underlying demand has remained weak, particularly in Latin America. Instead, traders have held off in anticipation of further cuts and they may not be too far off: at the time writing the **CFR TAMPA AMMONIA** benchmark for February had been lowered by US$40/tonne to US$310/tonne, while the **FOB TAMPA SULPHUR** benchmark was also cut to US$95/tonne

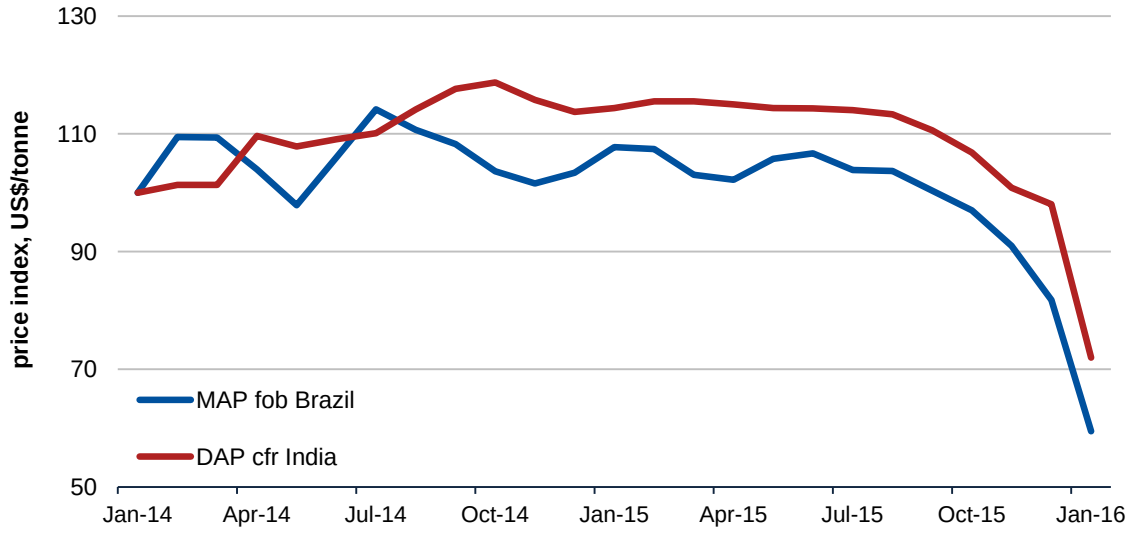
for 2016Q1, a reduction of US$15/tonne on the previous quarter. Meanwhile, in the case of rock, OCP announced on the 27th that their **FOB MOROCCO ROCK** prices would be US$10-20/tonne lower across the board in 2016Q1. While the market waits for demand to respond, producers have started to take matters in their own hands. Having cut back on operating rates in 2015Q4, Mosaic took unprecedented steps by moving into the US barge market as a buyer during January, repurchasing six barges at US$329/short tonne to prop up prices. Meanwhile in China, both YUC and Kailin both announced DAP production cuts, removing as much as 200,000 tonnes of product from the market during February.

Price development components, 2014 & 2015

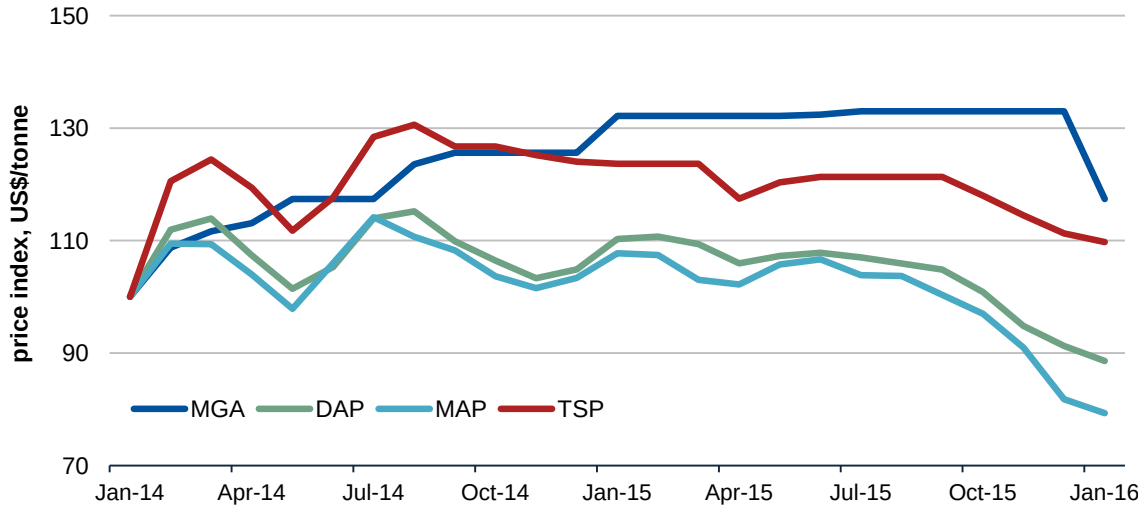
DAP fobTAMPA - price forecast variables, 2015Q1 - 2017Q2



Concentrated phosphates - performance of different benchmarks



Concentrated phosphates - MGA vs. DAP, MAP & TSP*



Data: CRU; **Note:** **MGA = cfr INDIA, DAP & TSP = fob MOROCCO, MAP = cfr Brazil*

Short-term price outlook

With the prospects for India and Pakistan returning to the market early in 2016 increasingly unlikely, given the large stock levels prevailing in both countries, DAP demand is set to remain under pressure. Considering the aforementioned reductions in raw materials pricing, we view that DAP prices have further to fall in 2016Q1. Our base-case forecast sees the **FOB TAMPA DAP** benchmark contract to a quarterly average of US$380/tonne from US$419/tonne in 2015Q4. FOB prices in Jordan and Saudi are set to remain around the US$400/tonne mark, accounting for their proximity to India, but also a slight improvement in their sales during March. In North Africa, OCP prices are also set to fall, but by a smaller margin as the limit sales to the European market, which trades at a premium to other bulk fertilizer markets. In Brazil, an anticipated improvement of purchases has so far failed to materialize and consequently MAP prices are also set to weaken. Our 2016Q1 **CFR BRAZIL MAP** price is estimated at US$373/tonne, which is US$47/tonne lower than the average for 2015Q4.

On an **FOB**-basis, the **TAMPA MAP** benchmark is set to have a slight edge over **RUSSIAN MAP** benchmark, given that Mosaic now owns distribution capacity in Brazil. Our view is that in order for the Russian exporters to grow their market share in Brazil, they will need to rely on discounting product. Perhaps most concerning in the MAP export market, is the lack of domestic demand for NPK in China. As Chinese 11-44-0 powder is often used as a feedstock for local NPK production, this is product that may build fast at ports. This together with the Chinese authorities' plans to reform corn support prices – that may see local prices fall to half their current levels – could well add further pressure to a underlying fundamentals. Rounding up the concentrated phosphate fertilizer markets, **TSP FOB MOROCCO** prices are set to fall to US$335/tonne in 2016Q1 from USUS371/tonne in 2015Q4.

During 2016Q2 we expect a slight improvement in phosphate fertilizer prices across the board as demand picks up in the northern hemisphere ahead of summer plantings. In the case of **MGA**, with contracts shifting back to quarterly agreements in 2016, the **CFR INDIA** benchmark should more closely relfect developments in ammoniated phosphate prices. That said, our cost estimates indicate the **CFR INDIA MGA** price would have needed to fall to US$660/tonne in order to be in line with our estimate for DAP prices during 2016Q1. For 2016Q2, MGA prices would have the scope to fall to US$690/tonne, based on our forecast for **CFR INDIA DAP** prices of US$418/tonne, but our forecast sees them benefiting from the beter market sentiment. As such, our forecast sees the **CFR INDIA MGA** benchmark recover to US$720/tonne.

While Brazil will not approach its main buying season until mid year the **MAP CFR BRAZIL** benchmark is expected to move upwards, driven by an improvement on MAP pricing in the USA. For 2016Q2 the **FOB TAMPA MAP** benchmark is forecast at US$396/tonne.

Table 3.3: Quarterly concentrated phosphate fertilizer price forecast

	2015			2016				2017	
US$/tonne, Nominal	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
DAP									
FOB TAMPA	469	464	419	380	382	395	367	375	375
FOB MOROCCO	499	492	469	441	423	425	403	415	415
FOB JORDAN	473	471	444	405	408	417	385	382	382
FOB SAUDI ARABIA	478	469	423	395	405	418	386	384	384
CFR INDIA	489	472	427	405	418	426	393	394	394
MAP									
FOB RUSSIA	473	470	429	377	379	396	365	377	377
FOB TAMPA	471	466	421	380	382	400	367	380	380
CFR BRAZIL	489	479	419	373	393	410	379	389	389
TSP									
FOB MOROCCO	387	393	371	335	338	340	307	304	304
Phosphoric Acid									
FOB MOROCCO	778	780	780	785	695	689	675	680	680
CFR INDIA	805	810	810	715	721	715	701	706	706
CFR NW EUROPE (low F/Fe)	945	950	950	900	902	890	809	810	810

Data: CRU, Fertilizer Week

Moving into the second half of the year, all eyes will be on the Indian subcontinent and developments of the 2016 monsoon. Last year, the monsoon arrived on time but failed to deliver through August and September, contributing to a building of stocks. For the January 2016 forecast, our base-case sees a continued drawing down of stocks during 2016H1, and provided the rains arrive in time and in line with long-term averages, Indian DAP demand is set to remain above 4.0 million P_2O_5 tonnes. Although this would represent an 11% y-o-y reduction, even at this reduced level, consumption would remain above volumes recorded during 2013 and 2014. If this were to occur in tandem with a improvement of Brazilian purcahses through 2016Q3, we could see a temporary tightening of demand fundamentals that should spur prices upwards. However, we are only forecasting modest increases through the quarter, with the **CFR INDIA DAP** and **CFR BRAZIL MAP** benchmarks increasing by US$8/tonne and 17/tonne respectively, as the comissioning of the second JPH project keeps a ceiling on an further grwoth.

During 2016Q4 prices are again forecast to fall, with demand in the key planting regions drying up. Moreover, in 2016Q4 OCP is scheduled to bring into production JPH III, which would mean that three of four of the new projects would now be operating. As such **FOB TAMPA DAP** price is set to fall by US$28/tonne to US$367/tonne. While the added capacity is considerable, we do not expect prices to fall to the US$350/tonne level until 2018 once the new MWSPC plant has had a chance to ramp up its production.

Medium-term price outlook

Lower raw materials input costs coupled with weaker demand/supply fundamentals have led to a downward revision of phosphate fertilizer prices across the board. Since the publication of the *PFMO October 2015 Edition*, the **FOB TAMPA DAP** benchmark has been lowered by US$45/tonne for 2016. For 2018-2019 the spread is US$60/tonne, before narrowing to US$35/tonne in 2020.

Table 3.4: Annual phosphate fertilizer price forecast

US$/tonne, Nominal	2015	2016	2017	2018	2019	2020	Δ 2015-2020
DAP							
FOB TAMPA	459	381	388	350	355	390	↓
FOB MOROCCO	492	423	399	360	365	402	↓
FOB JORDAN	467	404	385	347	350	386	↓
FOB SAUDI ARABIA	462	401	382	348	353	388	↓
CFR INDIA	465	410	395	358	361	396	↓
MAP							
FOB RUSSIA	463	379	384	347	351	386	↓
FOB TAMPA	460	382	389	351	359	392	↓
CFR BRAZIL	471	389	395	358	367	400	↓
TSP							
FOB MOROCCO	388	330	306	280	283	316	↓
Phosphoric Acid							
FOB MOROCCO	774	711	662	565	564	627	↓
CFR INDIA	808	713	688	597	577	636	↓
CFR NW EUROPE (low F/Fe)	948	875	801	693	672	712	↓

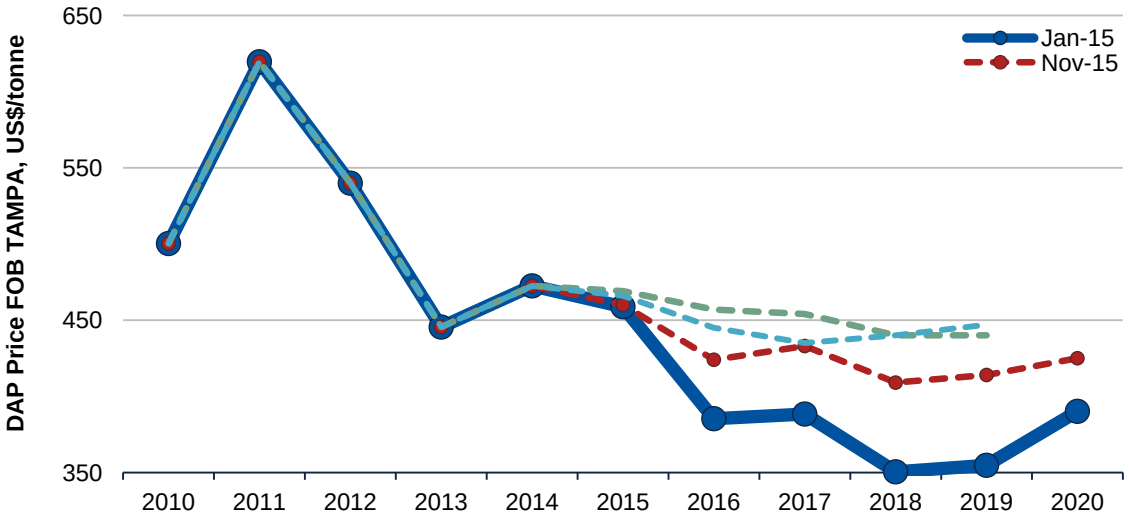
Data: CRU, Fertilizer Week

Over the medium-term, the industry will have to absorb a large volume of new supply. OCP's development schedule will see its JPH II plant online during 2016Q2/Q3 and the JPH III plant online in 2016Q4. The final of the first wave of JPH projects (JPH IV), with an annual capacity of 450,000 P_2O_5 tonnes, is planned for commissioning in 2017. All of these operations are currently in construction and categorized as *firm* in our *PGS*. A further three identical units are included as probable in our forecast which extends through to the end of 2020. In Saudi Arabia,

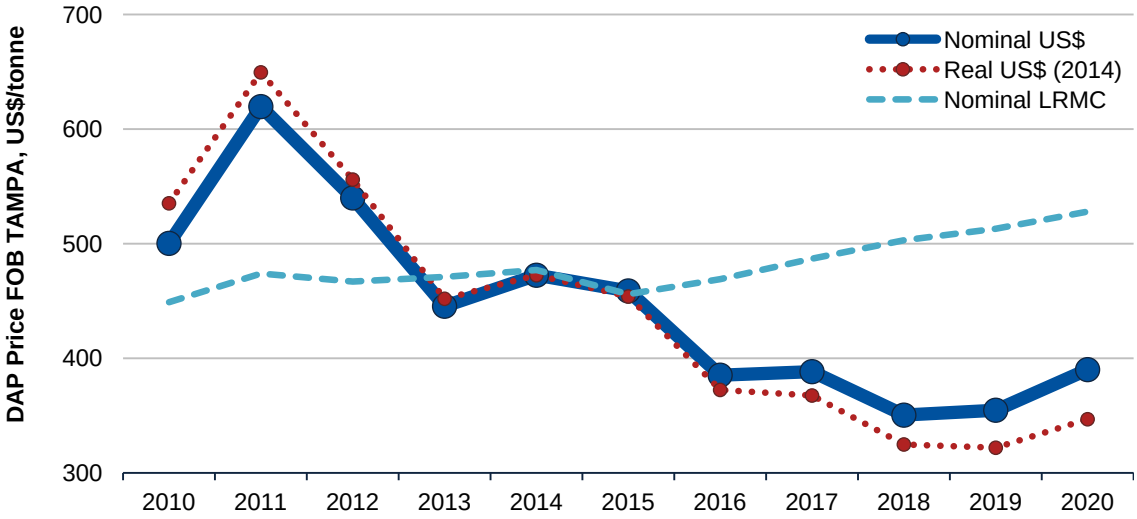
Ma'aden will bring 1.5 million P_2O_5 tonnes capacity online in 2017Q4 and there are a number of other expansions in development in China, Tunisia, Brazil and other locations.

CRU medium-term DAP price forecast, 2010-2020

DAP FOB Tampa price forecast comparison



DAP FOB Tampa nominal, real price forecast and LRMC



Data: CRU

Given the additional volume of capacity coming online during the forecast period, it is our view that phosphate producers will have to accept lower prices in order to maintain their market shares. As explained in the *Short-term Price Outlook*, we do not expect there to be a sufficient demand increase for this to happen. Beyond 2017, dynamics drive our lowered price forecasts. With the introduction of Ma'aden's and other new capacity in 2018, competition to secure sales in key markets is expected to be fierce, pushing prices down.

Table 3.5: Forecasting phosphate prices – Input variables

US$/tonne	2014	2015	2016	2017	2018	2019	2020
Ammonia (cfr Tampa)	545	454	336	345	362	402	440
Phosphate rock (fob Morocco)	110	117	112	109	110	101	104
Sulphur (cfr Tampa)	124	132	98	95	93	90	94
Corn	195	172	178	192	197	202	206
Soybeans	464	370	373	394	404	409	420

Data: CRU

We expect healthy demand growth through the forecast period, at 1.7% per year on average, exceeding the forecast growth for phosphoric acid capacity between 2015 and 2020. However, the outlook is complicated by the fact that China and Russia's presence in export markets is much expanded due to exchange rate and legislative changes and we do not expect this to change. The rouble is forecast to strengthen only gradually in our macroeconomic forecasts, from RUB60.96 in 2015 to RUB54.92 by 2020, and we expect gradual Chinese capacity closures to reduce DAP exports by only 2% between 2015 and 2020.

Risks to the forecast

Bearish and bullish factors that could impact on prices

Bearish risks	Bullish risks
Farmer margins continue to deteriorate in 2016 on the back of lower crop prices, with cuts in application rates likely.	**Generous government support** in **some agricultural economies** helping to offset lower crop prices.
Indian producers continue to **favour NPK** over DAP and lower prices to reduce high stocks and further undercut DAP prices.	**OCP choose not to enter the Indian DAP market** and maintain lower utilization rates.
Dollar strength reduces affordability in Europe, South and Central America, prompting fewer purchases.	**Structural reform of the Indian subsidy scheme** results in increased phosphate demand.
Slowdown in Brazil crop expansion continues and softens demand in the near-term.	**OCP chooses to rein in capacity expansion plans**, delaying commissioning of JPH II-IV units to balance the market.
Government subsidies on farming are cut back in China, leading to reduced application rates and lower demand.	**The rouble regains lost value**, returning to close to RUB30 per dollar and increasing Russian producer costs.
Low crop prices in 2016 and more accelerated reductions in applications rates continue to lower domestic demand and **Chinese exporters ship more product**.	**Higher interest rates result in less credit being available in equity markets,** tightening supply prospects in the medium-run.
Removal of phosphoric acid export tariffs in China encourages a large increase in MGA exports.	**Chinese market consolidates faster than expected**, in terms of closures of inefficient producers or more solid pricing policies.
OCP chooses to maximise production volumes at new downstream units and compete for market share in India and Brazil.	**Ramp up of new urea capacity** could lead to higher merchant ammonia prices and consequent concentrated phosphate production costs.
Sulphur consumers in China continue to utilise domestic smelter acid instead of sulphur.	**Climatic anomalies disrupt crop production** and push food prices higher, improving phosphate affordability for farmers.
	Raw material prices recover from a very weak 2016Q1 and raise cost of production.

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Appendix A

The long term outlook for the phosphate market

A.1 Introduction

Phosphate fertilizer prices are influenced by a number of factors at various points in the value chain, including demand and supply, trade, agricultural practices, government policies, weather conditions and crop prices. These factors will continue to influence the future market price for phosphates and phosphate rock, though as many are either seasonal and/or cyclical in nature.

Over the long term (in excess of five years), it is difficult to accurately pinpoint the timing and duration of drivers for phosphate demand. Details about individual phosphate projects are also less certain, as very few companies budget that far ahead. Projects that could supply phosphate products 10 or 20 years into the future are currently at a much earlier stage compared to those currently being developed, or may even not be under consideration yet. As a result, there is considerable uncertainty associated with cyclical forecasts.

CRU believes that over the long run, the phosphates market can be more appropriately understood through an assessment of the 'trend' growth rates expected for demand, supply, and prices. This is a structurally driven/top down market forecast based on **Marginal Cost methodology.** During this time period, both **Short** and **Long Run Marginal Costs** need to be considered. Though both reflect the cost of production for the marginal or highest cost plant required to meet demand, the fundamental difference between these two concepts is that capital charges are higher for new capacity than for existing capacity. Operating costs of new projects are expected to be comparable to existing operations, but it's the marginal producer in the long run that will be a company which will invest in this new capacity, and thus face higher capital charges.

The aim of this Appendix is to provide a forecast for the LRMC of downstream phosphate materials. The forecast period under consideration covers 2018 to 2037. As well as providing an LRMC forecast, it includes an outlook for long term demand and supply.

A.2 The long term outlook for phosphate demand

In order to forecast long-term phosphate prices, it is necessary to understand what the future investment needs in the phosphates industry are. To do this, a high level assessment of long term demand and supply is necessary. By definition, supply and demand should be in balance each year. Any additional supply will originate from existing mines and plants or investments in new capacity. On the demand side, growth will be determined by the outlook for crop production, which is based on our forecast for food demand and crop plantings. By 2037 CRU foresees that food consumption, due to rising incomes, will reach 9,700 trillion kcal/year. To fulfil this growth, agricultural production will exceed 11.6 billion tonnes by 2037, and as such form the driving force behind a subsequent rise in fertilizer demand. A more comprehensive explanation of the work underpinning our agricultural production is provided in the grey box on pages 108-112.

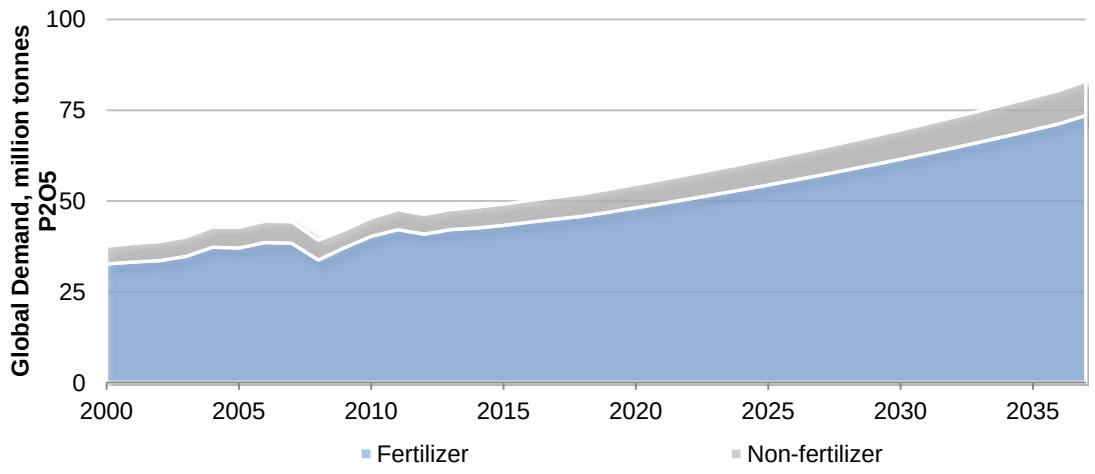
Our first scenario is our **low case** through to 2037, which is based on the assumption that there is constant growth between the nutrients. It assumes a longer lasting economic stagnation in developed economies, which due to its length and intensity will eventually spread to emerging markets. Under this scenario, less capital is available for investment into projects, which in turn brings the global supply/demand balance closer to 80%. Although this provides upward support for fertilizer prices, it is not sufficient to simulate new investment (given the constraint on credit). This bearish view of the economy will not only be a constraint on fertilizer availability, but also on the agricultural markets. With less credit, less capital will be available for new and improved farming equipment. On a global level, we would then see lower yield gains, further constraining farming budgets. As a consequence, fertilizer would become more costly, encouraging lower rates of application. Our assumptions for the main consuming economies are described below in greater detail.

- For **China**, continued cost inflation will see domestic fertilizer prices rise substantially, and cause them to reach global market rates. As such fertilizers will become less affordable to the general farmer, thereby encouraging the country to either lower its overall fertilizer application rates, or consume fertilizers with lower nutrient contents. Therefore, this will reduce the volume of P applied to crops. Towards the mid to latter stage of our long run forecast, persistent cost inflation encourages the government to switch its focus away from cash crops (as well as livestock), focusing instead on raising the production (and stocks) of staple foods, such as wheat and rice. Planted area previously used to produce soyabeans and other P intensive products is therefore switched across to products which require less fertilizer.

- In **India**, we assume the government will be unable to find a workable solution to the country's current subsidy scheme. Consequently, there will continue to be an imbalance between N and both P & K, which not only then plays a bigger role in the country's choice of crops, but also in yields. Again, we expect to see sustained inflation of food prices through towards the end of the forecast period, and a switch towards food products that require less fertilization.
- Our base case estimate for **Brazilian** demand is driven by the need for additional cash crops and livestock production. If China were to shift its policy to focusing on consuming more staple products, Brazil could easily adjust its offering to continue being one of its principal suppliers. This means that much of the new land being brought into production would be focused on these lower value, larger-volume crops. As consequence, we would still expect to see a requirement for P and K (in order to improve soil quality), but this requirement would be lower than under the base case scenario.
- An inverse trend will be apparent in the **USA**. With farming budgets cut, US consumers will become more price sensitive. Unless we see a price response on these products, we are likely to see a shift away from value-added fertilizers (NP+S) towards more standardized (cheaper) products. This, in turn, may even see the country's overall consumption of phosphate rise, relative to the current rates.

Although demand growth will be constrained under the low case scenario, we are still forecasting a rise in consumption to 70.7 million tonnes P_2O_5. This represents a growth of 24.5 million tonnes P_2O_5, over the 2012-2037 period, and will effectively see P consumption growing in line with N consumption over the coming 25 years.

Our second scenario is our base case, which sees P_2O_5 demand growing by a CAGR of 2.4% per year over the next 25 years, reaching 83.0 million tonnes nutrient in 2037. This scenario is based on the assumption that additional phosphate application, whether it be for plant or feed rations, will have a beneficial impact on crop and/or livestock production. The bulk of this growth is expected on the agricultural side, effectively meaning that the balance between sectors (i.e. fertilizer vs. non-fertilizer products) will remain fairly constant between 2012 and 2037 (i.e. any losses on the industrial/food side are likely to be made up by growth in feed consumption).



Data: CRU

Central to our base-case scenario is the assumption that farmers will not only need more fertilizer, but that they will be moving towards achieving a better balance between nutrients. As such, P application will be favoured at the expense of N, due to a number of factors. The table below shows our forecast consumption growth for P fertilizer between 2012 and 2037. P fertilizer consumption is expected to rise to 73.5 million tonnes nutrient by 2037. Close to 40% of this forecast growth is likely to stem from increased demand from soyabean plantings. As described below, the country with the best prospects for agricultural expansion over the medium to long term is Brazil. Much of this new land being brought into production will be of a low quality, and therefore will need a substantial application of fertilizer. A large proportion of this new land is likely to be allocated to soyabean and corn plantings, which will then be exported.

We also acknowledge that prevailing weather conditions will play a role in the scenario actually materializing. Weather patterns will become increasingly unpredictable and result in a substantial depletion of corn and wheat stocks. This has tightened the balance for both products, and in turn pushed their prices up substantially. Whilst our scenario assumes that weather patterns will become increasingly volatile, it also sees a gradual improvement of crop growing conditions in the world's main agricultural markets. This will favour crop production, and in turn encourage fertilizer application.

Table A.1: P fertilizer demand growth by crop, base case, '000 tonnes P_2O_5

	Soyabean	Corn	Wheat	F&V	Other	**Total**
2012	2,969	4,883	6,362	7,028	18,244	40,692
2037	16,371	10,252	9,549	12,430	24,944	73,546
Change	13,402	5,369	3,187	5,402	6,700	32,854

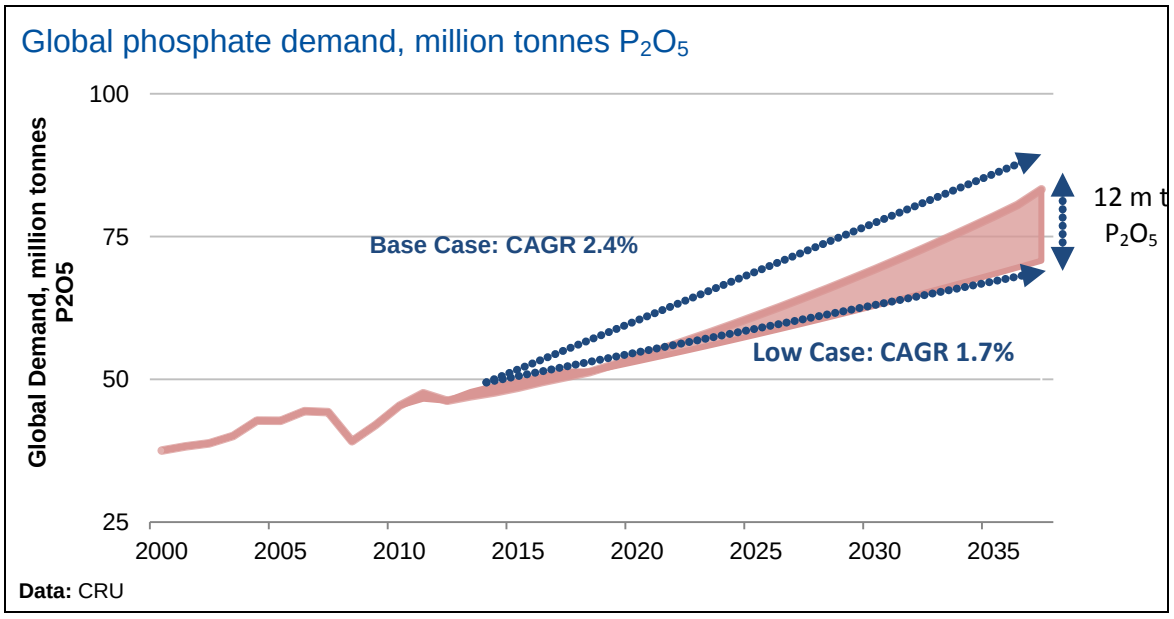
Data: CRU

Country-wise, the greatest share of the growth will emanate from emerging economies, where populations and incomes are rising rapidly. India, Brazil, and China will continue to drive this, leading to increased consumption of cash crops favouring phosphate application, as well as foods containing high calorific contents. Brazil has the ability to expand arable land substantially in the future, though this is less likely in India and China. Both will be facing limited availability of arable land, making it necessary to increase productivity on existing harvested acreages. This will be done with more intensive (but also better targeted) fertilizer application and more advanced agricultural technology. For each of these countries, we have compiled a set of assumptions, which are outlined below.

- In **China**, the forecast for phosphate consumption is based on improving wealth, and likely changes to the country's overall agricultural policy. On the macroeconomic side, CRU expects GDP to grow by an average of 5.3% per annum through to 2037. Whereas this is well below the 9.9% achieved during the preceding 25 year period (1987-2012), the year-on-year percentage growth will inevitably slow as overall volumes rise. As such, it is better to assess the GDP per capita, which is set to surpass US$11,000 in 2037, up from just US$3,400 in 2012. As previously mentioned, enhanced wealth will contribute to a shift from wheat based food products (requiring a larger proportion of N fertilizer) to soy, corn and sugar based products, all of which favour additional volumes of P fertilizer. On the agricultural side, there will be gradual consolidation of arable land in the forecast. This should allow, and encourage, a faster rate of mechanization, which will lead to more efficient and balanced fertilizer application in the future. This will aid an overall decline in the global ratio of N:P consumption from 2.55 in 2012, to 2.20 in 2037.
- Outside China, CRU believes that the strongest economic growth in the BRIC countries will emerge from **India.** Its GDP is forecast to rise by an average of 6.1% per annum between 2012 and 2037, as it moves from being largely agricultural based, to having a more mechanized and industrial foundation. During this period we expect its GDP per capita to rise to over US$4,300, which is four times the current value. Although this in itself will go a long way in driving P consumption (e.g. through additional demand for poultry), the greatest impact will be from a change to the subsidy scheme. Since the decontrolling of K and P farm gate prices in 2010, the country's subsidy has swung heavily in favour of N products. The retail price of urea, for example, is approximately US$88/tonne, whereas for KCl and DAP this is roughly US$266 and US$375 respectively. This imbalance is already starting to have an impact on yields and if left untouched will become a serious threat to the country's agricultural position. As such, it is CRU's view that P and K subsidies will have to be raised, at the expense of N, and become more affordable. This is most likely to occur after 2014, following the government elections, and as there will be some push back, the increases will be gradual, spanning the 2015-2020

period. Given that India is the world's largest importer of DAP, even a small shift in the subsidy will have a significant impact on P fertilizer consumption.

- Year-on-year economic growth is likely to be far lower in **Brazil** relative to either China or India, averaging at 2.4% per annum. However, of the three, it has the largest scope to increase arable land during the forecast period. A larger proportion of this new land will need to be heavily fertilized with P and/or K, as Brazil's soils are often deficient in these nutrients. Moreover, our outlook sees much of this area being planted with either soyabeans or corn, both of which need large quantities of P fertilizer. Inorganic feed phosphates (IFP) will also play a role in driving Brazilian P consumption upwards into the long run. Although GDP per capita is already comparatively high, at US$6,150, by 2037 it is likely to be US$10,532 per year. This near doubling of wealth will inevitably boost domestic meat consumption volumes, which in turn will stimulate additional demand for IFP, and therefore P.



- The **USA** is a mature market, which has been suffering from a declining demand forecast. Whilst greater efficiency, and increased rates of mechanization kick-started the trend, it has more recently been driven by a movement towards value-added fertilizers. Although these generally contain lower P_2O_5 volumes, the argument is that traditional P fertilizers actually contain too much P relative to the needs of plants, ignoring the importance of secondary/micro nutrients such as sulphur or zinc. Premium products have had great success with US farmers, and given the increasing S deficiency in soils, are assumed to continue gaining popularity. On the positive side, the resulting decline due to lower P_2O_5 volumes is likely to be offset by an increase in arable land, as land previously protected in conservation schemes is brought back into production.

The long-term outlook for food and agricultural markets

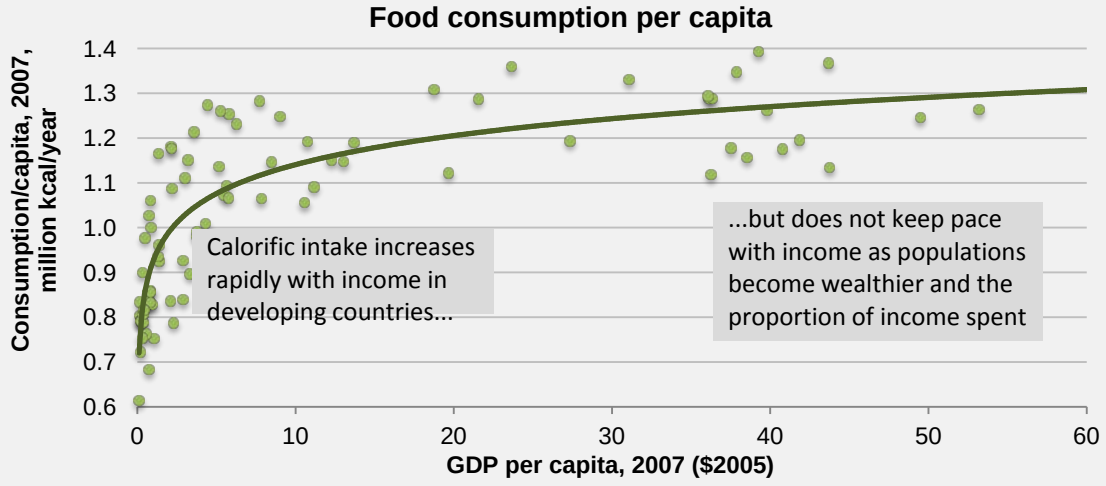
Demand for fertilizers is determined by the outlook for crop production, which is related to food consumption, as well as the need for animal feed, natural fibres and biofuels. Taking into account these, in order to forecast **medium term** fertilizer consumption, CRU uses a bottom-up forecast of nutrient demand, based food demand and crop plantings forecasts. These take into account factors such as planted area, applications rates (which are affected by fertilizer prices and crop prices) and economic cycles and population growth (and in turn changes in income and diet).

Over the **long term** it becomes more difficult to predict the development of many of these variables, especially the timing or duration of economic cycles driving income changes. Instead, the focus is on the structural elements that determine trend levels and rates of growth through time. The drivers of fertilizer demand that will persist over the long term will be food consumption (driven by population growth and changes in income) and changes in productivity. There are also issues that deserve consideration as risks to these drivers, such as resource availability, technological advances, and climate change. This section provides an overview for agricultural markets and fertilizer demand over the long term (2018-2037).

Food consumption

Over the long run, population and income determine food consumption. CRU has examined food demand measured by calorific intake as a function of per capita GDP. A 2007 study from the Food and Agricultural Organization of the United Nations (FAO) demonstrated that as income per capita rises in

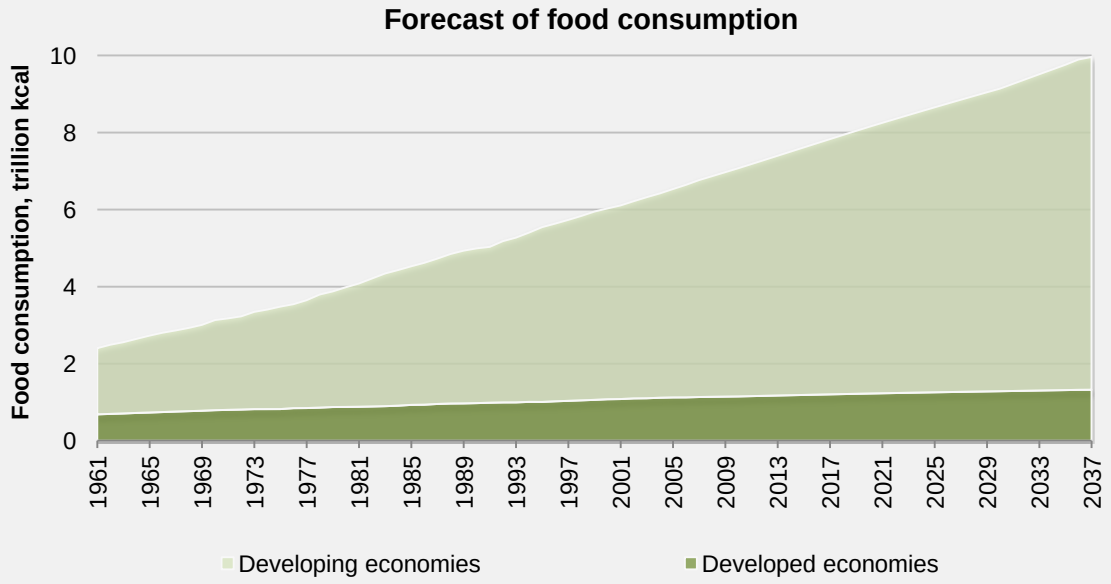
developing countries, their calorific intake also increases rapidly, but over time growth in calorific intake does not keep pace with growth in income.



Data: FAO; CRU

Changes in income lead to shifts in diet. As income rises, people move away from staple foods, such as cereals, in favour of higher-value products including meat, edible oils and dairy. For example, according

to the FAO, from 1990-2007 incomes in East Asia rose by 6.0% per annum. During this time consumption of meat, fish, eggs and dairy rose by 4-6% per annum., while consumption of cereals fell. In particular the shift in favour of meat consumption requires higher levels of agricultural production and resource use (animal feed requires significant quantities of grain). CRU has made forecasts of food consumption, measured by calorific intake based on the position of key regions on the curve, and projections for population and GDP. This means that regions with lower incomes are assumed to experience faster food consumption growth in than those with higher incomes per capita.



Data: FAO; CRU

The forecast for food consumption assumes that the world population will grow from 7.1 billion to 8.7 billion by 2037, equivalent to 1.5% per annum. Growth will increasingly be driven by the developing economies, which can still support relatively rapid labour productivity growth, and therefore GDP growth. The trend rate of world GDP growth is projected to be close to 3.0% per annum to 2037. Based on population and income growth projections, CRU forecasts world food consumption (measured by calorific intake) to reach 9,700 trillion kcal/year by 2037. This is in comparison to 7,300 trillion kcal/year in 2012.

Agricultural production

Whilst crop production is subject to seasonal and cyclical variations, such as unpredictable

weather conditions and changes in crop prices, over the long-term, agricultural production growth tracks demand. However, the ability of agriculture to feed 8.7 billion people the 9,700 trillion kilocalories we forecast to be needed by 2037, will be governed by resource constraints and agricultural productivity. These issues are considered below.

(i) Resource constraints

The availability of land and water are the most notable resource constraints to future agricultural production. Although producers will need to increase agricultural land area and/or increase yields, there are concerns that the availability of arable land may become a limiting factor. The FAO estimates that around one third of the world's land surface is prime land (capable of yields of more than 80% of the "potentially attainable" maximum) and good land (capable of 40-80% of potentially

Whilst this seems ample for agricultural expansion, in reality much of this land is, in practice, unsuitable for crop production for the following reasons:

it is under an alternative competing use, such as woodland, urban areas, infrastructure;
available land is unevenly distributed, with the majority in sub-Saharan Africa and Latin America;

it may be unsuitable for most demanded crops (FAO does not distinguish suitability by crop type);

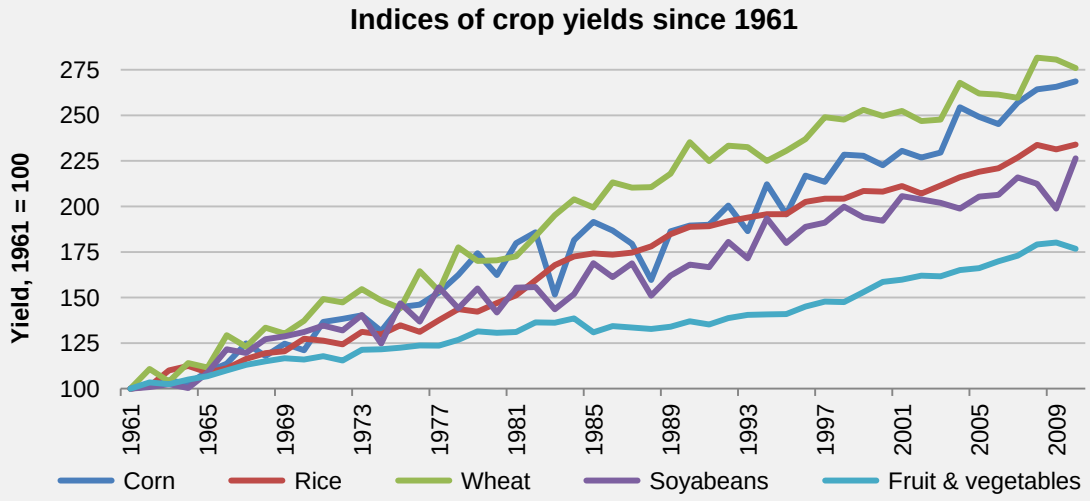
the infrastructure necessary to support large-scale farming may inadequate or absent.
CRU believes in addition to any physical restriction on crop area expansion, there is an economic constraint that will be reached earlier (i.e. there could be land available but it might be uneconomic to farm, subject investment costs, land quality and prevailing crop prices). As this economic limit is approached it will become increasingly slow and costly to bring additional land into production, placing pressure on producers to achieve higher crop yields to compensate. Based on current literature, CRU is of the opinion that overall the world will not reach the physical and economic bottleneck in land availability within the forecast period, but shortages of arable land will pose problems in some areas, notably North Africa and parts of Asia. Moreover, there will need to be the incentives in place, including higher crop prices and public investment, in order to enable the investment needed to create roads, silos, ports and other requirements, as well as for farm machinery, agronomy, herbicides, pesticides and significant nutrient applications to make available land productive.

Water scarcity is a complex issue, on account of the many competing demand sectors, such as residential, agricultural and industrial. The agricultural sector is by far the biggest consumer of water, but its share of global freshwater withdrawals has trended downwards since the late 1980s. Nonetheless, according to the FAO, there are still ample opportunities to increase water use efficiency, through better water resource management, provided the necessary incentives are in place.

On balance, given the high productivity of irrigated land, CRU believes that constraints on water resources represent a significant risk to demand growth for food and fertilizers over the forecast period. Despite there being sufficient water resources at a global level, the FAO and other bodies stress that these are unequally distributed, and that an increasing number of countries face water scarcity, most notably in North Africa, South Asia and parts of China. Moreover, climate change provides a greater degree of uncertainty, meaning increased risk of severe water shortages or flooding.

(ii) Agricultural Productivity

Facing resource constraint, the main means by which agricultural producers can meet future demand is by increasing productivity. According to the FAO, over 1961 to 2009, more than three quarters of the world's growth in crop production can be attributed to improvements in yields, as opposed to land expansion and increased cropping intensity. However, what is of most concern is whether further improvements can be made in agricultural productivity to enable continued yield gains over the long term.



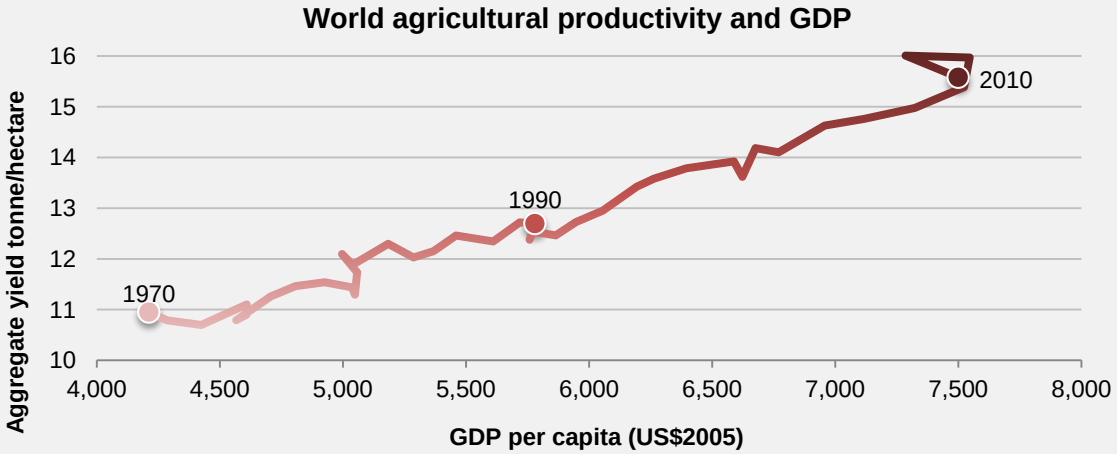
Data: FAO

There has historically been a clear correlation between GDP per capita and crop yields, implying that further improvements can be expected based on our forecasts for income growth.

Many countries still have scope to bridge the gap between attainable and actual yields through improvements in technology, crop husbandry, fertilization and irrigation.

Although there are concerns that further gains in productivity might not be possible from a technical perspective or that resource constraints may counter productivity gains, current literature suggests that further yield improvements over the forecast period are possible. However, the pace of change will certainly be dependent on public policy and investment measures to incentivise the necessary development. Although some efforts to improve productivity may have negative implications for fertilizer consumption (such as precision application techniques) fertilizer use will continue to play an important role in productivity gains in many countries.

CRU has made a high-level forecast of future agricultural production based on food consumption and the assumptions discussed above. By taking into account changes in income, we account for dietary changes over the long term, but do not forecast any unforeseen step change linked to wealth effects. CRU forecasts agricultural production to grow by 1.6% per annum to 2035, rising from 7.7 billion tonnes in 2011 to 11.6 billion tonnes in 2037.
CRU's forecasts allow for some agricultural production being driven by non-food uses, most notably biofuel production. World biofuel output experienced exceptional growth of 22% per annum between 2000 and 2011, though this rate is slowing as governments exercise more caution in their policy support for biofuels compared to in the early 2000s. It is worth remembering that biofuel crops often yield other products (such as soyabean meal or distiller's dried grains), which are used in the food chain.



Data: FAO; CRU

Risks to the Outlook

The outlook presented above represents CRU's base case scenario for long term food demand, which is used to drive our long term forecasts for fertilizer demand. However, CRU recognises

that forecasting over such a long period of time is fraught with risks and uncertainties, which could result in significantly different scenarios.

Stronger than expected energy prices, or renewed policy support for biofuel initiatives could increase the share of industrial demand in future agricultural production. This would accelerate the period in which we reach the economic and physical land constraints.
The long term impact of climate change is uncertain and we assume the net effect of climate changes and measures to tackle it are neutral. However, we expect greater unpredictability and extremity in weather events, and as such crop production.

There are upside and downside risks associated with biotechnology and the introduction of new farming methods and technologies. An increase in yields resulting from such technologies would be associated with increased fertilizer demand. Conversely, many technologies aim at using bespoke formulations and targeted nutrient application to maximize the effect of fertilizers and minimize physical wastage, resulting in lower fertilizer unit consumption.

A.3 The long term outlook for phosphate supply

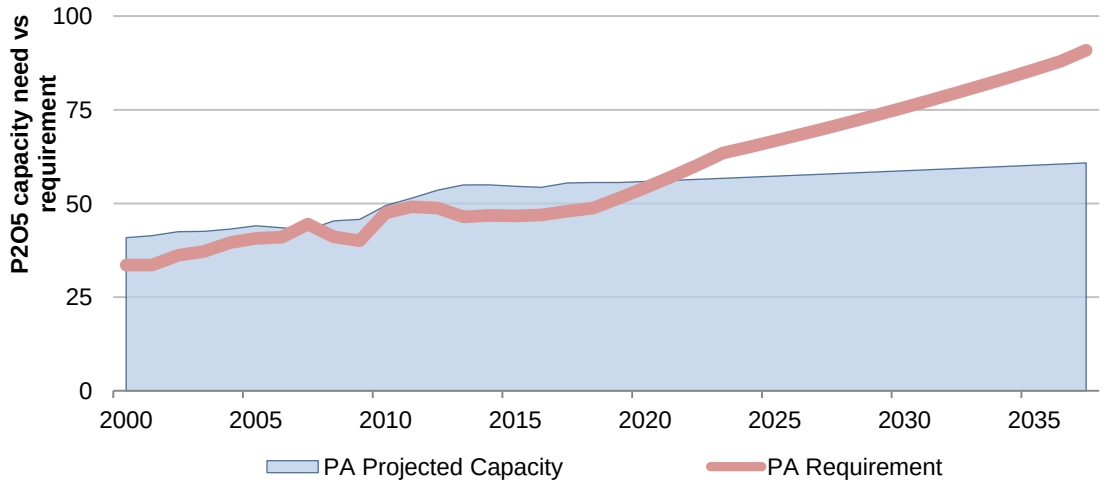
The assumption is that future supply will need to increase in order meet the future demand forecast. To demonstrate the magnitude of the investment needed, CRU first considers how much capacity will be required to meet long-term demand. To do this, we have projected existing capacity forward, taking into account the potential for creep (i.e. increased production owing to productivity gains) and for closures (owing to the mothballing of inefficient capacity). This is based on the following calculation:

Projected Capacity = Prior Year Existing Capacity (Including Firm/Probable Expansions Over Medium Term Forecast) + Capacity Creep - Closures

CRU assumes that world production capacity will be unconstrained over the considered time period, with sufficient global phosphate rock reserves available. As such, it is believed that production will be able to meet total phosphate demand (fertilizer and non-fertilizer), which is therefore equal to the demand estimate (83.0 million tonnes P_2O_5 in 2037). Implicit in this outlook is the assumption that the bulk of future growth will be based on wet-process acid derivatives. Notably, we have also taken the view that closures (-0.5% per annum) will outweigh creep (+1.0% per annum) between 2017 and 2037. This opinion has been derived by the large volume of capacity that is expected on-stream in the latter part of the medium term

forecast. Much of this capacity will be more efficient than what is currently in operation, and therefore it is likely to cause closures of older plants.

Phosphoric acid capacity requirement, million tonnes P_2O_5



Data: CRU

It should be noted that although most of the new P_2O_5 capacity will be based on wet-process phosphoric acid, downstream products have, and will continue, to evolve in the future. As discussed in our main report, over the past few years we have seen a surge in demand for value-added P fertilizers, such as the MicroEssentials brand. Mosaic has, in fact, had so much success with this product that other suppliers – such as Coromandel, OCP and Simplot – are also trying to enter this space. Deficiencies of sulphur as well as other secondary/micro nutrients will almost certainly become more common in the future, thus it is likely that we will see greater variation in products going forward. However, it is still our belief that ammoniated phosphates (DAP or MAP) will command the bulk share of demand in the future.

A.4 Determining a long term trend price for phosphate

A.4.1 Introduction to Marginal Cost theory

According to economic theory, competition among producers should set the price of a good at the Marginal Cost (MC), which is equivalent to the cost of producing the last unit of output required to meet demand. There are two marginal cost concepts used to forecast prices. These are applicable on different timescales. These two concepts are:

- **The Short Run Marginal Cost (SRMC)**
- **The Long Run Marginal Cost (LRMC)**

Table A.2: Difference between short and long run marginal costs

Variable	Short Run Marginal Costs	Long Run Marginal Costs
Time period	Generally five years or less	Generally over five years
Fixed vs. variable	Capacity remains fixed. At least one operating variable remains fixed	Capacity can change. All costs become variable. There are no fixed costs
Marginal producers	Production costs at the top of the industry cost curve	Highest industry production costs including costs of new capacity
Calculations	Operating cost for marginal producer.	Operating costs for marginal producer including capital
Use of concept	Calculation will set the floor price of the short-term price cycle.	Calculation of the trend price for long term cycle.
Decisions	Price < SRMC, leads to a cut in production Price > SRMC, leads to an increase of production	Price < LRMC, no investment in new capacity Price > LRMC investment in new capacity

Source: CRU

The **short run** is defined as a period of time where capacity remains relatively fixed. CRU defines model, the short run as five years or less. Short run capacity can change with a closure or debottleneck of an existing mine or plant or capacity that is currently under development. More specifically, in the short term a producer only has the ability to respond to changes in demand and prices by controlling its variable costs which are dependent on its level of output. At least one, but in reality more likely several, of its input costs are fixed in the very short term (less than one year) and not dependent on the level of output (e.g. interest on debt, central overheads, etc.). Hence, operating decisions at existing producers are based on the relationship between market prices and operating costs**.** In the short run, the marginal producers are those producers who are at the top of the industry cost curve. For the phosphate industry, these are producers feeding on imported phosphate rock (or phosphoric acid).

As the time horizon increases over the **long run** (more than five years), all costs become variable. Hence, this can include changes in production capacity whereby an investment in additional capacity is made. Operating decisions for long run marginal producers (producers building and operating profitable capacity sufficient to meet future expected demand), are based on the relationship between market prices and operating and capital costs. The concept of marginal cost is also useful in order to calculate the floor price, i.e. how low could prices go. The above assumes an ideal market, but in reality commodity markets are not entirely perfect and other factors could interfere with the role of prices as a signal for investment, such as speculative investment. However, we believe these concepts offer a reasonable basis to provide an insightful long term view.

A.4.2 Selection of long run producers

Looking forward 25 years is a daunting task in any market, including the phosphate industry. It is, however, made easier by the belief that most new phosphate will originate from mineral

phosphate rock. As described in the body of the report, CRU believes much of the new acidulation/granulation capacity will originate in regions that have access to an integrated source of phosphate rock[1]. Africa, Middle East, South America and East Asia are jointly expected to enjoy between 80-90% of all expansions over the medium term, and although there is less certainty over the longer term, given the distribution of high quality reserves, the aforementioned areas will undoubtedly continue to drive supply/capacity beyond 2017.

Besides access to rock, there are a number of other factors that can affect the success of a project. These include government stability, access to raw materials other than rock, access to finance, environmental requirements, ability to respond to market requirements and proximity to target markets. All of these factors require careful consideration, but it remains our opinion that most can be overcome. One exception may be government stability which is essential for project financing (from sources other than the sovereign state itself). The recent social and political turmoil in the Middle East has dented the prospects for further expansion in Tunisia, and the potential downstream integration in Algeria.

For the purposes of determining long run marginal producers, CRU has identified eight countries where phosphate production is likely to expand between 2017 and 2037: Brazil, Morocco, Saudi Arabia, China, India, Indonesia, Kazakhstan and Australia. The decision on their location/size is based on an assessment of the above criteria, focusing specifically on their access to phosphate rock and/or target markets. Each location has its own strengths and weaknesses, and these are discussed below in greater detail:

- **Brazil:** While the country is thought to hold less than 2% of global phosphate rock resources, its agricultural demand has grown by such an extent that it is now one of the world's largest consumers of high analysis phosphate fertilizer (in particular MAP). Much of this is imported. In 2012, for example, domestic operations supplied 1.3 million tonnes of MAP, which was slightly less than 50% of the country's overall requirement. As such, there is potential for further expansion over the medium/long term, particularly as the national government has laid out plans to become self sufficient by 2020. Domestic projects will potentially benefit from both a sea and an inland freight advantage. Indeed, it is estimated that transport from a port to a customer in Brazil could add up to US$170/tonne to cfr cost. Although we acknowledge that this figure could be reduced by improving domestic transport links, given the size and layout of the country, this will be a

[1] This is not to say that we won't see stand alone rock mines developed in the future. In fact there are a number of interesting options, from Brazil through to French Polynesia, that are currently being explored (discussed in greater detail in the **Phosphate Rock Market Outlook**).

considerable undertaking, both in terms of time and cost. Therefore, most new projects in Brazil should have a healthy competitive advantage.

- **Morocco:** Morocco holds approximately a third of all known rock resources, and currently ranks as the world's second largest phosphate rock producer. At the same time, it consumes a comparatively small amount of fertilizer. Therefore any new capacity will need to be export-focused. Presently this approach is viable as a result of the wide spread that exists between phosphate rock costs and prices. Geographically the country is well placed to serve Europe, Africa, the Americas and the Indian sub-continent. Although competition into these markets has intensified, it should still be well placed to expand production into the long run.

Location of future acidulation/granulation projects

Data: CRU

- **Saudi Arabia:** Saudi Arabia is a relative newcomer to the phosphates market, having ramped up its maiden operation in 2011. The country however does have a number of advantages which should allow further expansions (beyond those outlined in the medium term). Firstly, its geographical position is key. Ras Al-Khair is less than 1,200 nautical miles away from the west coast of India, which is the world's largest importer of DAP. Secondly, an abundance of hydrocarbons in the country means that Ma'aden is one of the few phosphate producers that is fully integrated (i.e. with rock and also ammonia). CRU believes that future gas deals are likely to be less attractive than the one currently in place, but this should still provide a significant cost advantage. Finally, in recent years, the

government has actively been trying to diversify its product offering away from the oil/gas industry. This policy is unlikely to change soon, which means that further investments into bulk raw materials is possible.

- **India:** India is the world's second largest consumer of phosphate around the world, and its increasing population/improving wealth suggest that its consumption will continue growing in the future. While technological/agricultural improvements may result in less fertilizer wastage, the pressure of feeding a growing population is unlikely to recede. Currently domestic consumers are almost entirely dependent on foreign product, whether it be rock, acid or DAP, as the country suffers from a chronic shortage of phosphate rock. In recent years, there has been an effort to look for solutions to this. One such approach has been to invest in a rock/acid JV in a country where these products are readily available, and secure raw materials/intermediate products at a favourable price, which are then further processed domestically. During 2013, two phosphoric acid JVs are set to be commissioned, and further JVs are in the pipeline over the medium/longer term.

- **China:** China is currently the world's largest producer and consumer of phosphate fertilizer. Although rock quality has reportedly been falling, with 16.9 billion tonnes of resources, it is likely to continue to be an important producer of P based fertilizer in the future. CRU, however, is of the opinion that the supply side of the market will be subject to widespread rationalization over the next few years. Rock producers are now being pushed into developing downstream capacity, and vice-versa. Moreover, the country is understood to have over 300 granulation operations in production, many of which are small and uncompetitive. Many of these will most likely shut down in forthcoming years, especially as competition in international trade intensifies. Hence we do expect further capacity additions in both the medium and longer term, as these plants are replaced with newer, more efficient operations.

- **Kazakhstan:** Kazphosphate is currently the only high analysis phosphate fertilizer producer in Kazakhstan. Further developments have thus far been constrained by the country's geographical position and also quality of rock available domestically. However in recent years there has been interest (by two different companies) in building new assets, including a DAP/MAP acidulation/granulation unit. Whilst rock quality can be overcome by producing off-standard grades of DAP/MAP, its geographical location still presents a challenge. Domestically, Kazakhstan only consumes about 25,000 tonnes of MAP (product), which means that most of the product will need to be exported. Western China, Central Asia, Eastern Europe and the Black Sea could all be targeted, but would still incur

considerable freights. Thus, it is our view that a fully integrated operation is possible, but is likely to be one of the more marginal projects.

- **Indonesia:** Behind Brazil, Indonesia is the world's second largest consumer of TSP, and one of the globe's larger consumers of SSP, which is largely applied to rice, corn and oil palm. In addition to Petrokimia Gresik, new acidulation units, will be operating on JPMC's rock, financed through JV agreements between the Jordanian miner and local fertilizer companies. Further out, CRU believes that there is further potential to expand. South East Asia as a whole is a net importer of product, which provides an opportunity for domestic production to expand further in the long run.

- **Australia:** Despite being resource rich, the country only has one high analysis phosphate fertilizer producer (Incitec Pivot). The main challenge facing new players is logistics. Most phosphate deposits are a long way away from an FOB point, and then still face a fairly length ocean voyage to a target market. There are, however, a number of projects, which could be developed in the next few decades.

A.4.3 Raw material LRMC outlook

The fertilizers covered in this report are produced from phosphate rock. Most plants around the world react phosphate rock with sulphuric acid to produce phosphoric acid on-site. Due to the heat/energy release and the difficulty in transportation, sulphuric acid is also usually produced on-site by burning elemental sulphur. Ammonia is required to make ammonium phosphates. Therefore the price/cost relationships of phosphate rock, sulphur/sulphuric acid and ammonia all determine the cost of manufacturing phosphate products, and hence there longer term outlook need to be considered before reviewing the DAP long run marginal cost.

- **Phosphate rock:** In determining the LRMC for phosphate rock, CRU has considered nine rock mining projects that could come into production over the next 25 years. These include selection of integrated operations (Morocco, Saudi Arabia, Brazil, China and Australia), as well a number of standalone rock operations (West Africa, Peru and Kazakhstan). In each case, chosen operations are estimated to be the lowest cost marginal producer to that specific target market, hence all nine operations have been considered for the LRMC calculation. For comparative purposes, output from each speculative mine has been netted back to Morocco, and P_2O_5 grades have been equalized at a grade of 32%.

- **Sulphur:** Given the involuntary nature of the production of sulphur, CRU takes a different approach in calculating long run marginal cost in the market to voluntarily produced

commodities. CRU considers that price in the long run will trend toward the cost of re-melting a tonne of stockpiled sulphur plus the cost of transporting that tonne to market. CRU has identified two producers, Canadian oil sands upgraders in northern Alberta and the Kashagan oil and gas project, as the likely suppliers of the marginal tonne into the market. We feel that these two producers will be the most likely to build a stockpile and are the lowest cost marginal suppliers to their target markets. The capital component of the LRMC of sulphur is smaller when compared with other commodities and the long run cost is largely determined by the freight component. CRU considers Canadian producers at Fort McMurray as the marginal producer given a slightly higher freight cost that that of Kashagan.

Table A.3: Raw material LRMC outlook, US$/tonne

	Base year (2014)	2019	2037
Phosphate Rock LRMC, 65-75BPL, fob Morocco	118	131	199
Sulphur (molten) LRMC, cfr Tampa	120	130	214
Phosphoric acid LRMC, fob Morocco	630	602	1,143
Ammonia LRMC, fob Black Sea	354	364	658

Data: CRU

- **Phosphoric acid:** Operations included in the phosphoric acid LRMC analysis are the same as the ones that have been outlined for the DAP LRMC (described below in greater detail). Despite the well-proven competitive disadvantages of non-integrated production, two acidulators are non-integrated operations. Both are assumed to be operating on imported rock, through a rock/acid JV agreement (e.g. similar to Faustina), as it is assumed that there will still be a place for them in the future. In addition, we have included a further plant in Morocco, which will be selling phosphoric acid to the Indian market.

  In this case only four of the eight proposed operations were considered for the LRMC estimate. As previously mentioned, in order to be considered for the LRMC, a plant needs to be the lowest cost marginal operation to that particular target market. In this case, the Moroccan acid plant is believed to be a more competitive option to India or Indonesia, that either's domestic counterpart. Therefore both the Indian and Indonesian options are excluded. Instead, the phosphoric acid LRMC is determined by Morocco, where it was estimated at US$635/tonne for 2012. Although Morocco competes favourably against Brazil and Saudi Arabia on operating costs, it is at a disadvantage when it comes to freight and WACC[2]. Going forward, we expect to see inflation push the LRMC up to US$1,009/tonne by 2037.

[2] Again, the assumptions driving our WACC estimates are detailed below.

- **Ammonia:** CRU's view of long-term ammonia pricing is based on the current operating costs at a series of modelled greenfield ammonia plants with the addition of capital expenses and a the freight netback from their target markets to the Middle East. All of these costs are then inflated forward using our forecasts for natural gas prices, labour, freight, US dollar deflation and capital expenditure. Our model assumes that new plants are likely to be built in the USA, Russia, the Middle East and North Africa, and of these the most marginal tonne will be Russian, given Russia's high weighted average cost of capital.

  Our LRMC forecast for ammonia grows from US$325/tonne in 2012 to US$583/tonne in 2037. This suggests that current and forecast market conditions are now looking less attractive to new investment than they have over the past few years (when prices were above the long-term trend), given the need to repay debt holders and provide a reasonable return to equity over and above the risk-free rate. This would make perfect sense in the oversupplied nitrogen market we have forecast over the medium term, and given the greater attractiveness of investing in integrated (downstream) nitrogen plants rather than the comparatively capital intensive stand-alone ammonia configuration. It should be noted that we are not suggesting that there will be no investment over the medium term; investors in low-cost regions such as the Middle East, or latterly North America, can still develop new capacity with the potential for a return that would meet investors' risk-adjusted expectations.

Table A.4: Base-year (2014) merchant grade phosphoric acid LRMC estimate

	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8
Country	Brazil	Morocco	Saudi Arabia	China	India	Indonesia	Kazakhstan	Australia
Target market	Brazil	India	Saudi Arabia	China	India	Indonesia	Kazakhstan	Australia
Investment Rational	Reject	Accept	Accept	Reject	Reject	Reject	Reject	Reject
MGA capacity - '000 t/y	200	450	500	300	200	200	300	200
WACC - %	9.3%	11.1%	8.9%	9.2%	9.1%	9.1%	12.3%	9.1%
Capex total – mil US$	222	300	554	332	222	222	332	222
Capex total – US$/t	162	112	157	161	160	160	203	160
Opex total – US$/t	603.8	477.8	447.8	602.3	721.0	719.4	636.8	583.5
Freight total – US$/t	-151.7	45.5	-46.6	-134.9	-45.5	-55.1	-23.1	-61.7
LRMC – US$/t	**581**	**626**	**554**	**640**	**836**	**809**	**800**	**659**
MGA LRMC – US$/t	**626**							

Source: CRU

A.4.4 DAP long run marginal cost in 2012

In order to estimate the future dynamics of the LRMC for phosphate, we have assessed costs at each of the locations described above. The components that will affect the LRMC estimation in the base year (2012) for each project are the following:

Production costs at the site;
Capital costs incurred when financing a project;
Freight costs to a target market; and
The netback to the benchmark fob point (TAMPA).

Operational costs are computed using CRU's Phosphate Fertilizer Cost Model, and take into account feedstock costs, maintenance costs, conversion costs and macroeconomic dynamics. A more detailed analysis of the costing methodology is provided in CRU's *Phosphate Fertilizer Cost Report*.

In order to estimate operational costs, speculative long-term plants have been endowed with a dedicated phosphoric acid train which is able to meet the requirements for DAP production. Their size has been determined by matching their norm (for that particular area), or in the case when future expansion plans have been outlined, the size of the known projects. It should be noted, however, that companies rarely reveal long-term (>5 years) growth plans. Hence the analyst is usually forced to make his/her own judgement on these factors.

Capital costs are the defining component for calculating the LRMC. Again, where specific details about projects are known, they have been in incorporated into our research. However, as many projects are integrated, and/or state-sponsored (thus not needing much outside investment), few details may be disclosed. In this case, CRU has used the following capex estimates which are based on information available from published reports. The current capital cost of building a 1.8 million tonne/year greenfield surface phosphate rock mine is estimated around US$350 million. A 525,000 tonne P_2O_5/year acidulation unit will add a further US$500-600 million, while the cost of a 750,000 tonne product DAP/MAP granulation unit is estimated between US$200-250/tonne.

For the purposes of the long run analysis, capex has been computed assuming a 10-year loan at a fixed interest rate, which is determined summing the Weighted Average Cost of Capital (WACC) of the fertilizer industry to a country-risk premium. Our current estimate for the long-run guidance for the WACC in the fertilizer industry stands at 9.6%, and is adjusted for different projects with a suitable country risk premium. This covers additional political risks in respect to countries in which they are prepared to invest. It is however important to note that

this has been taken from a US investor's point of view, and thus if projects are predominantly funded by domestic funds, for example in Morocco, they may not include such a risk premium. This would lead to an overall lower WACC and would decrease the LRMC.

The magnitude of capital costs confirms that, despite their expected higher efficiency (80% operating rate), new projects will anyway act as marginal producers, and set the long-term price on their LRMC.

In order to allow for cost comparison, all site and capital costs (representing the ex-works price in a competitive market) are converted into free-on-board prices ex-Tampa (our benchmark price estimate). This is obtained by adding the freight required to reach the target market, and subtracting the sea freight to Tampa, as shown in the equation below.

Netback LRMC = ex works operating cost + capital charge + land freight to fob point - ocean freight to target market – sea freight from target market to TAMPA

The table below shows hypothetical plants selected by CRU to determine the DAP LRMC. Five out of the eight granulation projects considered for the LRMC have been rejected. Again, this has to do with their respective competitiveness. Plant 1 (Brazil), for example, has been rejected, because the lowest cost option for a Brazilian farmer is in fact importing from Plant 2 (Morocco). Similarly, Plant 6 (Indonesia) has also been rejected, as Plant 3 in Saudi Arabia (despite targeting India) could potentially supply South East Asia market at a lower cost. This leaves only three projects to determine the LRMC.

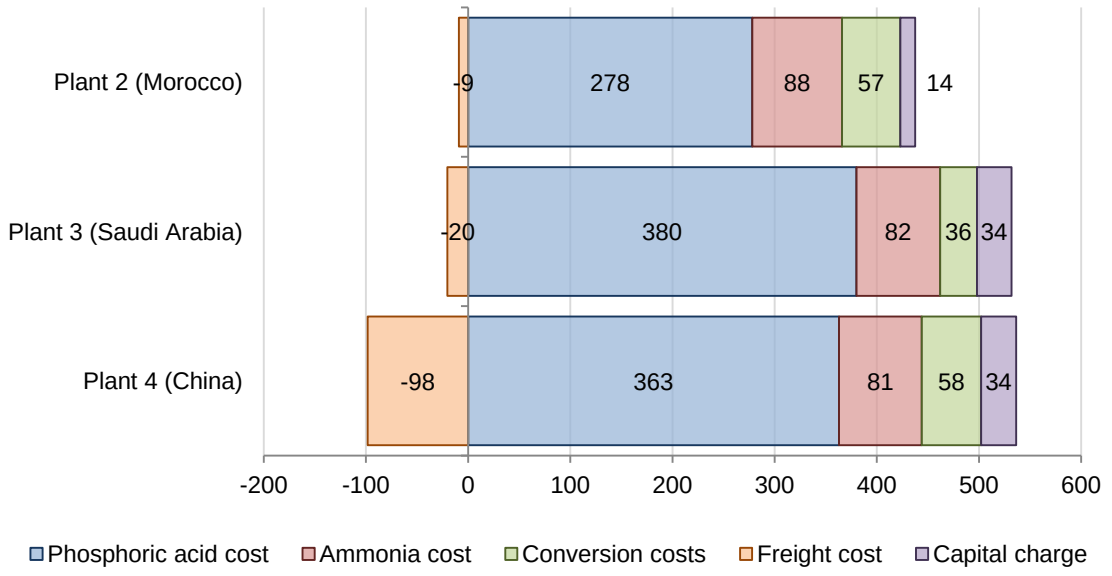
The only plants which have met our testing for economic viability are located in Morocco, Saudi Arabia and China. Although Moroccan capacity is used as the base for CRU's LRMC estimation in the phosphate fertilizer market, this is primarily due to the freight differential against a particular price point. By being included in our estimate, it reflects the strong advantage these projects have against investments elsewhere in the world. More specifically, Moroccan capacity suffers from a larger distance to the Brazilian market compared to producers in Tampa, and to a lower penetration in terms of warehouses and port facilities than its US competitors. Not surprisingly, this is one of the focuses of Morocco's investments in Brazil. In addition, Saudi Arabia's proximity to India gives it a significant advantage over Moroccan DAP, and the same applies to Chinese DAP for the domestic market.

Table A.5: Base-year (2014) DAP LRMC estimate

	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Plant 6	Plant 7	Plant 8
Country	Brazil	Morocco	Saudi Arabia	China	India	Indonesia	Kazakhstan	Australia
Target market	Brazil	Brazil	India	China	India	Indonesia	China	India
Investment Rational	Reject	Accept	Accept	Reject	Reject	Reject	Reject	Reject
DAP capacity - '000 t/y	435	978	1087	652	435	435	652	435
Capex total – mil US$	119	100	298	179	119	119	179	119
WACC - %	9%	11%	9%	9%	9%	9%	12%	9%
Capex total – US$/t	34.5	14.5	33.8	34.4	34.3	34.3	41.7	34.2
Opex total – US$/t	531.2	447.9	425.4	528.0	630.6	617.6	574.2	482.6
Freight differential – US$/t	-89.1	-9.0	-20.3	-103.2	-24.0	-52.2	34.2	25.5
LRMC – US$/t	**473**	**466**	**445**	**479**	**653**	**609**	**652**	**540**
DAP LRMC – US$/t	**466**							

Source: CRU

Stylized plants considered for the LRMC calculation



Data: CRU

A.4.5 Escalation of the long run marginal cost

In order to escalate the base year LMRC estimate over time, two additional parameters need to be taken into account:

An estimate of productivity growth, to obtain real LRMC projections;
An LRMC inflation index, to obtain nominal projections to form the base-case long-run price estimate.

While there is limited scope for productivity growth on the acidulation side, we are fairly bullish about the prospects for further technological improvements/efficiencies on the granulation side, reducing the real LRMC for DAP production by an average of 0.22% per annum through to 2037.

The LRMC inflation index is constructed starting from CRU's in-house macroeconomic forecasts, involving a specific mix of labour and capital costs, engineering supply costs, freights costs and, most importantly, feedstock prices. Such a procedure ensures that each product across the CRU portfolio of market outlooks is escalated using a dedicated inflation index, hence representing a robust methodology for understanding future market developments.

Table A.6: Long term DAP real trend escalators

Escalator	Escalation weight	CAGR 2012-2037
Capital cost index	8%	0.8%
Power index	6%	-0.3%
Ammonia index	7%	0.1%
Phosphoric acid index	15%	0.5%
Chemical supplies index	27%	0.0%
Ocean freight index	1%	-0.2%
Labour inflation index	36%	-0.4%
Total	**100%**	**0.4%**
US GDP Deflator		*1.8%*

Source: CRU

As shown in the previous table, the most important escalators for DAP are phosphoric acid, supplies and labour, jointly responsible for 78% of the increase during 2012 and 2037.

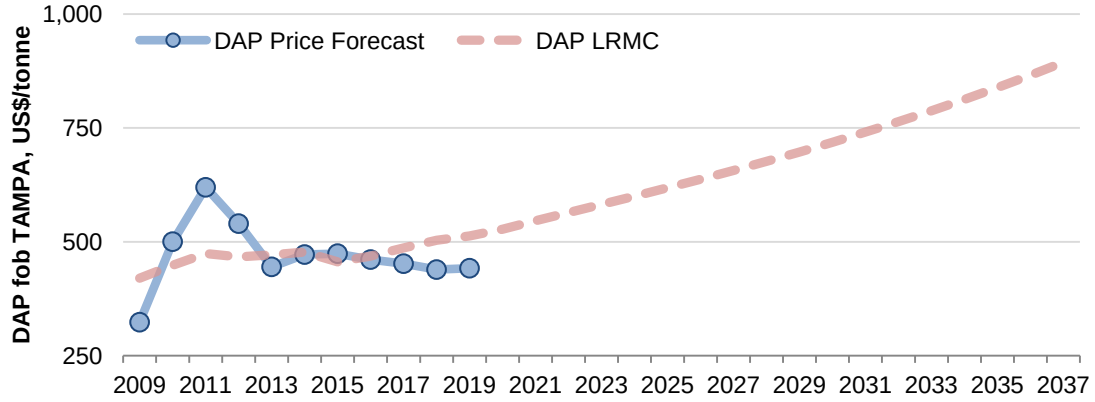
The phosphoric acid index has been estimated from its LRMC (which is described above in some detail). Between 2012 and 2037, the acid LRMC is likely to grow from US$635/tonne to US$1,009/tonne, registering a CAGR of 1.87% over the 25-year period.

The chemical supplies index has been derived to capture the impact of the various catalysts/chemicals consumed in the phosphate production process. Acidulation/granulation plants utilize a number of different catalysts, each of which has varying life spans. Having flattened in 2012, we believe that the index will once again resume its growth trend in 2013. Over the next 25 years chemical/catalyst costs are expected to increase by a CAGR of 2.4%.

Even though labour cost pressure of the kind experienced in recent years are not expected to continue in the longer term, the labour index show the strongest growth over the next 25 years. The shortage of skilled labour seen in recent years is likely to persist into the medium term, but

should eventually start to ease as more recruits move into the commodity producing sector. Our long-term labour cost projection is a function of country specific whole economy labour productivity growth, consumer price inflation and the exchange rate against the US$. Countries with relatively rapid growth in labour productivity, such as China and India, will experience the most rapid growth in hourly labour costs in US$ terms.

DAP LRMC forecast 2009-2037 , US$/tonne



Data: CRU

The LRMC for DAP was lower than the market price during between 2010 and 2012, explaining the drive to build new capacity that has emerged in recent years. Since then, however, prices have fallen and are currently thought to be below the LRMC. The decline has thus far not been steep enough to postpone/delay expansions, but if this trend continues into 2014/15, we may see a significant slowdown in new capacity additions.

A.4.6 Risks to the outlook

Long term forecasting is fraught with uncertainties, given the variety of events and scenarios that could develop over the forecast period that could change the long term outlook from the base case scenario. Below is a selection of risks that could result in higher or lower phosphate prices over the long term. For those related to agricultural markets, please see the Focus on Agricultural Markets throughout this report.

- Operating costs are an important part of our LRMC calculations and these are based on a number of assumptions. Although the LRMC estimate will be regularly updated with CRU's latest forecasts, the accuracy of the LRMC forecast is clearly reliant on the accuracy of these underlying forecasts. The LRMC forecasts do not account for any breakthrough in mining or processing technology, or step-change in mine productivity that could affect operating costs. Capital cost inflation, including the country-specific risk premiums, may also differ from our forecasts.

- Our demand outlook is primarily based on a forecast of agricultural production and its relationship with nutrient consumption. Demand projections will be impacted if:
  - Agricultural production does not grow as predicted and/or the historical correlation between agricultural production and breaks down;
  - If phosphate fertilizer consumption grows faster or slower than forecast – as discussed in the demand section, we believe that a reduction in the world N:P_2O_5 ratio in the long term represents the more likely risk.

- The relatively small size of the international market for the phosphate rock industry increases the impact of new mines or plants on global supply. This means that the timing of individual projects could have a significant impact on the LRMC.

- As noted earlier, there is also a risk that favourable investment conditions in the medium term create a prolonged excess capacity, with the effect of depressing prices below the projected LRMC. On the other hand, until such new capacity materialises, the existing producers can be expected to pursue the established strategy of managed supply with the intention of maintaining prices above the LRMC level.

Table B.1: Phosphate Fertilizer Consumption 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**41,239**	**41,503**	**41,496**	**42,912**	**43,401**	**43,246**	**44,559**	**45,537**	**46,361**	**47,422**
Europe & CIS Total	**3,697**	**3,889**	**4,003**	**4,488**	**4,397**	**4,533**	**4,628**	**4,695**	**4,757**	**4,783**
West Europe Total	1,752	1,873	1,904	2,286	2,152	2,146	2,137	2,114	2,098	2,078
France	432	495	473	577	529	539	544	543	545	545
Germany	247	284	284	311	292	299	294	286	281	275
Spain	355	377	427	505	466	448	441	434	431	427
United Kingdom	188	194	201	250	236	233	233	232	229	226
Other	530	523	519	642	629	627	624	618	613	604
East Europe Total	983	1,106	1,189	1,189	1,211	1,289	1,342	1,392	1,434	1,470
Poland	371	387	394	438	441	474	497	527	550	567
Romania	119	122	152	160	160	160	159	159	159	159
Ukraine	216	268	283	183	191	233	259	275	291	305
Other	278	329	360	408	419	423	427	431	435	439
CIS Total	962	910	909	1,014	1,034	1,097	1,150	1,190	1,225	1,236
Belarus	292	221	208	213	225	239	248	258	268	278
Russia	549	564	565	580	608	651	689	713	738	763
Uzbekistan	105	109	115	162	138	139	140	145	146	116
Other	16	16	21	59	63	68	73	73	73	78
Africa Total	**1,308**	**1,470**	**1,585**	**1,797**	**1,841**	**1,918**	**1,995**	**2,076**	**2,160**	**2,255**
North Africa Total	501	529	562	652	624	631	637	642	648	657
Egypt	150	163	177	236	215	219	222	224	226	229
Morocco	212	215	248	298	289	291	293	295	296	301
Other	139	151	137	118	119	121	122	124	125	127
East Africa Total	390	541	570	657	691	731	772	816	861	909
Ethiopia	175	335	245	302	318	335	353	372	392	412
Kenya	83	70	161	174	184	195	207	219	231	245
Other	132	137	164	181	188	200	212	225	238	252
West Africa Total	218	195	259	265	281	299	319	339	361	385
Cote d'Ivoire	15	23	50	49	52	56	59	62	66	70
Ghana	53	51	40	42	45	47	50	53	56	59
Nigeria	60	58	64	70	77	85	93	103	113	125
Senegal	30	30	35	35	36	37	39	40	42	43
Other	60	32	71	68	72	75	78	81	85	89
Central Africa Total	13	14	8	28	29	32	33	36	37	39
Cameroon	13	13	7	17	18	19	20	20	21	22
Other	0	2	1	10	11	13	14	15	16	17
Southern Africa Total	186	190	186	196	216	225	234	243	252	265
South Africa	186	190	186	193	213	222	231	240	249	262
Other	0	0	0	3	3	3	3	3	3	3
North America Total	**4,749**	**5,046**	**4,974**	**5,068**	**4,912**	**4,926**	**4,959**	**4,973**	**4,955**	**4,956**
North America Total	4,749	5,046	4,974	5,068	4,912	4,926	4,959	4,973	4,955	4,956
Canada	799	831	886	850	812	776	779	793	775	776
USA	3,950	4,215	4,088	4,218	4,100	4,150	4,180	4,180	4,180	4,180
Central & South America Tota	**5,724**	**6,060**	**6,542**	**6,758**	**6,062**	**6,357**	**6,689**	**6,925**	**7,157**	**7,429**
Caribbean Total	40	36	33	47	45	45	45	45	46	46
Dominican Republic	22	16	15	21	21	22	22	22	23	23
Other	19	20	18	26	23	23	23	23	23	23
Central America Total	366	405	415	446	447	449	454	457	460	464
Guatemala	40	49	49	43	44	45	46	47	48	49
Mexico	281	300	305	338	336	335	337	337	337	336
Other	45	57	61	65	67	69	71	74	76	79
South America Total	5,318	5,619	6,094	6,266	5,571	5,863	6,190	6,423	6,652	6,919
Brazil	3,860	4,325	4,641	4,752	4,068	4,298	4,559	4,754	4,952	5,188
Colombia	175	174	189	161	162	163	164	164	169	166
Peru	75	65	68	104	92	88	83	83	78	81
Venezuela	65	70	70	70	72	73	74	76	77	80
Other	1,143	985	1,127	1,178	1,177	1,242	1,310	1,345	1,375	1,405
Asia Total	**24,551**	**23,931**	**23,259**	**23,545**	**24,917**	**24,237**	**24,986**	**25,547**	**25,994**	**26,641**
Middle East Total	945	959	959	1,015	1,049	1,079	1,103	1,147	1,178	1,217
Iran	170	170	176	227	258	286	320	351	383	405
Turkey	490	532	623	582	574	568	544	543	536	535
Other	285	257	160	206	217	225	239	252	258	277

Table B.1: Phosphate Fertilizer Consumption 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South Asia Total	9,168	7,992	7,176	7,311	8,425	7,978	8,620	9,058	9,429	9,946
India	7,914	6,653	5,634	5,728	6,780	6,300	6,900	7,300	7,628	8,100
Pakistan	633	747	881	936	1,003	1,023	1,049	1,071	1,097	1,126
Other	621	591	661	646	641	655	671	687	704	720
South-East Asia Total	2,032	2,460	2,489	2,696	2,827	2,921	3,044	3,148	3,243	3,363
Indonesia	584	944	849	957	1,050	1,120	1,193	1,267	1,324	1,414
Malaysia	300	320	320	314	315	314	317	318	318	318
Thailand	390	400	494	395	389	395	405	413	420	428
Vietnam	680	696	706	892	934	951	986	1,006	1,034	1,055
Other	78	100	120	139	140	141	143	145	146	148
East Asia Total	12,405	12,520	12,635	12,524	12,616	12,259	12,219	12,195	12,144	12,114
China	11,858	11,977	12,096	11,915	12,015	11,666	11,632	11,615	11,571	11,547
Other	547	543	539	609	601	594	587	580	573	567
Oceania Total	**1,210**	**1,106**	**1,132**	**1,255**	**1,272**	**1,275**	**1,301**	**1,320**	**1,339**	**1,358**
Australia	873	803	816	913	922	917	935	945	955	965
New Zealand	337	303	316	342	350	358	367	375	384	393
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table C.1: Phosphoric acid consumption 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**40,898**	**40,892**	**42,267**	**42,849**	**44,184**	**44,922**	**46,305**	**47,177**	**47,841**	**48,506**
Europe & CIS Total	**4,951**	**4,897**	**4,585**	**4,702**	**5,572**	**5,776**	**5,812**	**5,803**	**5,745**	**5,693**
West Europe Total	1,082	1,086	904	882	1,138	1,142	1,121	1,121	1,121	1,122
Finland	178	182	220	203	245	245	245	245	245	245
France	139	207	180	218	232	231	232	232	232	232
Netherlands	105	158	133	151	221	215	215	215	215	215
Spain	174	199	159	111	146	146	146	146	146	146
Other	486	340	212	199	294	304	283	283	283	283
East Europe Total	987	916	834	854	916	1,007	1,024	1,001	995	992
Bulgaria	117	112	94	115	140	172	173	174	174	174
Lithuania	445	429	447	454	369	361	372	354	354	354
Poland	340	294	187	233	355	370	372	355	349	346
Other	85	80	107	52	52	104	108	118	118	118
CIS Total	2,882	2,896	2,846	2,966	3,518	3,628	3,667	3,680	3,629	3,580
Russia	2,513	2,557	2,533	2,561	3,192	3,270	3,281	3,291	3,231	3,187
Other	369	338	314	405	326	358	386	390	398	392
Africa Total	**3,134**	**2,997**	**3,625**	**3,581**	**3,144**	**3,783**	**4,614**	**4,987**	**5,636**	**6,106**
North Africa Total	2,812	2,758	3,345	3,230	2,931	3,504	4,306	4,659	5,308	5,778
Egypt	30	31	51	87	32	52	52	52	52	52
Morocco	2,316	2,121	2,530	2,498	2,486	2,943	3,661	3,869	4,477	4,942
Tunisia	450	590	750	631	399	496	579	726	765	770
Other	16	16	14	15	14	12	13	13	13	13
East Africa Total	12	2	1	2	3	3	23	43	43	43
Uganda	0	0	0	0	0	0	20	40	40	40
Other	12	2	1	2	3	3	3	3	3	3
West Africa Total	27	15	7	42	88	104	104	104	104	104
Senegal	26	14	5	40	86	102	102	102	102	102
Other	1	1	2	2	2	2	2	2	2	2
Central Africa Total	0	0	0	0	2	2	2	2	2	2
Other	0	0	0	0	2	2	2	2	2	2
Southern Africa Total	283	223	272	306	119	171	179	179	179	179
South Africa	283	223	272	306	117	169	177	177	177	177
Other	0	0	0	0	2	2	2	2	2	2
North America Total	**8,351**	**7,920**	**8,081**	**7,598**	**7,421**	**7,635**	**7,780**	**7,767**	**7,715**	**7,719**
North America Total	8,351	7,920	8,081	7,598	7,421	7,635	7,780	7,767	7,715	7,719
Canada	389	379	320	327	310	299	299	299	299	299
USA	7,962	7,541	7,761	7,270	7,111	7,335	7,480	7,467	7,415	7,419
Central & South America Tota	**1,945**	**2,014**	**2,022**	**1,798**	**1,914**	**1,894**	**1,885**	**1,973**	**2,030**	**2,101**
Caribbean Total	1	2	0	1	2	2	2	2	2	2
Dominican Republic	0	1	0	0	1	1	1	1	1	1
Other	0	1	0	0	1	1	1	1	1	1
Central America Total	650	667	626	579	548	557	597	616	619	621
Mexico	647	660	621	576	543	552	592	611	613	616
Other	3	6	5	3	5	5	5	5	5	5
South America Total	1,294	1,345	1,396	1,219	1,363	1,335	1,286	1,354	1,409	1,478
Brazil	1,190	1,187	1,341	1,189	1,284	1,263	1,218	1,286	1,340	1,410
Colombia	13	10	13	13	20	20	20	20	20	20
Peru	11	13	12	8	11	7	3	3	3	3
Venezuela	67	62	18	1	33	30	30	30	30	29
Other	12	72	14	8	16	16	16	16	16	16
Asia Total	**22,057**	**22,731**	**23,544**	**24,752**	**25,742**	**25,430**	**25,807**	**26,228**	**26,312**	**26,489**
Middle East Total	1,585	2,044	2,139	2,571	2,511	2,583	2,872	3,656	3,945	4,141
Iran	35	34	36	55	76	70	73	73	73	73
Israel	380	310	391	327	374	357	311	313	313	314
Jordan	348	309	307	425	253	338	504	504	452	450
Lebanon	113	115	80	120	76	70	73	77	77	77
Saudi Arabia	218	846	928	1,160	1,243	1,270	1,436	2,214	2,559	2,757
Syria	61	40	25	0	0	0	2	2	2	2
Turkey	431	391	352	483	483	475	469	469	465	464
Other	0	0	20	0	6	3	3	3	3	3
South Asia Total	4,129	3,883	3,630	3,610	4,515	4,594	4,644	4,375	4,198	4,131
India	3,755	3,543	3,237	3,209	4,069	4,201	4,253	3,988	3,812	3,744
Pakistan	324	313	327	346	350	339	338	332	331	332
Other	51	28	66	54	97	54	54	54	54	54

Table C.1: Phosphoric acid consumption 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South-East Asia Total	675	689	646	611	523	720	871	901	902	902
Indonesia	377	419	418	423	346	446	596	626	626	626
Philippines	148	115	79	2	2	2	2	2	2	2
Vietnam	101	102	102	132	108	205	205	206	206	207
Other	49	52	48	55	67	67	67	67	67	67
East Asia Total	15,668	16,115	17,129	17,960	18,193	17,532	17,420	17,296	17,267	17,315
China	15,202	15,713	16,832	17,687	17,850	17,153	17,041	16,927	16,905	16,953
Other	466	402	297	273	343	379	379	369	362	362
Oceania Total	**460**	**333**	**411**	**419**	**390**	**403**	**406**	**418**	**403**	**397**
Australia	459	331	409	418	388	401	405	417	401	396
Other	1	1	1	1	2	2	2	2	2	2
Unidentified Total	0	0	0	0	1	1	1	1	1	1
Other	0	0	0	0	1	1	1	1	1	1

Table C.2: Phosphoric acid capacity 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**50,551**	**52,615**	**54,436**	**54,495**	**54,914**	**55,893**	**56,349**	**57,553**	**57,878**	**58,553**
Europe & CIS Total	**5,896**	**5,746**	**5,775**	**5,875**	**5,975**	**6,125**	**6,125**	**6,125**	**6,125**	**6,125**
West Europe Total	545	545	545	545	545	545	545	545	545	545
Belgium	180	180	180	180	180	180	180	180	180	180
Finland	290	290	290	290	290	290	290	290	290	290
Greece	75	75	75	75	75	75	75	75	75	75
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	1,446	1,296	1,325	1,425	1,425	1,425	1,425	1,425	1,425	1,425
Bulgaria	200	200	200	200	200	200	200	200	200	200
Lithuania	440	440	469	469	469	469	469	469	469	469
Poland	354	354	354	354	354	354	354	354	354	354
Ukraine	302	302	302	302	302	302	302	302	302	302
Other	150	0	0	100	100	100	100	100	100	100
CIS Total	3,905	3,905	3,905	3,905	4,005	4,155	4,155	4,155	4,155	4,155
Belarus	230	230	230	230	230	230	230	230	230	230
Kazakhstan	150	150	150	150	250	400	400	400	400	400
Russia	3,298	3,298	3,298	3,298	3,298	3,298	3,298	3,298	3,298	3,298
Uzbekistan	227	227	227	227	227	227	227	227	227	227
Other	0	0	0	0	0	0	0	0	0	0
Africa Total	**7,837**	**7,844**	**8,024**	**8,229**	**9,129**	**9,779**	**10,289**	**10,573**	**10,798**	**11,473**
North Africa Total	6,187	6,234	6,414	6,819	7,719	8,369	8,819	9,044	9,269	9,944
Morocco	4,510	4,510	4,510	4,735	5,635	6,085	6,535	6,760	6,985	7,660
Tunisia	1,563	1,563	1,743	1,923	1,923	2,123	2,123	2,123	2,123	2,123
Other	114	161	161	161	161	161	161	161	161	161
East Africa Total	40	0	0	0	0	0	59	119	119	119
Other	40	0	0	0	0	0	59	119	119	119
West Africa Total	660	660	660	660	660	660	660	660	660	660
Senegal	660	660	660	660	660	660	660	660	660	660
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	950	950	950	750	750	750	750	750	750	750
South Africa	950	950	950	750	750	750	750	750	750	750
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**9,547**	**9,547**	**9,547**	**9,547**	**8,816**	**8,816**	**8,816**	**8,816**	**8,816**	**8,816**
North America Total	9,547	9,547	9,547	9,547	8,816	8,816	8,816	8,816	8,816	8,816
Canada	345	345	345	345	345	345	345	345	345	345
USA	9,202	9,202	9,202	9,202	8,471	8,471	8,471	8,471	8,471	8,471
Central & South America Tota	**2,414**	**2,554**	**2,646**	**2,646**	**2,646**	**2,646**	**2,646**	**2,826**	**2,826**	**2,826**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	878	878	878	878	878	878	878	878	878	878
Mexico	878	878	878	878	878	878	878	878	878	878
Other	0	0	0	0	0	0	0	0	0	0
South America Total	1,536	1,676	1,768	1,768	1,768	1,768	1,768	1,948	1,948	1,948
Brazil	1,389	1,529	1,621	1,621	1,621	1,621	1,621	1,801	1,801	1,801
Other	147	147	147	147	147	147	147	147	147	147
Asia Total	**24,257**	**26,323**	**27,844**	**27,598**	**27,748**	**27,927**	**27,873**	**28,613**	**28,713**	**28,713**
Middle East Total	3,059	3,819	3,824	4,074	4,149	4,095	4,541	5,681	5,681	5,681
Israel	640	640	640	640	640	640	640	640	640	640
Jordan	624	624	624	862	1,099	1,099	1,099	1,099	1,099	1,099
Saudi Arabia	761	1,521	1,521	1,521	1,521	1,521	1,967	3,107	3,107	3,107
Other	1,034	1,034	1,039	1,051	889	835	835	835	835	835
South Asia Total	2,283	2,403	2,450	2,531	2,578	2,578	2,578	2,578	2,578	2,578
India	2,202	2,322	2,369	2,450	2,497	2,497	2,497	2,497	2,497	2,497
Other	81	81	81	81	81	81	81	81	81	81
South-East Asia Total	758	758	758	579	1,033	1,083	1,083	1,183	1,283	1,283
Indonesia	200	200	200	350	550	600	600	700	800	800
Philippines	396	396	396	0	0	0	0	0	0	0
Vietnam	162	162	162	229	483	483	483	483	483	483
Other	0	0	0	0	0	0	0	0	0	0
East Asia Total	18,158	19,344	20,812	20,415	19,988	20,171	19,671	19,171	19,171	19,171
China	17,429	18,615	20,083	19,806	19,379	19,562	19,062	18,562	18,562	18,562
Other	729	729	729	609	609	609	609	609	609	609

Table C.2: Phosphoric acid capacity 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Oceania Total	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**	**600**
Australia	600	600	600	600	600	600	600	600	600	600
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table C.3: Phosphoric acid production 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**40,952**	**41,687**	**42,523**	**43,164**	**44,183**	**44,922**	**46,305**	**47,177**	**47,841**	**48,506**
Europe & CIS Total	**4,255**	**4,170**	**4,104**	**4,242**	**4,809**	**5,046**	**5,068**	**5,063**	**5,006**	**4,953**
West Europe Total	419	428	443	458	398	437	401	401	401	401
Belgium	124	135	138	145	62	90	59	59	59	59
Finland	241	262	268	270	276	289	284	284	284	284
Other	54	30	37	43	59	58	58	58	58	58
East Europe Total	959	856	819	823	881	971	990	972	966	963
Bulgaria	117	109	92	107	134	167	168	169	169	169
Lithuania	444	429	447	454	368	360	371	353	353	353
Poland	320	270	182	218	342	355	357	345	339	336
Other	78	48	99	45	37	90	95	104	104	104
CIS Total	2,878	2,886	2,842	2,961	3,530	3,638	3,677	3,690	3,639	3,589
Russia	2,509	2,554	2,529	2,556	3,205	3,280	3,291	3,301	3,241	3,197
Other	369	332	314	405	325	358	386	390	398	391
Africa Total	**6,139**	**5,652**	**6,278**	**6,253**	**5,540**	**6,173**	**7,194**	**7,194**	**7,625**	**8,057**
North Africa Total	5,125	4,864	5,535	5,601	5,160	5,678	6,491	6,417	6,886	7,341
Morocco	4,404	3,864	4,444	4,525	4,570	4,940	5,561	5,339	5,763	6,208
Tunisia	700	950	1,050	1,000	568	701	892	1,040	1,086	1,095
Other	21	50	41	76	22	37	37	37	37	37
East Africa Total	10	0	0	0	0	0	20	40	40	40
Other	10	0	0	0	0	0	20	40	40	40
West Africa Total	391	363	260	200	196	201	310	400	376	376
Senegal	391	363	260	200	196	201	310	400	376	376
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	613	425	482	451	184	294	373	338	323	300
South Africa	613	425	482	451	184	294	373	338	323	300
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**8,748**	**8,227**	**8,508**	**7,927**	**7,718**	**7,935**	**8,030**	**8,017**	**7,940**	**7,944**
North America Total	8,748	8,227	8,508	7,927	7,718	7,935	8,030	8,017	7,940	7,944
Canada	324	266	290	306	259	249	249	249	249	249
USA	8,424	7,961	8,218	7,621	7,459	7,685	7,780	7,767	7,690	7,694
Central & South America Tota	**1,719**	**1,951**	**1,849**	**1,619**	**1,709**	**1,702**	**1,696**	**1,784**	**1,841**	**1,912**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	619	622	575	510	497	502	542	561	563	566
Mexico	619	622	575	510	497	502	542	561	563	566
Other	0	0	0	0	0	0	0	0	0	0
South America Total	1,101	1,329	1,274	1,109	1,211	1,200	1,154	1,223	1,277	1,345
Brazil	1,039	1,287	1,258	1,109	1,180	1,173	1,128	1,196	1,250	1,320
Other	61	42	16	0	31	27	27	27	27	25
Asia Total	**19,640**	**21,367**	**21,384**	**22,715**	**24,031**	**23,675**	**23,922**	**24,712**	**25,038**	**25,255**
Middle East Total	1,606	2,023	2,218	2,648	2,847	2,928	3,177	3,960	4,295	4,493
Israel	514	504	576	524	717	549	557	557	557	557
Jordan	484	447	470	658	593	824	901	901	901	901
Saudi Arabia	140	715	845	1,073	1,158	1,195	1,361	2,139	2,484	2,682
Other	469	356	327	393	379	360	358	363	353	353
South Asia Total	1,723	1,414	1,447	1,482	2,331	2,292	2,292	2,417	2,442	2,417
India	1,698	1,395	1,426	1,450	2,256	2,247	2,247	2,372	2,397	2,372
Other	25	20	22	32	76	45	45	45	45	45
South-East Asia Total	444	450	387	373	421	680	840	871	866	861
Indonesia	197	207	210	243	223	376	536	586	586	586
Philippines	146	113	77	0	0	0	0	0	0	0
Vietnam	100	130	100	130	198	303	303	284	279	275
Other	0	0	0	0	0	0	0	0	0	0
East Asia Total	15,867	17,481	17,332	18,214	18,432	17,775	17,613	17,465	17,436	17,484
China	15,500	17,200	17,100	18,000	18,229	17,533	17,371	17,232	17,210	17,258
Other	367	281	232	214	203	242	242	233	226	226
Oceania Total	**450**	**321**	**401**	**408**	**376**	**391**	**395**	**407**	**391**	**386**
Australia	450	321	401	408	376	391	395	407	391	386
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table C.4: Phosphoric acid imports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**4,219**	**4,055**	**3,881**	**3,886**	**4,332**	**4,289**	**4,318**	**3,899**	**3,693**	**3,652**
Europe & CIS Total	**763**	**850**	**720**	**727**	**980**	**950**	**949**	**944**	**944**	**945**
West Europe Total	731	827	700	692	940	910	910	910	910	910
Belgium	174	130	98	120	126	100	100	100	100	100
France	139	194	180	218	232	231	232	232	232	232
Netherlands	105	156	133	151	221	215	215	215	215	215
Spain	174	198	159	111	146	146	146	146	146	146
Other	139	150	131	92	216	217	217	217	217	217
East Europe Total	28	20	15	31	35	35	34	29	29	29
Bulgaria	0	3	2	8	6	5	5	5	5	5
Poland	20	15	5	16	13	15	15	10	10	10
Other	7	2	9	8	15	15	14	14	14	14
CIS Total	4	4	4	5	5	5	5	5	5	6
Russia	4	3	4	4	4	5	5	5	5	5
Other	0	0	0	0	1	0	0	0	0	1
Africa Total	**36**	**31**	**30**	**33**	**60**	**41**	**41**	**41**	**41**	**41**
North Africa Total	25	26	24	26	24	27	28	28	28	28
Algeria	15	15	13	15	12	10	10	10	10	10
Egypt	9	10	10	11	9	15	15	15	15	15
Other	1	1	1	1	3	3	3	3	3	3
East Africa Total	2	2	1	2	3	3	3	3	3	3
Kenya	1	1	1	1	2	2	2	2	2	2
Other	1	1	0	1	1	1	1	1	1	1
West Africa Total	1	1	2	2	3	2	2	2	2	2
Nigeria	1	1	1	1	1	1	1	1	1	1
Other	0	0	1	1	1	1	1	1	1	1
Central Africa Total	0	0	0	0	2	2	2	2	2	2
Other	0	0	0	0	2	2	2	2	2	2
Southern Africa Total	8	3	3	3	28	6	6	6	6	6
South Africa	8	3	3	3	26	4	4	4	4	4
Other	0	0	0	0	2	2	2	2	2	2
North America Total	**95**	**96**	**70**	**68**	**124**	**100**	**100**	**100**	**100**	**100**
North America Total	95	96	70	68	124	100	100	100	100	100
Canada	65	48	30	22	50	50	50	50	50	50
United States	30	48	40	47	74	50	50	50	50	50
Central & South America Tota	**272**	**277**	**214**	**209**	**247**	**222**	**218**	**219**	**219**	**220**
Caribbean Total	1	2	0	1	2	2	2	2	2	2
Dominican Republic	0	1	0	0	1	1	1	1	1	1
Other	0	1	0	0	1	1	1	1	1	1
Central America Total	78	87	91	100	93	85	85	85	85	85
Mexico	74	81	86	97	88	80	80	80	80	80
Other	3	6	5	3	5	5	5	5	5	5
South America Total	193	188	122	109	152	135	131	131	131	132
Brazil	151	90	83	80	104	90	90	90	90	90
Colombia	13	10	13	13	20	20	20	20	20	20
Other	29	87	27	16	28	26	22	22	22	23
Asia Total	**3,043**	**2,744**	**2,793**	**2,779**	**2,907**	**2,963**	**2,997**	**2,582**	**2,377**	**2,333**
Middle East Total	297	346	269	353	376	363	357	357	353	352
Saudi Arabia	78	127	83	87	85	75	75	75	75	75
Turkey	213	214	185	255	276	283	277	276	273	272
Other	6	5	1	11	15	5	5	5	5	5
South Asia Total	2,406	2,048	2,183	2,128	2,184	2,303	2,353	1,958	1,756	1,714
India	2,056	1,728	1,811	1,759	1,813	1,954	2,005	1,617	1,415	1,372
Pakistan	324	313	327	346	350	339	338	332	331	332
Other	25	8	45	23	21	9	9	9	9	9
South-East Asia Total	232	277	259	239	197	141	131	111	111	111
Indonesia	179	221	208	180	124	70	60	40	40	40
Thailand	38	41	35	44	52	52	52	52	52	52
Other	15	15	17	15	22	19	19	19	19	19
East Asia Total	110	73	82	59	150	157	157	157	157	157
China	10	10	17	0	10	20	20	20	20	20
Japan	27	25	31	24	25	30	30	30	30	30
Taiwan	31	38	35	35	47	47	47	47	47	47
Other	42	0	0	0	68	60	60	60	60	60

Table C.4: Phosphoric acid imports 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Oceania Total	**10**	**12**	**9**	**11**	**14**	**12**	**12**	**12**	**12**	**12**
Australia	9	11	8	10	12	10	10	10	10	10
Other	1	1	1	1	2	2	2	2	2	2
Unidentified Total	0	44	45	58	0	1	1	1	1	1
Other	0	44	45	58	0	1	1	1	1	1

Table C.5: Phosphoric acid exports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**4,379**	**4,284**	**4,113**	**4,204**	**4,332**	**4,289**	**4,318**	**3,899**	**3,693**	**3,652**
Europe & CIS Total	**173**	**276**	**239**	**268**	**217**	**220**	**205**	**205**	**205**	**205**
West Europe Total	173	276	239	268	200	205	190	190	190	190
Belgium	110	195	191	200	168	160	150	150	150	150
Finland	63	81	48	68	32	45	40	40	40	40
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
CIS Total	0	0	0	0	17	15	15	15	15	15
Other	0	0	0	0	17	15	15	15	15	15
Africa Total	**3,042**	**2,732**	**2,683**	**2,705**	**2,456**	**2,430**	**2,621**	**2,248**	**2,030**	**1,993**
North Africa Total	2,338	2,177	2,215	2,397	2,253	2,201	2,213	1,785	1,606	1,591
Morocco	2,088	1,817	1,914	2,027	2,084	1,997	1,900	1,470	1,285	1,266
Tunisia	250	360	301	370	170	204	312	315	321	326
Other	0	0	0	0	0	0	0	0	0	0
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	366	350	255	160	110	99	209	298	275	275
Senegal	366	350	255	160	110	99	209	298	275	275
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	338	205	213	148	93	130	200	164	149	127
South Africa	338	205	213	148	93	130	200	164	149	127
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**492**	**468**	**497**	**398**	**421**	**400**	**350**	**350**	**325**	**325**
North America Total	492	468	497	398	421	400	350	350	325	325
United States	492	468	497	398	421	400	350	350	325	325
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**46**	**135**	**40**	**30**	**41**	**30**	**30**	**30**	**30**	**30**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	46	135	40	30	41	30	30	30	30	30
Mexico	46	135	40	30	41	30	30	30	30	30
Other	0	0	0	0	0	0	0	0	0	0
South America Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**626**	**616**	**633**	**743**	**1,196**	**1,208**	**1,112**	**1,066**	**1,103**	**1,100**
Middle East Total	318	333	348	430	712	708	662	661	703	705
Israel	134	194	185	197	344	192	246	244	244	243
Jordan	136	138	163	233	340	487	397	397	450	451
Other	47	0	0	0	27	30	20	20	10	10
South Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	0	95	100	100	80	75	70
Other	0	0	0	0	95	100	100	80	75	70
East Asia Total	309	284	285	313	389	400	350	325	325	325
China	309	281	285	313	389	400	350	325	325	325
Other	0	3	0	0	0	0	0	0	0	0
Oceania Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	58.1	21	60	0	0	0	0	0	0
Other	0	58	21	60	0	0	0	0	0	0

Table D.1: DAP consumption 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**15,051**	**15,825**	**15,691**	**15,062**	**16,425**	**16,081**	**16,733**	**17,251**	**17,681**	**18,079**
Europe & CIS Total	**841**	**1,020**	**1,167**	**1,101**	**998**	**1,161**	**1,169**	**1,188**	**1,194**	**1,195**
West Europe Total	601	774	953	784	771	834	833	828	825	819
Belgium	88	129	106	19	69	94	94	94	94	94
France	105	137	170	191	144	189	191	190	191	191
Germany	85	96	169	124	147	141	138	135	132	129
Italy	80	139	115	122	71	120	119	117	115	114
Spain	101	143	166	131	122	134	132	130	129	128
Other	141	131	227	196	217	156	159	162	165	163
East Europe Total	165	214	200	260	264	266	276	300	308	314
Bulgaria	16	21	36	32	43	33	33	34	34	35
Poland	64	102	77	66	97	118	124	142	148	153
Romania	44	41	64	85	66	56	59	64	64	64
Other	40	50	24	77	58	59	60	61	62	63
CIS Total	75	32	13	58	-37	62	60	60	61	61
Russia	75	32	12	40	-50	50	50	50	50	50
Other	0	0	2	17	12	12	10	10	11	11
Africa Total	**647**	**654**	**583**	**564**	**409**	**485**	**501**	**517**	**535**	**555**
North Africa Total	267	207	201	300	223	218	219	221	222	225
Morocco	226	125	150	228	182	175	176	177	178	181
Tunisia	33	40	22	27	23	21	21	21	20	20
Other	8	42	29	46	19	23	23	23	24	24
East Africa Total	244	354	284	209	94	142	151	160	169	179
Ethiopia	149	270	136	89	0	0	0	0	0	0
Kenya	67	54	119	83	74	98	103	109	116	122
Other	28	29	30	37	20	45	48	50	53	56
West Africa Total	45	60	94	40	68	86	90	95	100	105
Cote d'Ivoire	7	15	33	14	14	28	29	31	33	35
Mali	15	0	15	0	9	9	10	10	10	10
Senegal	19	29	33	18	32	37	39	40	42	43
Other	5	16	13	8	14	12	13	14	15	16
Central Africa Total	7	3	4	6	12	8	8	8	9	9
Cameroon	7	2	4	5	11	8	8	8	9	9
Other	0	1	0	1	1	0	0	0	0	0
Southern Africa Total	84	30	0	10	12	31	32	34	35	37
South Africa	84	30	0	10	12	31	32	34	35	37
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**1,511**	**1,557**	**1,414**	**1,306**	**1,543**	**1,569**	**1,580**	**1,581**	**1,580**	**1,580**
North America Total	1,511	1,557	1,414	1,306	1,543	1,569	1,580	1,581	1,580	1,580
Canada	59	39	37	50	43	54	55	55	54	54
United States	1,452	1,518	1,378	1,257	1,501	1,515	1,526	1,526	1,526	1,526
Central & South America Tota	**922**	**999**	**1,047**	**1,023**	**854**	**946**	**989**	**1,024**	**1,049**	**1,080**
Caribbean Total	20	19	16	17	26	24	24	24	24	25
Dominican Republic	16	13	13	13	10	17	18	18	18	18
Other	4	7	3	4	17	6	6	6	6	6
Central America Total	257	262	298	261	286	230	240	249	251	254
Guatemala	34	42	36	25	26	31	32	33	33	34
Mexico	164	134	198	182	172	151	158	165	165	165
Other	59	86	64	54	87	48	50	51	53	55
South America Total	645	717	733	746	542	693	725	751	773	801
Argentina	131	143	141	143	79	169	188	199	209	218
Brazil	246	316	307	332	216	172	182	190	198	208
Other	269	258	284	271	247	352	355	362	366	376
Asia Total	**10,874**	**11,336**	**11,265**	**10,684**	**12,323**	**11,656**	**12,227**	**12,668**	**13,048**	**13,390**
Middle East Total	355	424	461	448	436	481	475	481	481	498
Iraq	8	38	53	27	41	46	52	59	61	64
Saudi Arabia	98	82	56	122	50	71	67	64	60	72
Turkey	199	262	302	319	295	313	299	299	295	294
Other	50	42	50	-20	50	51	56	60	65	68
South Asia Total	5,657	5,138	4,310	4,289	5,712	5,268	5,752	6,112	6,437	6,700
India	4,841	4,444	3,430	3,179	4,522	4,032	4,485	4,818	5,111	5,340
Pakistan	534	504	712	885	789	921	944	964	988	1,013
Other	282	190	169	225	400	316	323	331	339	346

Table D.1: DAP consumption 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South-East Asia Total	707	808	736	847	1,084	1,086	1,124	1,150	1,180	1,208
Indonesia	17	69	103	76	151	112	119	127	132	141
Thailand	211	257	235	218	236	237	243	248	252	257
Vietnam	399	388	329	434	591	666	690	704	724	738
Other	80	94	69	119	106	71	72	72	72	72
East Asia Total	4,155	4,966	5,759	5,101	5,092	4,822	4,876	4,924	4,950	4,984
China	3,978	4,792	5,563	4,935	4,917	4,608	4,664	4,716	4,744	4,780
Other	177	175	195	166	175	214	211	208	206	203
Oceania Total	**256**	**259**	**214**	**384**	**297**	**262**	**268**	**271**	**275**	**279**
Australia	191	190	161	273	196	183	187	189	191	193
New Zealand	65	69	53	109	101	79	81	83	84	86
Other	0	0	0	1	1	0	0	0	0	0
Unidentified Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other	0	0	0	0	0	0	0	0	0	0

Table D.2: DAP capacity 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**22,847**	**24,079**	**24,966**	**24,514**	**24,032**	**25,811**	**26,259**	**27,354**	**27,446**	**27,722**
Europe & CIS Total	**2,121**	**1,796**	**1,861**	**1,732**	**1,832**	**1,832**	**1,832**	**1,832**	**1,832**	**1,832**
West Europe Total	138	138	138	0	0	0	0	0	0	0
Spain	138	138	138	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	748	653	718	718	718	718	718	718	718	718
Lithuania	390	390	455	455	455	455	455	455	455	455
Poland	147	147	147	147	147	147	147	147	147	147
Other	211	116	116	116	116	116	116	116	116	116
CIS Total	1,235	1,005	1,005	1,014	1,114	1,114	1,114	1,114	1,114	1,114
Russia	1,235	1,005	1,005	1,014	1,014	1,014	1,014	1,014	1,014	1,014
Other	0	0	0	0	100	100	100	100	100	100
Africa Total	**1,515**	**1,512**	**1,688**	**1,981**	**2,184**	**2,319**	**2,521**	**2,611**	**2,703**	**2,979**
North Africa Total	1,405	1,452	1,628	1,921	2,124	2,259	2,461	2,551	2,643	2,919
Morocco	900	900	1,076	1,369	1,572	1,707	1,909	1,999	2,091	2,367
Tunisia	505	505	505	505	505	505	505	505	505	505
Other	0	47	47	47	47	47	47	47	47	47
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	60	60	60	60	60	60	60	60	60	60
Senegal	60	60	60	60	60	60	60	60	60	60
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	50	0	0	0	0	0	0	0	0	0
Other	50	0	0	0	0	0	0	0	0	0
North America Total	**3,836**	**3,681**	**3,681**	**3,460**	**2,158**	**2,158**	**2,158**	**2,158**	**2,158**	**2,158**
North America Total	3,836	3,681	3,681	3,460	2,158	2,158	2,158	2,158	2,158	2,158
USA	3,836	3,681	3,681	3,460	2,158	2,158	2,158	2,158	2,158	2,158
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**460**	**460**	**280**	**280**	**280**	**280**	**280**	**280**	**280**	**280**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	330	330	150	150	150	150	150	150	150	150
Mexico	330	330	150	150	150	150	150	150	150	150
Other	0	0	0	0	0	0	0	0	0	0
South America Total	130	130	130	130	130	130	130	130	130	130
Venezuela	130	130	130	130	130	130	130	130	130	130
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**14,515**	**16,231**	**17,056**	**16,661**	**17,178**	**18,822**	**19,067**	**20,072**	**20,072**	**20,072**
Middle East Total	1,999	2,674	2,674	2,674	2,674	2,764	3,109	4,264	4,264	4,264
Jordan	508	508	508	508	508	598	598	598	598	598
Saudi Arabia	825	1,500	1,500	1,500	1,500	1,500	1,845	3,000	3,000	3,000
Turkey	446	446	446	446	446	446	446	446	446	446
Other	220	220	220	220	220	220	220	220	220	220
South Asia Total	3,806	3,839	3,869	4,019	4,052	4,052	4,052	4,052	4,052	4,052
India	3,275	3,308	3,338	3,488	3,521	3,521	3,521	3,521	3,521	3,521
Other	531	531	531	531	531	531	531	531	531	531
South-East Asia Total	595	595	595	211	350	350	350	350	350	350
Philippines	396	396	396	0	0	0	0	0	0	0
Vietnam	149	149	149	161	300	300	300	300	300	300
Other	50	50	50	50	50	50	50	50	50	50
East Asia Total	8,115	9,123	9,918	9,757	10,102	11,656	11,556	11,406	11,406	11,406
China	7,801	8,809	9,604	9,523	9,868	11,422	11,322	11,172	11,172	11,172
Other	314	314	314	234	234	234	234	234	234	234
Oceania Total	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**
Australia	400	400	400	400	400	400	400	400	400	400
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table D.3: DAP production 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**14,977**	**16,078**	**15,723**	**15,112**	**16,425**	**16,081**	**16,733**	**17,251**	**17,681**	**18,079**
Europe & CIS Total	**1,261**	**1,159**	**889**	**796**	**952**	**980**	**984**	**976**	**936**	**901**
West Europe Total	82	101	63	0	0	0	0	0	0	0
Spain	72	91	53	0	0	0	0	0	0	0
Other	10	10	10	0	0	0	0	0	0	0
East Europe Total	540	473	411	438	434	435	449	431	431	431
Lithuania	384	350	363	365	328	323	337	319	319	319
Poland	150	120	47	73	106	103	103	103	103	103
Other	6	3	0	0	0	9	9	9	9	9
CIS Total	639	585	416	358	518	545	535	545	505	470
Russia	639	585	416	358	518	545	535	545	505	470
Other	0	0	0	0	0	0	0	0	0	0
Africa Total	**1,388**	**1,386**	**1,106**	**1,226**	**892**	**1,071**	**1,402**	**1,594**	**2,074**	**2,376**
North Africa Total	1,338	1,384	1,106	1,226	883	1,047	1,378	1,570	2,050	2,352
Morocco	1,142	1,067	793	967	782	852	1,134	1,217	1,680	1,982
Tunisia	196	297	313	259	93	171	221	328	345	345
Other	0	20	0	0	8	24	24	24	24	24
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	5	2	0	0	9	24	24	24	24	24
Other	5	2	0	0	9	24	24	24	24	24
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	46	0	0	0	0	0	0	0	0	0
Other	46	0	0	0	0	0	0	0	0	0
North America Total	**3,051**	**2,846**	**2,618**	**2,083**	**2,154**	**1,965**	**1,976**	**1,926**	**1,901**	**1,876**
North America Total	3,051	2,846	2,618	2,083	2,154	1,965	1,976	1,926	1,901	1,876
USA	3,051	2,846	2,618	2,083	2,154	1,965	1,976	1,926	1,901	1,876
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**144**	**158**	**146**	**111**	**124**	**113**	**113**	**113**	**113**	**113**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	140	154	146	111	120	113	113	113	113	113
Mexico	140	154	146	111	120	113	113	113	113	113
Other	0	0	0	0	0	0	0	0	0	0
South America Total	4	4	1	0	4	0	0	0	0	0
Venezuela	4	4	1	0	4	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**8,810**	**10,231**	**10,728**	**10,636**	**12,011**	**11,679**	**11,982**	**12,354**	**12,385**	**12,546**
Middle East Total	812	1,247	1,305	1,542	1,493	1,566	1,761	2,460	2,747	2,939
Jordan	326	276	279	335	204	299	461	462	412	412
Saudi Arabia	297	825	918	1,079	1,110	1,121	1,167	1,867	2,207	2,400
Other	188	146	108	128	179	146	132	132	128	127
South Asia Total	1,973	2,041	2,062	1,852	2,051	2,151	2,202	1,932	1,755	1,688
India	1,648	1,745	1,719	1,527	1,653	1,796	1,849	1,584	1,408	1,340
Pakistan	302	297	344	324	356	346	344	339	338	338
Other	23	0	0	0	42	9	9	9	9	9
South-East Asia Total	165	170	143	133	180	270	270	270	270	270
Indonesia	12	10	33	0	0	0	0	0	0	0
Vietnam	112	130	103	132	180	270	270	270	270	270
Other	42	30	7	0	0	0	0	0	0	0
East Asia Total	5,859	6,774	7,218	7,110	8,287	7,693	7,749	7,691	7,612	7,649
China	5,826	6,744	7,195	7,104	8,287	7,653	7,709	7,661	7,589	7,625
Other	33	30	23	6	0	40	40	30	23	23
Oceania Total	**324**	**299**	**236**	**260**	**292**	**273**	**277**	**289**	**273**	**268**
Australia	324	299	236	260	292	273	277	289	273	268
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table D.4: DAP imports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**6,599**	**6,646**	**6,226**	**6,614**	**7,592**	**7,217**	**7,725**	**8,467**	**9,033**	**9,427**
Europe & CIS Total	**622**	**795**	**1,083**	**1,035**	**981**	**1,010**	**1,011**	**1,017**	**1,025**	**1,021**
West Europe Total	519	674	907	900	771	834	833	828	825	819
Belgium	78	119	104	27	69	94	94	94	94	94
France	105	138	170	191	144	189	191	190	191	191
Germany	85	96	169	124	147	141	138	135	132	129
Italy	80	139	115	122	71	120	119	117	115	114
Spain	30	53	121	131	122	134	132	130	129	128
Other	141	131	227	304	217	156	159	162	165	163
East Europe Total	95	116	170	115	190	160	163	173	184	185
Bulgaria	15	21	36	32	43	23	24	24	25	25
Poland	1	14	37	17	46	45	45	50	60	60
Romania	44	41	64	85	66	56	59	64	64	64
Other	34	40	33	-19	34	35	35	35	35	36
CIS Total	8	5	7	20	20	17	15	15	16	16
Russia	8	5	5	6	8	5	5	5	5	5
Other	0	0	2	14	12	12	10	10	11	11
Africa Total	**323**	**465**	**414**	**348**	**189**	**257**	**272**	**287**	**303**	**320**
North Africa Total	8	32	29	32	11	14	14	15	15	15
Libya	2	8	26	21	10	11	11	11	11	11
Sudan	6	24	3	25	1	3	3	3	3	4
Other	0	0	0	-13	0	0	0	0	0	0
East Africa Total	244	354	284	251	94	142	151	160	169	179
Ethiopia	149	270	136	89	0	0	0	0	0	0
Kenya	67	54	119	83	74	98	103	109	116	122
Other	28	29	30	80	20	45	48	50	53	56
West Africa Total	26	46	94	49	60	62	66	71	76	81
Cote d'Ivoire	7	15	33	14	14	28	29	31	33	35
Mali	15	0	15	0	9	9	10	10	10	10
Senegal	0	15	33	18	23	13	15	16	18	19
Other	5	16	13	17	14	12	13	14	15	16
Central Africa Total	7	3	4	6	12	8	8	8	9	9
Cameroon	7	2	4	5	11	8	8	8	9	9
Other	0	1	0	1	1	0	0	0	0	0
Southern Africa Total	39	30	2	9	12	31	32	34	35	37
South Africa	39	30	2	10	12	31	32	34	35	37
Other	0	0	0	-1	0	0	0	0	0	0
North America Total	**154**	**122**	**147**	**282**	**338**	**354**	**355**	**355**	**354**	**354**
North America Total	154	122	147	282	338	354	355	355	354	354
Canada	59	39	37	50	43	54	55	55	54	54
United States	95	83	110	252	295	300	300	300	300	300
Central & South America Tota	**852**	**958**	**947**	**994**	**801**	**916**	**951**	**979**	**1,004**	**1,035**
Caribbean Total	20	19	16	25	26	24	24	24	24	25
Dominican Republic	16	13	13	13	10	17	18	18	18	18
Jamaica	2	3	3	3	1	3	3	3	3	3
Other	2	4	0	9	16	4	4	4	4	4
Central America Total	190	231	199	220	237	199	202	204	206	209
Guatemala	34	42	36	25	26	31	32	33	33	34
Honduras	26	23	28	24	38	9	10	11	12	13
Mexico	97	103	98	112	123	120	120	120	120	120
Other	33	62	37	59	49	39	40	40	41	43
South America Total	642	708	732	749	538	693	725	751	773	801
Argentina	131	143	141	143	79	169	188	199	209	218
Brazil	246	316	307	332	216	172	182	190	198	208
Other	265	249	284	274	243	352	355	362	366	375
Asia Total	**4,507**	**4,131**	**3,505**	**3,736**	**5,066**	**4,491**	**4,947**	**5,646**	**6,163**	**6,511**
Middle East Total	138	225	305	216	234	253	264	274	281	287
Iraq	8	38	53	27	41	46	52	59	61	64
Turkey	100	180	221	242	191	200	200	200	200	200
Other	30	7	32	-53	2	7	12	16	20	23
South Asia Total	3,684	3,093	2,248	2,433	3,661	3,118	3,551	4,180	4,681	5,012
India	3,193	2,699	1,711	1,652	2,870	2,236	2,636	3,234	3,702	4,000
Pakistan	232	227	368	560	433	575	600	625	650	675
Other	259	167	169	221	358	306	314	322	329	337

Table D.4: DAP imports 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South-East Asia Total	541	579	644	820	958	870	884	946	956	970
Thailand	211	257	235	218	236	237	243	248	252	257
Vietnam	287	199	266	356	465	450	450	500	500	500
Other	43	123	143	246	257	183	191	198	204	213
East Asia Total	144	235	308	266	213	250	248	246	244	242
China	0	91	125	76	12	55	55	55	55	55
Japan	130	143	182	168	157	184	182	180	178	176
Other	14	0	1	21	43	11	11	11	11	11
Oceania Total	**140**	**159**	**127**	**219**	**217**	**189**	**191**	**183**	**184**	**186**
Australia	75	90	74	125	116	110	110	100	100	100
New Zealand	65	70	53	109	101	79	81	83	84	86
Other	0	0	0	-14	1	0	0	0	0	0
Unidentified Total	0	16.7	4.3	11.2	0	0	0	0	0	0
Other	0	17	4	11	0	0	0	0	0	0

Table D.5: DAP exports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**6,539**	**6,657**	**6,297**	**6,587**	**7,592**	**7,217**	**7,725**	**8,467**	**9,033**	**9,427**
Europe & CIS Total	**1,042**	**980**	**805**	**677**	**935**	**829**	**826**	**804**	**766**	**727**
West Europe Total	0	27	17	8	0	0	0	0	0	0
Other	0	27	17	8	0	0	0	0	0	0
East Europe Total	470	395	380	345	360	329	336	304	306	302
Lithuania	378	340	373	321	304	300	312	293	292	292
Other	92	55	7	24	56	29	24	11	14	10
CIS Total	572	558	409	323	575	500	490	500	460	425
Russia	572	558	409	323	575	500	490	500	460	425
Other	0	0	0	0	0	0	0	0	0	0
Africa Total	**1,078**	**1,209**	**936**	**971**	**671**	**843**	**1,173**	**1,363**	**1,842**	**2,141**
North Africa Total	1,078	1,209	934	971	671	843	1,173	1,363	1,842	2,141
Morocco	915	941	643	739	600	678	958	1,041	1,502	1,802
Tunisia	163	257	291	232	70	150	200	308	325	325
Other	0	11	0	0	0	15	15	15	15	15
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	0	0	2	0	0	0	0	0	0	0
Other	0	0	2	0	0	0	0	0	0	0
North America Total	**1,694**	**1,411**	**1,350**	**1,078**	**949**	**750**	**750**	**700**	**675**	**650**
North America Total	1,694	1,411	1,350	1,078	949	750	750	700	675	650
United States	1,694	1,411	1,350	1,078	949	750	750	700	675	650
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**73**	**109**	**89**	**72**	**72**	**82**	**74**	**67**	**68**	**68**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	73	109	89	72	72	82	74	67	68	68
Mexico	73	109	89	72	72	82	74	67	68	68
Other	0	0	0	0	0	0	0	0	0	0
South America Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**2,443**	**2,749**	**2,968**	**3,677**	**4,754**	**4,514**	**4,702**	**5,333**	**5,500**	**5,667**
Middle East Total	595	907	1,149	1,367	1,291	1,338	1,550	2,254	2,547	2,728
Jordan	336	251	260	360	194	288	450	450	400	400
Saudi Arabia	199	623	862	957	1,060	1,050	1,100	1,804	2,147	2,328
Other	60	33	27	51	37	0	0	0	0	0
South Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	27	51	55	55	55	30	66	46	32
Other	0	27	51	55	55	55	30	66	46	32
East Asia Total	1,848	1,815	1,768	2,255	3,408	3,121	3,122	3,013	2,907	2,907
China	1,848	1,810	1,757	2,246	3,382	3,100	3,100	3,000	2,900	2,900
Other	0	6	11	9	26	21	22	13	7	7
Oceania Total	**208**	**199**	**149**	**112**	**212**	**200**	**200**	**200**	**183**	**175**
Australia	208	199	149	112	212	200	200	200	183	175
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table E.1: MAP consumption 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**12,154**	**12,089**	**11,832**	**11,789**	**11,770**	**12,138**	**12,335**	**12,488**	**12,575**	**12,695**
Europe & CIS Total	**959**	**1,064**	**1,140**	**887**	**961**	**1,038**	**1,111**	**1,150**	**1,185**	**1,212**
West Europe Total	155	161	133	127	129	145	150	149	148	146
France	13	15	17	12	12	13	16	16	16	16
Italy	23	32	25	29	30	31	31	31	30	30
Spain	23	43	41	38	35	36	35	35	34	34
United Kingdom	19	8	18	6	4	10	10	10	10	10
Other	76	63	33	42	49	54	57	57	56	56
East Europe Total	315	335	427	275	366	386	406	420	439	456
Hungary	21	32	51	31	31	38	37	37	37	37
Poland	90	89	94	85	103	118	124	132	137	142
Serbia	18	33	47	10	23	19	19	19	19	19
Ukraine	96	64	125	51	66	89	98	104	116	128
Other	90	117	111	98	142	122	127	128	129	130
CIS Total	489	567	580	486	466	507	555	581	599	611
Belarus	139	108	117	97	70	24	25	26	27	28
Russia	301	395	413	334	320	391	434	464	480	496
Other	49	64	50	54	76	93	97	92	92	87
Africa Total	**199**	**168**	**258**	**316**	**298**	**256**	**266**	**278**	**289**	**303**
North Africa Total	31	15	90	-30	73	32	33	33	34	35
Morocco	26	4	79	-55	35	10	10	10	10	11
Other	5	10	11	25	38	22	23	23	24	24
East Africa Total	2	10	19	102	42	55	59	62	66	70
Mozambique	1	9	10	23	13	22	24	26	28	29
Tanzania	0	1	9	0	0	9	10	10	11	11
Other	1	0	0	79	28	24	25	26	28	29
West Africa Total	11	1	5	8	25	11	12	13	13	14
Cote d'Ivoire	2	0	5	7	25	11	12	12	13	14
Other	9	1	0	0	0	0	0	0	0	0
Central Africa Total	0	1	1	0	2	1	1	1	2	2
Cameroon	0	0	1	0	1	1	1	1	1	1
Other	0	0	0	0	1	0	0	0	0	0
Southern Africa Total	155	143	142	236	157	155	161	168	174	184
South Africa	155	143	142	236	156	155	161	168	174	184
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**2,122**	**2,053**	**2,282**	**2,457**	**2,359**	**2,408**	**2,423**	**2,475**	**2,462**	**2,463**
North America Total	2,122	2,053	2,282	2,457	2,359	2,408	2,423	2,475	2,462	2,463
Canada	323	262	576	615	607	582	584	594	581	582
United States	1,799	1,792	1,706	1,842	1,753	1,826	1,839	1,881	1,881	1,881
Central & South America Tota	**2,257**	**2,399**	**2,612**	**3,132**	**2,762**	**2,989**	**3,108**	**3,171**	**3,231**	**3,303**
Caribbean Total	1	0	2	2	2	2	2	2	2	2
Other	1	0	2	2	2	2	2	2	2	2
Central America Total	64	126	68	113	129	113	114	115	115	115
Mexico	58	122	65	92	114	100	101	101	101	101
Other	6	4	3	22	16	13	13	14	14	14
South America Total	2,192	2,273	2,542	3,017	2,631	2,874	2,992	3,055	3,114	3,186
Brazil	1,711	1,781	2,142	2,499	2,209	2,407	2,508	2,567	2,625	2,698
Other	481	492	400	518	423	467	484	488	490	489
Asia Total	**6,183**	**6,089**	**5,159**	**4,487**	**4,971**	**4,985**	**4,983**	**4,985**	**4,974**	**4,975**
Middle East Total	48	53	38	24	49	36	35	35	34	34
Israel	10	19	7	3	2	6	6	6	6	5
Turkey	37	18	31	30	40	28	27	27	27	27
Other	1	15	1	-10	7	1	1	1	1	2
South Asia Total	275	112	39	98	45	146	159	167	175	185
Bangladesh	0	0	5	3	2	0	0	0	0	0
India	234	104	30	93	43	126	138	146	153	162
Pakistan	21	6	5	2	0	20	21	21	22	23
Other	19	2	0	0	0	0	0	0	0	0
South-East Asia Total	30	21	30	68	104	52	53	54	55	56
Malaysia	4	7	9	16	18	11	11	11	11	11
Thailand	23	13	15	31	29	28	28	29	29	30
Vietnam	2	0	4	17	49	10	10	10	10	11
Other	2	0	2	3	8	3	4	4	4	4

Table E.1: MAP consumption 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
East Asia Total	5,831	5,903	5,052	4,298	4,774	4,751	4,737	4,729	4,711	4,700
China	5,757	5,814	4,978	4,226	4,686	4,666	4,653	4,646	4,628	4,619
Other	74	89	74	71	88	85	84	83	82	82
Oceania Total	**434**	**316**	**382**	**510**	**419**	**462**	**443**	**429**	**434**	**438**
Australia	408	316	382	508	417	459	439	425	430	434
Other	26	0	0	1	2	4	4	4	4	4
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table E.2: MAP capacity 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**16,331**	**16,805**	**18,132**	**17,929**	**18,108**	**17,699**	**17,418**	**17,469**	**17,495**	**17,573**
Europe & CIS Total	**2,609**	**2,636**	**2,636**	**2,571**	**2,514**	**2,664**	**2,664**	**2,664**	**2,664**	**2,664**
West Europe Total	150	150	150	0	0	0	0	0	0	0
Spain	150	150	150	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	579	436	436	436	436	436	436	436	436	436
Bulgaria	104	104	104	104	104	104	104	104	104	104
Poland	140	140	140	140	140	140	140	140	140	140
Ukraine	192	192	192	192	192	192	192	192	192	192
Other	143	0	0	0	0	0	0	0	0	0
CIS Total	1,880	2,050	2,050	2,135	2,078	2,228	2,228	2,228	2,228	2,228
Russia	1,441	1,612	1,612	1,697	1,697	1,697	1,697	1,697	1,697	1,697
Uzbekistan	215	215	215	215	215	215	215	215	215	215
Other	223	223	223	223	166	316	316	316	316	316
Africa Total	**1,022**	**1,022**	**1,320**	**1,481**	**1,751**	**1,976**	**2,156**	**2,246**	**2,272**	**2,350**
North Africa Total	737	737	1,070	1,291	1,561	1,786	1,966	2,056	2,082	2,160
Morocco	737	737	870	1,091	1,361	1,586	1,766	1,856	1,882	1,960
Tunisia	0	0	200	200	200	200	200	200	200	200
Other	0	0	0	0	0	0	0	0	0	0
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	285	285	250	190	190	190	190	190	190	190
South Africa	285	285	250	190	190	190	190	190	190	190
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**3,276**	**3,276**	**3,086**	**3,307**	**3,435**	**3,103**	**3,103**	**3,103**	**3,103**	**3,103**
North America Total	3,276	3,276	3,086	3,307	3,435	3,103	3,103	3,103	3,103	3,103
Canada	345	345	345	345	345	345	345	345	345	345
USA	2,931	2,931	2,741	2,962	3,090	2,758	2,758	2,758	2,758	2,758
Central & South America Tota	**774**	**794**	**1,004**	**1,004**	**1,004**	**1,004**	**1,004**	**1,104**	**1,104**	**1,104**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	150	150	330	330	330	330	330	330	330	330
Mexico	150	150	330	330	330	330	330	330	330	330
Other	0	0	0	0	0	0	0	0	0	0
South America Total	624	644	674	674	674	674	674	774	774	774
Brazil	624	644	674	674	674	674	674	774	774	774
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**8,450**	**8,877**	**9,886**	**9,366**	**9,204**	**8,752**	**8,291**	**8,152**	**8,152**	**8,152**
Middle East Total	196	396	396	396	306	270	309	420	420	420
Iraq	146	146	146	146	37	0	0	0	0	0
Saudi Arabia	50	250	250	250	250	250	289	400	400	400
Other	0	0	0	0	20	20	20	20	20	20
South Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	10	29	29	29	29	29	29
Other	0	0	0	10	29	29	29	29	29	29
East Asia Total	8,254	8,481	9,490	8,960	8,868	8,453	7,953	7,703	7,703	7,703
China	8,189	8,416	9,425	8,895	8,803	8,388	7,888	7,638	7,638	7,638
Other	65	65	65	65	65	65	65	65	65	65
Oceania Total	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**	**200**
Australia	200	200	200	200	200	200	200	200	200	200
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table E.3: MAP production 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**12,548**	**12,356**	**11,877**	**11,836**	**11,770**	**12,138**	**12,335**	**12,488**	**12,575**	**12,695**
Europe & CIS Total	**1,867**	**1,583**	**1,679**	**1,624**	**1,467**	**1,615**	**1,682**	**1,678**	**1,657**	**1,643**
West Europe Total	36	10	12	0	0	0	0	0	0	0
Spain	6	10	12	0	0	0	0	0	0	0
Other	30	0	0	0	0	0	0	0	0	0
East Europe Total	160	128	92	59	85	149	149	145	138	138
Bulgaria	16	22	19	0	13	21	21	21	21	21
Poland	80	67	49	48	65	84	84	70	63	63
Ukraine	65	40	24	11	7	44	44	54	54	54
Other	0	0	0	0	0	0	0	0	0	0
CIS Total	1,670	1,444	1,574	1,564	1,382	1,466	1,533	1,534	1,519	1,505
Russia	1,430	1,255	1,452	1,443	1,301	1,341	1,374	1,374	1,355	1,346
Other	240	189	122	121	81	126	159	159	164	159
Africa Total	**751**	**952**	**1,170**	**973**	**769**	**1,023**	**1,243**	**1,342**	**1,463**	**1,578**
North Africa Total	628	841	1,013	813	709	916	1,132	1,230	1,352	1,467
Morocco	628	841	940	798	700	896	1,112	1,190	1,302	1,407
Other	0	0	73	15	9	20	20	40	50	60
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	123	111	157	160	60	107	112	112	112	112
South Africa	123	111	157	160	60	107	112	112	112	112
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**2,848**	**2,602**	**2,647**	**2,770**	**2,702**	**2,779**	**2,853**	**2,890**	**2,863**	**2,892**
North America Total	2,848	2,602	2,647	2,770	2,702	2,779	2,853	2,890	2,863	2,892
Canada	323	262	286	304	304	293	293	293	293	293
USA	2,525	2,341	2,361	2,467	2,398	2,485	2,560	2,596	2,569	2,598
Central & South America Tota	**775**	**986**	**947**	**856**	**825**	**791**	**790**	**845**	**900**	**968**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	267	267	249	227	173	182	215	231	231	231
Mexico	267	267	249	227	173	182	215	231	231	231
Other	0	0	0	0	0	0	0	0	0	0
South America Total	509	718	698	629	652	609	575	614	669	737
Brazil	509	718	698	629	652	607	573	612	666	735
Other	0	0	0	0	0	2	2	3	3	2
Asia Total	**6,172**	**6,154**	**5,322**	**5,459**	**5,919**	**5,811**	**5,646**	**5,613**	**5,572**	**5,494**
Middle East Total	7	20	17	162	128	115	131	195	192	190
Israel	7	20	17	14	0	0	0	0	0	0
Other	0	0	0	148	129	115	131	195	192	190
South Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	0	8	20	20	20	20	20
Vietnam	0	0	0	0	8	20	20	20	20	20
Other	0	0	0	0	0	0	0	0	0	0
East Asia Total	6,166	6,134	5,305	5,297	5,783	5,675	5,495	5,398	5,360	5,283
China	6,155	6,124	5,300	5,296	5,767	5,662	5,482	5,385	5,347	5,270
Other	11	10	5	1	16	13	13	13	13	13
Oceania Total	**135**	**79**	**113**	**154**	**89**	**120**	**120**	**120**	**120**	**120**
Australia	135	79	113	154	89	120	120	120	120	120
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table E.4: MAP imports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**3,490**	**3,141**	**3,594**	**4,524**	**4,129**	**4,270**	**4,431**	**4,469**	**4,484**	**4,509**
Europe & CIS Total	**429**	**444**	**557**	**424**	**509**	**430**	**454**	**472**	**497**	**513**
West Europe Total	119	121	124	127	129	145	150	149	148	146
France	13	16	17	12	12	13	16	16	16	16
Italy	23	32	25	29	30	31	31	31	30	30
Spain	17	33	32	38	35	36	35	35	34	34
United Kingdom	19	8	18	6	4	10	10	10	10	10
Other	46	33	33	42	49	54	57	57	56	56
East Europe Total	207	266	348	222	297	258	276	295	320	336
Hungary	21	32	51	31	31	38	37	37	37	37
Poland	10	22	45	37	38	34	40	62	74	79
Serbia	18	33	47	10	23	19	19	19	19	19
Ukraine	60	57	104	45	62	44	54	51	62	74
Other	99	122	103	99	142	122	126	126	127	128
CIS Total	104	57	84	75	83	27	28	29	30	31
Belarus	88	46	79	69	70	24	25	26	27	28
Other	15	11	5	7	13	3	3	3	3	3
Africa Total	**87**	**75**	**86**	**219**	**247**	**177**	**188**	**199**	**210**	**224**
North Africa Total	5	11	17	28	37	20	21	21	22	22
Algeria	5	10	16	20	30	20	20	20	21	21
Other	0	1	1	8	7	1	1	1	1	1
East Africa Total	2	10	19	102	42	55	59	62	66	70
Mozambique	1	9	10	23	13	22	24	26	28	29
Tanzania	0	1	9	0	0	9	10	10	11	11
Other	1	0	0	79	28	24	25	26	28	29
West Africa Total	11	1	5	8	25	11	12	13	13	14
Cote d'Ivoire	2	0	5	7	25	11	12	12	13	14
Other	9	1	0	0	0	0	0	0	0	0
Central Africa Total	0	2	1	0	2	1	1	1	2	2
Cameroon	0	1	1	0	1	1	1	1	1	1
Congo	0	0	0	0	0	0	0	0	0	0
Other	0	1	0	0	0	0	0	0	0	0
Southern Africa Total	69	53	43	82	142	89	95	101	108	117
South Africa	69	53	43	82	141	89	95	101	108	117
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**535**	**491**	**553**	**689**	**669**	**629**	**606**	**592**	**553**	**529**
North America Total	535	491	553	689	669	629	606	592	553	529
Canada	293	242	296	312	303	288	291	301	288	289
United States	242	248	257	376	366	341	316	291	266	241
Central & South America Tota	**1,719**	**1,604**	**1,889**	**2,481**	**2,072**	**2,360**	**2,516**	**2,546**	**2,552**	**2,555**
Caribbean Total	1	0	2	2	2	2	2	2	2	2
Bahamas	0	0	2	0	0	0	0	0	0	0
Other	1	0	0	2	2	2	2	2	2	2
Central America Total	35	49	44	91	91	93	98	104	104	104
Mexico	28	45	41	69	75	80	85	90	90	90
Other	6	4	3	22	16	13	13	14	14	14
South America Total	1,683	1,555	1,844	2,388	1,979	2,265	2,416	2,441	2,446	2,449
Argentina	299	323	228	308	199	279	292	291	288	283
Brazil	1,202	1,063	1,444	1,870	1,557	1,800	1,935	1,956	1,959	1,962
Other	181	169	171	210	224	186	189	194	199	203
Asia Total	**410**	**247**	**176**	**274**	**269**	**322**	**333**	**342**	**348**	**359**
Middle East Total	41	35	35	38	55	37	35	35	35	35
Turkey	37	18	31	30	40	28	27	27	27	27
Other	4	17	5	7	15	8	8	8	8	8
South Asia Total	275	112	39	98	45	146	159	167	175	185
Bangladesh	0	0	5	3	2	0	0	0	0	0
India	234	104	30	93	43	126	138	146	153	162
Pakistan	21	6	5	2	0	20	21	21	22	23
Other	19	2	0	0	0	0	0	0	0	0
South-East Asia Total	31	21	30	68	96	67	68	69	70	70
Indonesia	1	1	2	3	3	3	4	4	4	4
Malaysia	4	7	9	16	18	11	11	11	11	11
Thailand	23	14	15	31	29	28	28	29	29	30
Vietnam	2	0	4	17	41	25	25	25	25	25
Other	2	0	0	1	5	0	0	0	0	0

Table E.4: MAP imports 2011 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
East Asia Total	63	79	72	70	73	72	71	70	70	69
Japan	56	68	58	56	53	60	60	59	58	57
Taiwan	7	11	10	14	17	11	11	11	11	11
Other	0	0	4	0	3	1	1	1	1	1
Oceania Total	**311**	**249**	**269**	**389**	**364**	**352**	**333**	**319**	**324**	**328**
Australia	285	249	269	387	361	349	329	315	320	324
Other	26	0	0	1	2	4	4	4	4	4
Unidentified Total	0	32.1	64	49.6	0	0	0	0	0	0
Other	0	32	64	50	0	0	0	0	0	0

Table E.5: MAP exports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**3,579**	**3,119**	**3,575**	**4,522**	**4,129**	**4,270**	**4,431**	**4,469**	**4,484**	**4,509**
Europe & CIS Total	**1,337**	**941**	**1,095**	**1,161**	**1,015**	**1,007**	**1,025**	**1,000**	**969**	**943**
West Europe Total	0	3	3	0	0	0	0	0	0	0
Spain	0	3	3	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	52	15	14	7	16	21	20	19	19	18
Bulgaria	24	9	10	1	13	21	20	19	19	18
Ukraine	28	6	3	6	3	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
CIS Total	1,284	923	1,079	1,154	1,000	986	1,006	981	950	925
Russia	1,140	868	1,040	1,109	981	950	941	911	875	850
Other	144	55	39	45	18	36	65	70	75	75
Africa Total	**639**	**858**	**998**	**876**	**718**	**944**	**1,165**	**1,263**	**1,385**	**1,499**
North Africa Total	602	837	940	870	673	904	1,120	1,218	1,340	1,454
Morocco	602	837	860	856	669	886	1,102	1,180	1,292	1,396
Other	0	0	80	15	4	18	18	38	48	58
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	37	21	58	6	45	40	45	45	45	45
South Africa	37	21	58	6	45	40	45	45	45	45
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**968**	**835**	**917**	**1,002**	**1,011**	**1,000**	**1,036**	**1,006**	**954**	**958**
North America Total	968	835	917	1,002	1,011	1,000	1,036	1,006	954	958
United States	968	797	911	1,001	1,011	1,000	1,036	1,006	954	958
Other	0	37	6	0	0	0	0	0	0	0
Central & South America Tota	**237**	**198**	**224**	**205**	**135**	**161**	**198**	**220**	**220**	**220**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	237	198	224	205	135	161	198	220	220	220
Mexico	237	198	224	205	135	161	198	220	220	220
Other	0	0	0	0	0	0	0	0	0	0
South America Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**398**	**289**	**340**	**1,246**	**1,216**	**1,148**	**997**	**970**	**946**	**878**
Middle East Total	0	15	14	176	134	116	132	196	193	192
Israel	0	15	14	13	0	0	0	0	0	0
Saudi Arabia	0	0	0	159	106	101	117	181	181	182
Other	0	0	0	4	28	15	15	15	12	10
South Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	0	0	36	36	35	35	35
Vietnam	0	0	0	0	0	36	36	35	35	35
Other	0	0	0	0	0	0	0	0	0	0
East Asia Total	398	274	326	1,070	1,082	996	830	739	718	652
China	398	274	326	1,070	1,082	996	830	739	718	652
Other	0	0	0	0	0	0	0	0	0	0
Oceania Total	**0**	**0**	**0**	**33**	**33**	**10**	**10**	**10**	**10**	**10**
Australia	0	0	0	33	33	10	10	10	10	10
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table F.1: TSP consumption 2000 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**3,042**	**2,609**	**2,233**	**2,632**	**2,477**	**2,562**	**2,657**	**2,736**	**2,811**	**2,889**
Europe & CIS Total	**350**	**373**	**245**	**251**	**221**	**263**	**265**	**268**	**270**	**270**
West Europe Total	191	225	214	174	161	211	212	212	212	211
Belgium	42	42	28	18	11	33	33	33	33	33
France	44	69	68	52	61	62	62	62	62	63
Netherlands	28	22	29	8	15	12	13	14	16	16
United Kingdom	38	41	55	58	29	58	58	58	57	57
Other	39	51	34	39	45	47	46	45	44	44
East Europe Total	67	56	31	77	61	52	53	56	57	59
Bulgaria	29	28	9	41	21	21	21	21	22	22
Poland	36	23	20	28	30	28	30	32	33	34
Other	1	6	2	7	10	3	3	3	3	3
CIS Total	92	92	0	0	0	0	0	0	0	0
Other	92	92	0	0	0	0	0	0	0	0
Africa Total	**127**	**116**	**40**	**193**	**109**	**97**	**100**	**104**	**108**	**112**
North Africa Total	97	86	13	164	69	39	40	40	40	41
Tunisia	23	13	10	-27	5	7	7	7	7	7
Other	74	73	3	191	64	33	33	33	34	34
East Africa Total	3	1	5	2	4	3	4	4	4	4
Kenya	1	0	4	1	2	1	1	1	1	1
Tanzania	2	0	1	1	0	2	2	3	3	3
Other	0	0	0	0	2	0	0	0	0	0
West Africa Total	22	24	17	24	33	50	53	56	59	62
Cote d'Ivoire	6	4	8	14	11	17	18	19	20	21
Ghana	16	21	9	10	18	33	35	37	39	41
Other	0	0	0	0	4	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	4	4	4	3	3	4	5	5	5	5
South Africa	4	4	4	3	3	4	5	5	5	5
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**144**	**120**	**86**	**143**	**90**	**104**	**105**	**105**	**105**	**105**
North America Total	144	120	86	143	90	104	105	105	105	105
United States	144	120	86	143	90	104	105	105	105	105
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**984**	**1,114**	**1,029**	**1,017**	**1,068**	**1,009**	**1,065**	**1,106**	**1,148**	**1,197**
Caribbean Total	14	13	11	12	26	9	9	9	9	8
Cuba	13	12	10	12	26	9	9	9	9	8
Other	1	0	1	0	0	0	0	0	0	0
Central America Total	8	48	8	6	9	10	10	10	10	10
Mexico	8	47	7	5	8	10	10	10	10	10
Other	0	1	0	1	1	0	0	0	0	0
South America Total	962	1,053	1,010	1,000	1,032	990	1,046	1,088	1,129	1,179
Brazil	851	930	926	846	858	860	912	951	990	1,038
Other	111	124	84	154	175	130	134	137	139	141
Asia Total	**1,411**	**862**	**828**	**1,014**	**953**	**1,068**	**1,099**	**1,130**	**1,158**	**1,182**
Middle East Total	251	268	342	289	329	365	387	410	432	447
Iran	133	113	165	159	190	193	216	237	259	274
Lebanon	5	5	57	58	65	75	75	75	75	75
Turkey	36	103	61	84	67	74	71	71	70	70
Other	78	46	59	-11	7	23	25	27	28	29
South Asia Total	468	346	314	365	292	301	309	316	323	331
Bangladesh	337	307	276	305	250	253	259	265	271	278
Sri Lanka	56	38	36	57	40	38	39	40	41	42
Other	74	2	2	2	2	10	10	11	11	11
South-East Asia Total	172	170	101	141	137	146	149	150	150	151
Indonesia	143	141	80	113	106	112	113	114	113	113
Other	29	28	21	28	32	34	35	36	37	38
East Asia Total	519	78	72	219	194	256	255	255	253	253
China	482	41	43	195	176	233	233	232	231	231
Japan	27	28	23	19	18	16	16	16	16	16
Other	10	8	6	5	1	6	6	6	6	6

Table F.1: TSP consumption 2000 - 2020 ('000t P_2O_5) - *Concluded.*

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Oceania Total	**27**	**24**	**6**	**14**	**35**	**22**	**22**	**23**	**23**	**23**
Australia	24	22	4	12	29	18	19	19	19	19
New Zealand	3	2	2	2	6	4	4	4	4	4
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table F.2: TSP capacity 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**4,142**	**4,195**	**4,356**	**4,288**	**4,066**	**4,167**	**4,209**	**4,300**	**4,358**	**4,530**
Europe & CIS Total	**430**	**430**	**430**	**455**	**385**	**385**	**385**	**385**	**385**	**385**
West Europe Total	220	220	220	220	150	150	150	150	150	150
Belgium	70	70	70	70	0	0	0	0	0	0
France	115	115	115	115	115	115	115	115	115	115
Netherlands	35	35	35	35	35	35	35	35	35	35
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	210	210	210	235	235	235	235	235	235	235
Bulgaria	150	150	150	150	150	150	150	150	150	150
Poland	60	60	60	60	60	60	60	60	60	60
Other	0	0	0	25	25	25	25	25	25	25
CIS Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Africa Total	**1,116**	**1,116**	**1,116**	**1,116**	**1,206**	**1,426**	**1,518**	**1,609**	**1,667**	**1,839**
North Africa Total	1,100	1,100	1,100	1,100	1,190	1,410	1,433	1,455	1,513	1,685
Morocco	538	538	538	538	628	673	696	718	776	948
Tunisia	410	410	410	410	410	585	585	585	585	585
Other	152	152	152	152	152	152	152	152	152	152
East Africa Total	16	16	16	16	16	16	85	154	154	154
Zimbabwe	16	16	16	16	16	16	16	16	16	16
Other	0	0	0	0	0	0	69	138	138	138
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
North America Total	60	60	60	60	60	60	60	60	60	60
USA	60	60	60	60	60	60	60	60	60	60
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**703**	**750**	**777**	**777**	**777**	**777**	**777**	**827**	**827**	**827**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	180	180	180	180	180	180	180	180	180	180
Mexico	180	180	180	180	180	180	180	180	180	180
Other	0	0	0	0	0	0	0	0	0	0
South America Total	523	570	597	597	597	597	597	647	647	647
Brazil	523	570	597	597	597	597	597	647	647	647
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**1,834**	**1,839**	**1,973**	**1,880**	**1,638**	**1,519**	**1,469**	**1,419**	**1,419**	**1,419**
Middle East Total	994	999	1,183	1,183	976	907	907	907	907	907
Iraq	92	92	276	276	69	0	0	0	0	0
Israel	435	435	435	435	435	435	435	435	435	435
Lebanon	150	150	150	150	150	150	150	150	150	150
Syria	207	207	207	207	207	207	207	207	207	207
Other	110	115	115	115	115	115	115	115	115	115
South Asia Total	70	70	70	70	70	70	70	70	70	70
Bangladesh	70	70	70	70	70	70	70	70	70	70
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	8	23	23	23	23	23	23
Vietnam	0	0	0	8	23	23	23	23	23	23
Other	0	0	0	0	0	0	0	0	0	0
East Asia Total	770	770	720	620	570	520	470	420	420	420
China	750	750	700	600	550	500	450	400	400	400
Other	20	20	20	20	20	20	20	20	20	20
Oceania Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table F.3: TSP production 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**2,969**	**2,464**	**2,260**	**2,642**	**2,477**	**2,562**	**2,657**	**2,736**	**2,811**	**2,889**
Europe & CIS Total	**252**	**152**	**136**	**207**	**199**	**208**	**212**	**210**	**212**	**208**
West Europe Total	10	15	23	39	46	37	38	38	38	38
Belgium	10	5	3	4	0	0	0	0	0	0
France	0	0	10	12	12	12	12	12	12	13
Netherlands	0	10	10	24	33	26	26	26	26	26
Other	0	0	0	0	0	0	0	0	0	0
East Europe Total	150	137	113	168	153	171	174	172	174	170
Bulgaria	114	114	93	140	123	143	144	146	146	146
Poland	36	23	20	28	30	28	30	27	28	24
Other	0	0	0	0	0	0	0	0	0	0
CIS Total	92	0	0	0	0	0	0	0	0	0
Other	92	0	0	0	0	0	0	0	0	0
Africa Total	**595**	**691**	**705**	**871**	**651**	**792**	**928**	**1,004**	**1,070**	**1,143**
North Africa Total	595	691	705	871	651	792	928	1,004	1,070	1,143
Morocco	388	435	451	623	381	490	578	628	676	756
Tunisia	190	219	233	214	226	257	305	331	348	341
Other	18	37	21	34	43	45	46	46	46	46
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**73**	**15**	**12**	**9**	**11**	**12**	**12**	**12**	**12**	**12**
North America Total	73	15	12	9	11	12	12	12	12	12
USA	73	15	12	9	11	12	12	12	12	12
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**500**	**540**	**521**	**549**	**527**	**591**	**600**	**644**	**647**	**651**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	94	92	81	117	101	113	122	126	130	133
Mexico	94	92	81	117	101	113	122	126	130	133
Other	0	0	0	0	0	0	0	0	0	0
South America Total	407	448	440	432	426	478	478	518	518	518
Brazil	407	448	440	432	426	478	478	518	518	518
Other	0	0	0	0	0	0	0	0	0	0
Asia Total	**1,549**	**1,066**	**886**	**1,005**	**1,090**	**959**	**904**	**866**	**870**	**875**
Middle East Total	438	380	447	362	430	410	397	408	413	417
Israel	211	204	258	204	255	248	231	235	239	244
Lebanon	100	80	80	90	104	95	99	105	105	105
Syria	80	40	30	0	0	0	0	0	0	1
Turkey	48	56	52	68	67	68	68	68	68	68
Other	0	0	27	0	4	0	0	0	0	0
South Asia Total	28	22	37	41	73	59	59	59	59	59
Bangladesh	28	22	37	41	73	59	59	59	59	59
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	0	7	0	0	0	0	0
Other	0	0	0	0	7	0	0	0	0	0
East Asia Total	1,083	664	403	602	579	490	448	398	398	398
China	1,081	662	400	600	577	488	446	396	396	396
Other	2	2	3	2	3	2	2	2	2	2
Oceania Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Table F.4: TSP imports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**1,678**	**1,453**	**1,502**	**1,612**	**1,492**	**1,512**	**1,605**	**1,647**	**1,720**	**1,803**
Europe & CIS Total	**182**	**160**	**196**	**168**	**145**	**192**	**192**	**197**	**197**	**201**
West Europe Total	181	154	192	159	134	189	189	189	189	188
Belgium	32	16	25	15	11	33	33	33	33	33
France	44	44	58	40	48	50	50	50	50	50
Netherlands	28	12	19	8	2	2	2	4	5	5
United Kingdom	38	41	55	58	29	58	58	58	57	57
Other	39	41	34	39	45	47	46	45	44	44
East Europe Total	1	6	4	9	10	3	3	8	8	13
Croatia	1	4	1	4	0	1	1	1	1	1
Other	1	1	3	5	10	2	2	7	7	12
CIS Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Africa Total	**44**	**48**	**39**	**45**	**43**	**63**	**67**	**70**	**74**	**78**
North Africa Total	14	19	13	16	3	6	6	6	6	7
Algeria	9	13	13	13	0	0	0	0	0	0
Other	5	6	0	3	3	6	6	6	6	7
East Africa Total	3	1	5	2	4	3	4	4	4	4
Tanzania	2	1	1	1	0	2	2	3	3	3
Other	1	0	5	1	4	1	1	1	1	1
West Africa Total	22	24	17	24	33	50	53	56	59	62
Cote d'Ivoire	6	4	8	14	11	17	18	19	20	21
Ghana	16	21	9	10	18	33	35	37	39	41
Other	0	0	0	0	4	0	0	0	0	0
Central Africa Total	0	1	0	0	0	0	0	0	0	0
Other	0	1	0	0	0	0	0	0	0	0
Southern Africa Total	4	4	4	3	3	4	5	5	5	5
South Africa	4	4	4	3	3	4	5	5	5	5
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**71**	**79**	**74**	**134**	**80**	**92**	**93**	**93**	**93**	**93**
North America Total	71	79	74	134	80	92	93	93	93	93
United States	71	79	74	134	79	92	93	93	93	93
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**570**	**625**	**581**	**581**	**634**	**521**	**577**	**578**	**620**	**669**
Caribbean Total	14	13	11	12	26	9	9	9	9	8
Cuba	13	12	10	12	26	9	9	9	9	8
Other	1	0	1	0	0	0	0	0	0	0
Central America Total	2	1	1	1	1	0	0	0	0	0
Other	2	1	1	1	1	0	0	0	0	0
South America Total	555	612	570	569	606	512	568	570	611	661
Brazil	444	469	486	414	431	382	434	433	473	520
Other	111	143	84	154	175	130	134	137	139	141
Asia Total	**784**	**509**	**578**	**661**	**556**	**623**	**654**	**686**	**714**	**739**
Middle East Total	136	69	174	175	192	214	236	259	281	296
Iran	133	65	165	159	190	193	216	237	259	274
Other	3	4	9	17	2	22	21	22	22	23
South Asia Total	440	303	278	323	219	242	249	256	264	272
Bangladesh	310	264	240	264	177	193	200	206	212	218
Sri Lanka	56	38	36	57	40	38	39	40	41	42
Other	74	2	2	2	2	10	10	11	11	11
South-East Asia Total	172	112	101	141	130	146	149	150	150	151
Indonesia	143	84	80	113	106	112	113	114	113	113
Other	29	28	21	28	24	34	35	36	37	38
East Asia Total	35	25	26	22	15	21	20	20	20	20
Japan	25	16	20	17	15	14	14	14	14	14
Taiwan	10	8	6	5	1	5	5	5	5	6
Other	0	0	0	0	0	1	1	1	1	1
Oceania Total	**27**	**24**	**6**	**14**	**35**	**22**	**22**	**23**	**23**	**23**
Australia	24	22	4	12	29	18	19	19	19	19
New Zealand	3	2	2	2	6	4	4	4	4	4
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	7.7	28.1	10.3	0.23	0	0	0	0	0
Other	0	8	28	10	0	0	0	0	0	0

Table F.5: TSP exports 2011 - 2020 ('000t P_2O_5)

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
World Total	**1,590**	**1,453**	**1,501**	**1,612**	**1,492**	**1,512**	**1,605**	**1,647**	**1,720**	**1,803**
Europe & CIS Total	**84**	**93**	**88**	**125**	**122**	**137**	**138**	**139**	**139**	**139**
West Europe Total	0	1	1	24	19	15	15	15	15	15
Belgium	0	1	1	1	0	0	0	0	0	0
Other	0	0	0	24	19	15	15	15	15	15
East Europe Total	84	91	87	100	103	122	123	124	124	124
Bulgaria	84	86	87	100	103	122	123	124	124	124
Other	0	5	0	0	0	0	0	0	0	0
CIS Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Africa Total	**512**	**613**	**704**	**723**	**584**	**758**	**894**	**970**	**1,035**	**1,109**
North Africa Total	512	613	704	723	584	758	894	970	1,035	1,109
Morocco	335	391	459	461	340	484	572	622	670	751
Tunisia	166	205	223	241	221	250	298	324	341	334
Other	11	17	22	20	23	24	24	24	24	24
East Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
West Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Southern Africa Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
North America Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
North America Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Central & South America Tota	**87**	**90**	**74**	**113**	**93**	**103**	**112**	**116**	**120**	**123**
Other	0	0	0	0	0	0	0	0	0	0
Central America Total	87	86	74	112	93	103	112	116	120	123
Mexico	87	86	74	112	93	103	112	116	120	123
Other	0	0	0	0	0	0	0	0	0	0
South America Total	0	4	0	0	0	0	0	0	0	0
Other	0	4	0	0	0	0	0	0	0	0
Asia Total	**907**	**658**	**636**	**652**	**692**	**514**	**460**	**421**	**426**	**432**
Middle East Total	308	266	279	248	292	260	247	257	262	267
Israel	213	198	256	216	253	240	223	227	232	237
Other	95	68	23	32	39	20	24	30	30	30
South Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
South-East Asia Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
East Asia Total	599	392	357	405	400	254	213	164	165	165
China	599	392	357	405	400	254	213	164	165	165
Other	0	0	0	0	0	0	0	0	0	0
Oceania Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Other	0	0	0	0	0	0	0	0	0	0
Unidentified Total	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0

Appendix G
Industrial and economic outlook, 2015 – 2020

- **Signs of upswing in China but also increasing cause for concern**
- **US interest rate increases to boost $, implying downward pressure on commodity prices**
- **Winners and losers from oil price weakness**

Commodities production costs, and therefore price support, will also feel downward pressure from the renewed slide in oil prices, which hit an eleven-year low in December. From the macroeconomic perspective, sustained oil prices at a relatively low level are a net positive for the developed economies and for China and India. Our base case forecasts are for reasonable, if unspectacular, growth in the developed economies and a stronger rebound in the developed economies constitutes our upside scenario.

Downside risks dominate in the emerging markets. China remains the major downside risk to the outlook, with metals intensive sectors most at risk from past debt excesses and the rebalancing of the economy towards consumption and services. Many other emerging markets are exposed to weaker commodity prices, including oil prices, and to capital flight as financial markets adjust to rising US interest rates. In our downside scenario we explore the effects on growth of significant capital flight from emerging markets.

The Chinese government's cumulative measures to support the economy over the past year are beginning to have a positive impact, with both industrial production and fixed asset investment picking up in recent months. However, improving headline indicators have yet to be reflected in sentiment on the ground; the seasonally slow winter period and the Lunar New Year in February means that it is likely to be April before the state of Chinese demand becomes clearer. We are confident that the Chinese automotive sector will improve in 2016 compared to 2015 and that infrastructure investment, as a key policy lever, will expand as least as quickly as 2015. However, we have become increasingly concerned about the important real estate sector where, despite solid sales growth in 2015, developer's inventories remain very high. As a result we have trimmed our forecasts for GDP, investment and industrial production.

As CRU had expected, on 16th December the US Federal Reserve finally raised its benchmark interest rate for the first time since 2006. CRU expects the Fed to raise rates only gradually but, with a loosening bias in the Eurozone, Japan and China, we expect the trade weighted US$ to be over 5% stronger on average in 2016 compared to 2015. The appreciation of the US$ will put downward pressure on commodity prices in US$ terms.

World demand driver overview

(percentage change year-on-year)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Industrial production	6.8	4.2	4.2	4.6	3.1	3.9	4.3	4.1	4.2	4.2
Motor vehicles	3.9	5.3	3.5	2.6	1.4	3.5	2.7	4.0	4.4	3.1
Construction	4.7	5.4	6.1	5.8	4.7	4.4	4.1	4.1	4.1	4.2

Data : CRU

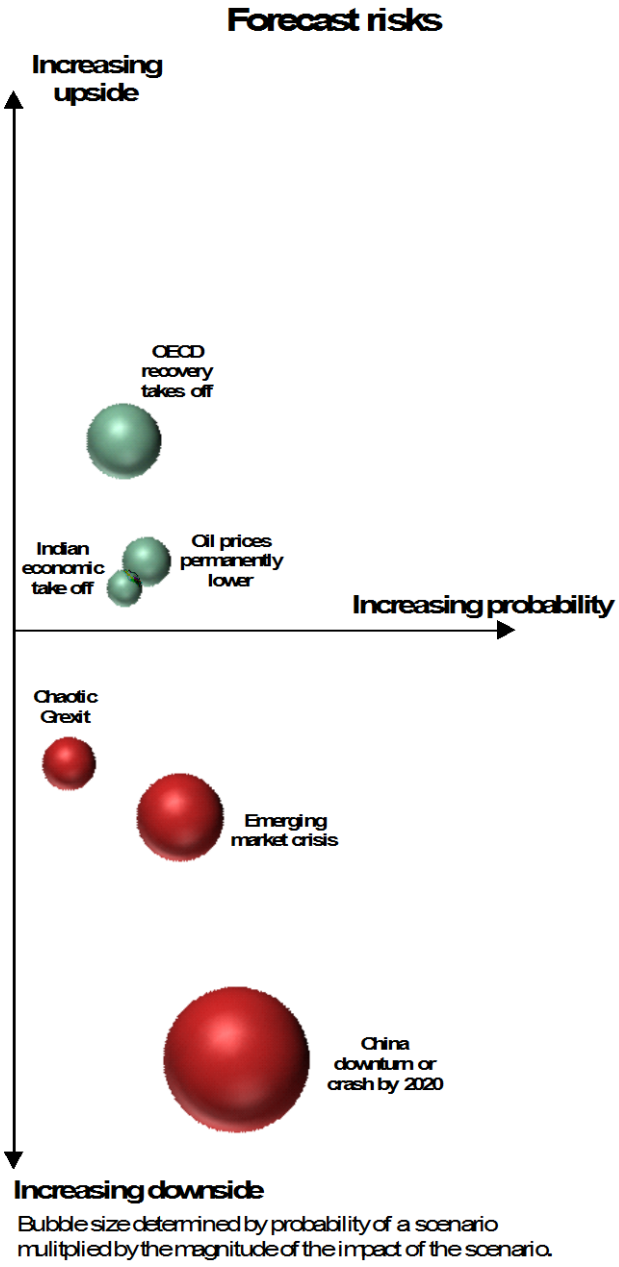
Notes: World industrial production and construction aggregates in this table have been created by weighting countries according to their shares of metals demand.

Upside risks

- **OECD recovery takes-off:** The OECD could take-off, bringing a stronger economic rebound as pent up demand is released. Stronger world trade would benefit all, especially export-dependent emerging economies.
- **Indian renaissance:** If economic reforms are implemented more quickly than expected, India could return to 8%+ GDP growth.
- **Oil prices permanently lower:** Still lower prices would boost global GDP growth by 20bp pa over 2016-18.

Downside risks

- **China crash:** A massive increase in debt and a bold program of structural reforms mean that risks are increasingly skewed to the downside as we go forward, especially for investment and construction. A large negative risk for commodity markets.
- **Emerging economy capital outflows:** Global capital is retreating from riskier emerging economies and finding a safer home in the developed world. Without foreign capital, emerging economy growth will slow and currencies weaken further.
- **Chaotic Grexit:** Concerns over Greece exiting the Eurozone have receded, but not gone away. Exit could shake confidence in the euro's future, sending the region into recession and denting world growth.



Industrial production in selected major economies

(percentage change year-on-year)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
North America	**3.2**	**2.5**	**1.7**	**3.6**	**1.1**	**1.9**	**3.0**	**2.6**	**2.5**	**2.4**
Canada	4.8	0.0	2.2	4.0	-1.4	2.6	1.7	1.7	1.6	1.6
Mexico	3.5	2.8	-0.5	2.5	1.3	2.0	3.4	3.6	3.3	3.1
USA	3.0	2.8	1.9	3.7	1.4	1.8	3.1	2.6	2.5	2.4
Central & South America	**2.2**	**-1.1**	**1.6**	**-2.1**	**-4.8**	**-1.2**	**2.7**	**3.0**	**2.9**	**2.9**
Argentina	6.6	-1.2	-0.2	-3.1	0.1	1.1	3.0	3.1	3.4	3.5
Brazil	0.5	-2.7	2.2	-2.9	-7.8	-3.4	2.5	2.1	2.0	2.0
Chile	3.6	2.9	3.9	0.4	-0.1	3.5	2.4	2.7	2.8	2.7
Europe	**3.3**	**-1.2**	**-0.6**	**1.2**	**0.8**	**1.4**	**1.9**	**1.6**	**1.5**	**1.6**
Eurozone	3.5	-2.4	-0.7	0.8	1.4	1.4	1.8	1.3	1.2	1.3
France	2.4	-2.5	-0.4	-1.1	1.3	0.9	0.8	0.5	0.6	0.7
Germany	7.3	-0.3	0.1	1.3	1.0	0.8	1.7	1.0	0.7	1.1
Italy	1.3	-6.2	-3.1	-0.5	1.0	1.6	1.3	1.1	0.9	0.6
Spain	-1.5	-6.6	-1.6	1.2	3.1	2.8	2.9	2.8	2.6	2.4
Poland	7.0	1.5	2.4	3.2	4.4	5.5	5.1	4.8	4.0	3.5
Russia	5.0	3.3	0.5	1.5	-3.0	-0.5	1.6	1.9	2.2	2.5
UK	-0.6	-2.8	-0.8	1.3	1.1	1.1	1.1	0.9	1.1	1.2
Asia & Australasia	**7.1**	**5.4**	**4.9**	**5.1**	**3.4**	**4.4**	**4.5**	**4.2**	**4.4**	**4.3**
Australia	1.2	3.3	2.1	4.6	2.1	3.6	2.2	2.0	2.2	2.2
China	13.7	10.0	9.7	8.3	6.2	6.2	5.9	5.8	6.0	6.0
India	4.8	0.7	0.6	1.8	4.1	5.6	6.9	6.9	7.0	6.9
Indonesia	4.1	4.1	6.0	4.8	4.8	4.6	5.2	5.1	5.4	5.4
Japan	-2.6	0.2	-0.6	2.1	-0.7	1.4	1.9	0.6	0.8	0.6
Malaysia	2.4	4.2	3.4	5.1	4.4	2.8	3.2	3.0	3.1	3.0
Philippines	4.7	5.4	10.3	8.3	5.9	8.6	5.4	5.6	5.4	4.9
South Korea	6.0	1.7	0.4	0.5	-0.9	2.1	3.7	2.9	2.1	1.9
Taiwan	4.4	-0.2	0.7	6.4	-1.2	3.2	4.2	3.1	2.2	2.2
Thailand	-8.5	2.1	-3.1	-4.6	-4.5	2.0	4.8	4.8	4.8	4.4
Vietnam	6.7	5.8	5.4	7.1	7.6	6.5	6.5	6.5	6.4	6.3
Africa	**-1.2**	**3.2**	**-2.0**	**3.2**	**-0.2**	**3.0**	**3.0**	**3.1**	**3.4**	**3.7**
Egypt	-6.9	5.1	-7.1	8.3	-0.7	4.0	4.1	4.0	4.0	4.0
South Africa	2.9	2.0	1.5	0.1	0.1	2.3	2.3	2.5	2.9	3.5
Middle East	**10.1**	**4.5**	**1.7**	**2.4**	**1.5**	**1.9**	**1.8**	**1.7**	**1.8**	**1.8**
Turkey	10.1	2.5	3.0	3.6	2.3	2.2	3.0	3.3	3.6	3.6
Saudi Arabia	12.0	4.9	0.2	2.7	0.8	1.3	1.3	0.8	0.5	0.5
UAE	5.4	4.6	4.2	4.5	2.2	2.2	1.2	1.2	1.8	2.1
World	**4.8**	**2.6**	**2.6**	**3.4**	**1.8**	**2.8**	**3.4**	**3.2**	**3.2**	**3.2**
Developed economies	2.2	0.4	0.4	2.4	0.7	1.7	2.3	1.8	1.7	1.7
Emerging economies	8.2	5.4	5.1	4.6	3.0	4.0	4.6	4.6	4.7	4.7

Data : OE, CRU

Notes: Except for 'Africa', regional totals include countries not shown in the table. Weighted by industrial aggregate value added at year 2010 prices and market exchange rates

Exchange rates

US dollar likely to gain after Fed move

As expected, the Fed raised interest rates at its meeting on December 16th, taking a small step towards normalization of US monetary policy. Federal Reserve Chair Janet Yellen stated that the Fed would implement additional rate increases very gradually in order to gauge their effects on the US economy and the value of the US dollar. Given that the outlook for the US economy is for moderate growth next year and inflation has not yet hit the 2% policy target, we do not anticipate any rate increases until June 2016, at the earliest.

Euro corrects after financial markets get carried away

Financial markets reacted strongly to ECB action that failed to live up to expectations earlier in December, with the euro jumping from 1.06 to 1.09 ($ per €). The ECB cut the deposit rate by 0.1% and extended QE by 6 months however, markets had been anticipating significantly more easing. Since then the Federal Reserve has increased its interest rate, such that, despite the disappointment from the ECB, monetary policy divergence is finally underway. As a result CRU expects a steady depreciation in the euro and an average value of around 1.05 in 2016Q4.

Depreciation of RMB to continue in 2016

After overseeing a 3% weakening of the RMB/$ rate in August the People's Bank of China (PBoC) raided its foreign exchange reserves to prevent the rate from dropping further. This support has been expensive and contributed to reserves falling by a massive $214bn in the four months to November. The outlook for further $ strength in 2016 has prompted a change of tactic. On 11 December the China Foreign Exchange Trade System (CFETS) announced a new index which tracks the RMB against a basket of currencies. This signals that the PBoC now intends to manage the RMB against a currency basket rather than against the US$, paving the way for further weakening of the RMB/$. We expect the RMB/$ to trade around 6.6 by the end of 2016, but risks have shifted to a weaker outturn.

Further Aussie $ weakness only a matter of time

Compared to our view in September the A$ held up better than expected in 2015Q4. The interest rate rise in the US, falling commodity prices and a substantial contraction in mining investment – which is impacting the domestic economy – are all negative for the A$. However, consumer related parts of the economy have been surprisingly strong, dissuading the Reserve Bank of Australia from lowering its interest rates further. The commodity outlook remains tough in 2016 and CRU continues to expect that this will drive a further weakening of A$. We expect a gradual recovery from 2017 as Australia's commodity exports in US$ value terms begin to pick-up.

Rouble follows oil lower

The Russian rouble has been hit hard by further falls in the price of oil. The importance of movements in the price of crude oil for the rouble is unlikely to fade and CRU has recently downgraded our oil price forecast, prompting downward revisions to our rouble forecast. We now expect the rouble to average 67 (roubles per US$) in 2016. Nonetheless, a gradual but sustained recovery in oil prices in the medium term should prompt an appreciation of the rouble.

Exchange rates, inflation rates and short-term interest rates

(Exchange rates shown as local currency/US$, nominal, yearly averages)

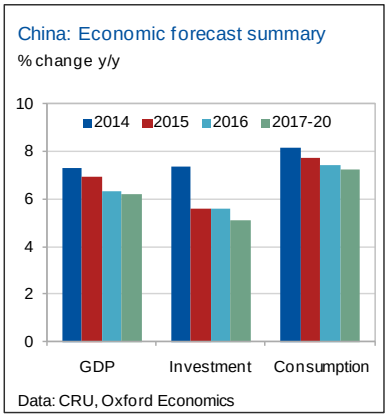
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Exchange rates										
China	6.46	6.31	6.15	6.16	6.27	6.56	6.52	6.47	6.39	6.27
Euro	0.72	0.78	0.75	0.75	0.90	0.94	0.94	0.92	0.90	0.88
India	46.7	53.5	58.6	61.0	64.2	65.8	66.8	68.6	70.1	71.2
Japan	80	80	98	106	121	124	126	127	127	127
UK	0.62	0.63	0.64	0.61	0.65	0.68	0.67	0.67	0.67	0.66
Australia	0.97	0.97	1.04	1.11	1.34	1.48	1.41	1.38	1.36	1.35
Brazil	1.67	1.95	2.16	2.35	3.34	4.04	3.56	3.59	3.69	3.78
Canada	0.99	1.00	1.03	1.10	1.28	1.30	1.23	1.15	1.09	1.08
Chile	484	486	495	570	651	715	675	636	593	550
Russia	29.4	31.1	31.8	38.4	61.1	67.2	61.5	58.8	57.6	56.9
South Africa	7.26	8.20	9.64	10.85	12.77	14.88	14.67	14.22	13.90	13.85
Inflation rates										
USA										
Consumer prices	3.1	2.1	1.5	1.6	0.0	1.2	2.2	2.2	2.3	2.4
GDP deflator	2.1	1.8	1.6	1.6	1.0	2.0	2.4	2.4	2.3	2.3
Consumer Prices										
China	5.4	2.6	2.6	2.0	1.4	2.0	2.6	2.8	3.0	3.0
Eurozone	2.7	2.5	1.3	0.4	0.1	1.2	1.9	1.5	1.6	1.8
India	9.6	9.7	10.7	6.6	4.9	5.8	6.0	5.5	5.4	5.1
Japan	-0.3	0.0	0.4	2.7	0.7	0.3	2.5	1.3	0.9	1.0
UK	4.5	2.8	2.6	1.5	0.1	1.1	1.8	1.5	1.7	2.1
Australia	3.3	1.8	2.4	2.5	1.7	2.9	2.7	2.8	2.6	2.6
Brazil	6.6	5.4	6.2	6.3	9.0	8.1	6.4	5.3	4.4	4.0
Canada	2.9	1.5	1.0	1.9	1.1	1.9	1.8	1.9	2.0	2.1
Chile	3.3	3.0	1.9	4.4	4.5	4.2	3.5	2.9	2.8	3.1
Russia	8.4	5.1	6.8	7.8	15.5	7.3	5.3	4.8	4.2	4.0
South Africa	5.0	5.7	5.8	6.1	4.6	6.2	6.0	5.6	5.5	5.3
Short-term interest rates										
Australia	4.8	3.9	2.8	2.7	2.4	2.7	3.8	5.0	5.4	5.5
Canada	0.9	1.0	1.0	0.9	0.5	0.6	1.0	1.3	1.7	2.2
China	5.3	4.6	5.0	5.1	4.2	3.6	4.0	4.3	4.7	5.4
Eurozone	1.4	0.6	0.2	0.2	0.0	-0.2	-0.1	0.1	0.4	0.8
Japan	0.2	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.1	0.1
UK	0.9	0.8	0.5	0.5	0.6	0.6	1.1	1.5	2.1	2.7
USA	0.3	0.4	0.3	0.2	0.3	0.7	1.5	2.2	2.7	3.2

Data : OE, CRU

Macroeconomic outlook

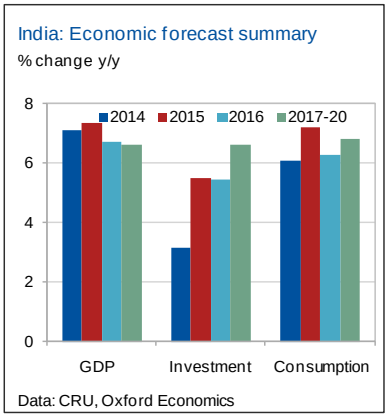
Each month CRU reviews and updates as appropriate its economic forecasts. This section sets out the macroeconomic story, which underpins the forecasts in the preceding sections. The written analysis in this section is amended as and when there are material changes to the outlook. The date of the latest update is listed below.

Country/region	Updated
Asia	
China: Twin track economy	**New this month**
India: Supportive macro policy and reforms drive growth	**New this month**
Indonesia: Mixed macro policy limits economy	**October**
Japan: BoJ steps up support for economy	**New this month**
Korea: Soft exports to weigh on economy	**November**
Malaysia: Consumer demand hit by GST	**October**
Thailand: Domestic demand, tourists drive growth	**November**
Vietnam: Export and investment led growth	**October**
Americas	
USA: Domestic strength will outweigh external weakness	**New this month**
Brazil: Still seeking a trough	**New this month**
Mexico: Solid domestic economy & stronger US will drive growth	**New this month**
Europe, Middle-East and Africa	
Eurozone: Slow but steady progress	**New this month**
Germany: Investment to take the reins	**November**
Italy: Seeing a cyclical upturn	**November**
Central &Eastern Europe: Solid growth to continue	**October**
Russia: Recovery to be limited by low oil prices	**November**
Turkey: Election leaves much unresolved	**November**
Mid-East Gulf: Iran to avoid 2016 slump	**November**
N.Africa: Growth despite diverse problems	**October**
Other Africa: Key themes of 2015 to persist	**November**



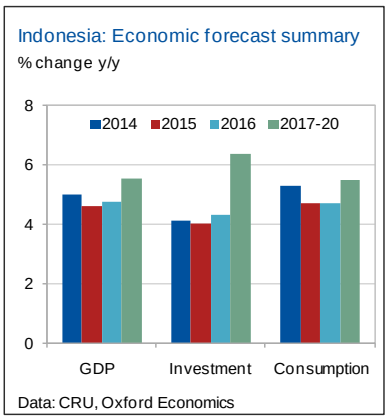
China: Twin track economy

- China's economy is divided. One track shows still strong growth in consumer spending and services sector output, backed by a firm labour market and solid real income growth. The other track shows struggling real estate investment, which is weighing on heavy industry and exacerbating the issue of overcapacity. We expect GDP growth to slow to less than 6.5% in 2016 from close to 7.0% in 2015.
- We expect a managed deceleration in GDP growth into the medium term of around 6.0-6.5%, but investment and construction will slow more sharply as the economy rebalances. Risks are skewed to the downside due to China's debt overhang. The government's reforms to rebalance the economy away from investment and industry are vital, but also entail significant implementation risks.



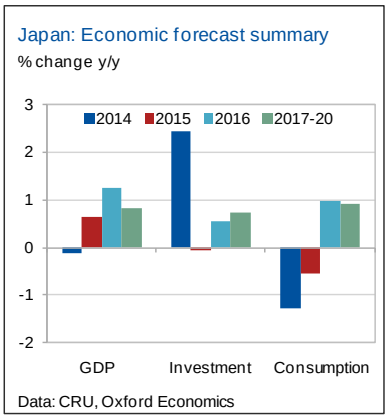
India: Supportive macro policy and reforms drive growth

- Industrial production has been trending higher with more metals-intensive manufacturing contributing notably. Leading indicators suggest IP will continue rising in the near term.
- The central bank has brought interest rates down on the back of softer price pressures in recent quarters and the effects of the stimulus should offer support to growth in the coming quarters.
- We expect GDP growth will slow from the sharply upward revised outturn in the recent past, but remain robust and average 6.6% pa over the next few years. Reform progress has been made but faster economic growth is conditional on further structural change.



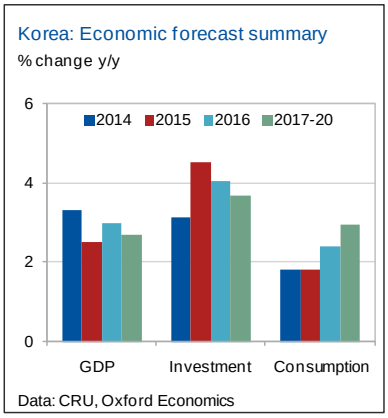
Indonesia: Mixed policy limits economy

- All GDP components contributed to slow economic growth to 5.0% in 2014. Lower domestic demand will weaken GDP growth this year but reduced imports (which detract from GDP) will partially offset this.
- Growth will be constrained by weaker export revenue due to softer commodity prices, and by elevated (though set to fall) inflation, which will keep monetary policy in check and weigh on consumption.
- The government talks of cutting red tape and making the country more open to foreign money. Although politics has frustrated, a cabinet reshuffle in 2015Q3 offers some hope that politicians can affect positive change in the economy in the coming years. Addressing structural problems would raise productivity and push GDP growth beyond the range of 5-5.5% we currently see as trend pace.



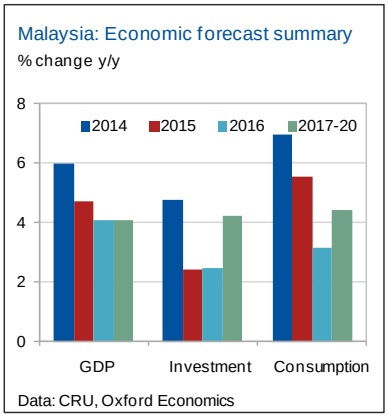
Japan: BOJ steps up support for economy

- Lesser demand from China and other parts of Asia are hurting exports but higher wages should offer a lift to consumer activity in the near term. Frontloading of purchases ahead of the next rise in the sales tax in 2017 should see consumption increase further in 2016 and 2017Q1.
- The central bank (BOJ) stepped up its asset program modestly in December and more fiscal stimulus seems likely. Despite the extraordinary level of stimulus in the country, the economy is set to continue eking out growth in the coming years as demographics and low productivity growth hinder the country.



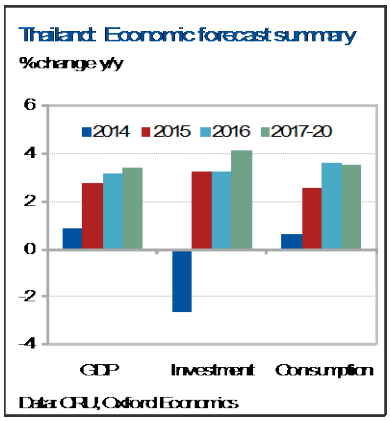
Korea: Soft exports to weigh on economy

- We expect GDP growth will be slightly softer this year than last. Though domestic demand is set to grow more quickly, trade will weigh on overall economic growth. Consumer spending is seeing some support from monetary easing since the middle of last year, rising wages and job growth. Meanwhile investment should see support from expansionary fiscal policy.
- The strength of the trade-weighted won has weighed on export growth over the past few years and we continue to expect a gradual appreciation of the currency into the medium term, which will weigh on GDP growth. However, strong fundamentals including a large fiscal surplus, and also the US recovery, which should give some support to exports, mean that risks are somewhat balanced.



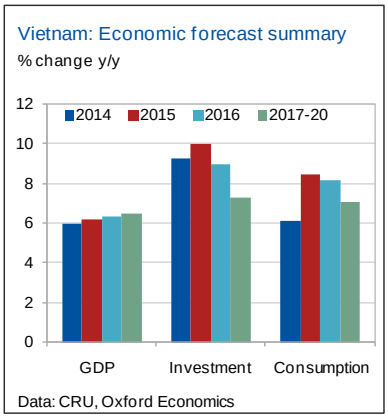
Malaysia: Consumer demand hit by GST

- GDP and IP grew sharply in 2015Q1 as households and businesses front-loaded expenditure to avoid the introduction of the new goods and services tax (GST) this past April. Domestic demand growth has since slowed and will slow further in 2016. The GST has caused inflation to rise, which we think will eat into consumer spending, while a sharp decline in capital goods imports suggest that business investment will slow.
- CRU expects economic growth to moderate into 2016 on weaker consumer spending, fiscal consolidation and political problems which are acting as a deterrent for foreign investment. However, the government's plans to support infrastructure investment do provide upside risk to medium-term economic growth.



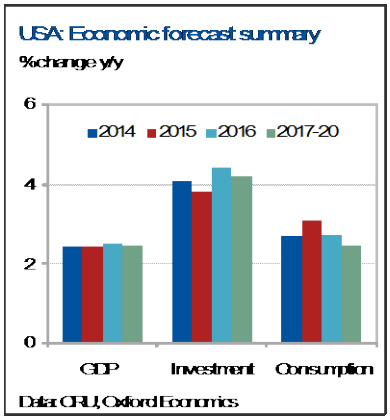
Thailand: Domestic demand and tourists

- GDP growth is improving this year due to a rebound in domestic demand. Inflation is more benign this year, boosting consumer spending and allowing monetary policy to remain accommodative. On the fiscal front, the military government appears to be implementing its spending plans, which are expanding public investment. Tourism, which is around 10% of GDP, is contributing significantly to 2015 growth despite the bombing of a shrine in Bangkok in August.
- The economy continues to face several headwinds, namely, high levels of household debt and the drag on export growth from slower Chinese growth, and these remain risks to our outlook. Thailand's political disruption has eased from the upheaval of 2014 but a renewed bout of uncertainty would derail investment and is a significant risk.



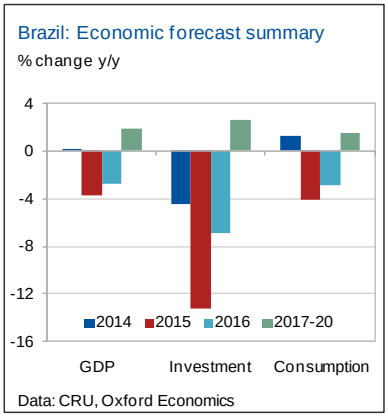
Vietnam: Export and investment led growth

- We expect the economy to grow as strongly as last year and anticipate further acceleration into the medium term. Exports should continue to grow robustly, as manufacturing is supported by a currency on trend depreciation against the US$, though softer demand from China will limit growth. Inflows of foreign direct investment, benign inflation and low interest rates have made room for the central bank to cut rates to support domestic demand and allow for more sustainable growth.
- CRU forecasts GDP growth to accelerate to around 6.5%pa into the medium term, with notable contributions from exports and investment. If implemented, the Trans-Pacific Partnership could benefit industry and agriculture. Downside risks include slower growth in China and a more gradual than expected pace of economic liberalisation.



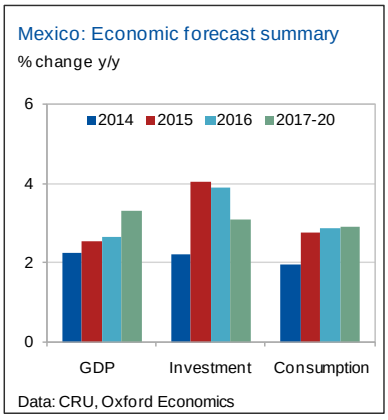
USA: Domestic strength will outweigh external weakness

- Though US interest rates are set to move higher, the Fed has pledged that increases will be gradual and designed to minimize negative effects on economic growth.
- Our forecast for US GDP growth assumes an acceleration in investment spending. This implies continued expansion in the housing and nonresidential construction markets, along with outlays aimed at raising productivity gains throughout the economy.
- Stronger wage gains and lower fuel prices will support higher levels of consumer spending during our forecast horizon.



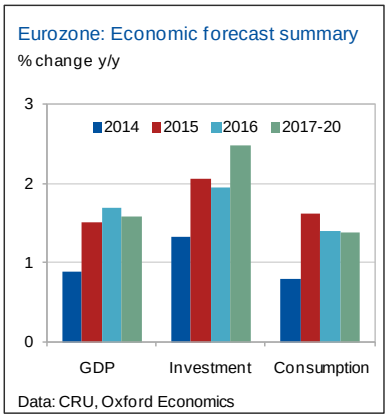
Brazil: Still seeking a trough

- In December, Fitch downgraded Brazilian sovereign debt to junk status and maintained a negative outlook. This followed S&P's downgrade to junk status in September.
- President Dilma Rousseff is facing impeachment proceedings so she will struggle to make any additional headway on Brazil's problems. It does not help that 90% of the 2016 budget cannot be decreased without a change in the constitution.
- The sharp drop in the real has set the stage for Brazil to become more competitive in terms of its exports and to seek new markets. However, in order to lay strong foundations for growth in the future, structural reforms are needed which will strengthen policymaking institutions, boost productivity and spur infrastructure upgrades.



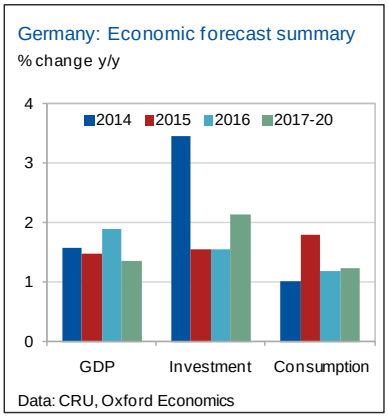
Mexico: Solid domestic economy and strong US will drive growth

- Consumers will be the driving force behind Mexican economic growth. As the US economy improves and Mexico's exporters gain market share, manufacturing will also remain on solid footing.
- The central bank appears ready to match the Fed's rate moves in order to support the peso and keep inflation under control. Given that US rate increases are likely to be very small and gradually implemented, this policy stance will help support domestic spending.
- The energy sector is the main constraint on growth in 2016. Until the global oil market comes back into balance in 2017, this remains a downside risk to Mexican industrial activity.



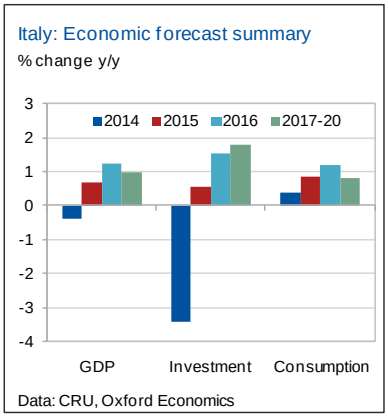
Eurozone: Slow but steady progress

- CRU expects that consumption growth will moderate in the next few years as the tailwind from lower oil prices fades. However, investment is well positioned to take the growth mantle in the coming years as capacity utilisation is currently at its highest level since 2011.
- In aggregate, though, slowing consumption and accelerating investment are likely to offset each other, leaving GDP growth close to current levels. Key structural factors, such as an ageing population, a prolonged period of high unemployment and a weak banking sector in many countries are likely to weigh on potential growth into the medium term. Labour market reforms in some countries offer signs of hope but the political backlash against immigration and austerity is a risk to future economic management and consequently, growth.



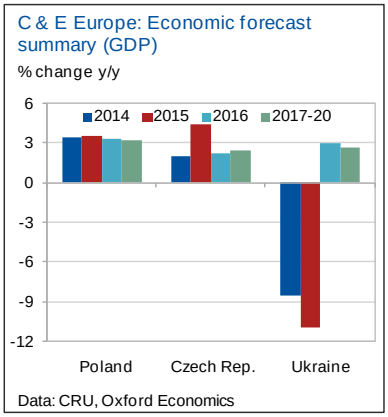
Germany: Investment to take the reins

- High capacity utilisation and strong industry sentiment point towards solid investment in Germany. CRU expects investment to become an increasingly important driver of growth through the forecast period, as the tailwind from lower oil prices fades.
- Risks to the forecast are centred on politics. The political risks to the wider Eurozone, in the form of anti-austerity parties, represent the main risk to Germany, through the impact on confidence and export demand.
- Further out in the forecast period demographic concerns remain key. The surge of refugees recently arriving in Germany has prompted some optimism but CRU does not expect inflows to be sufficient to offset slowing growth in the domestic population.



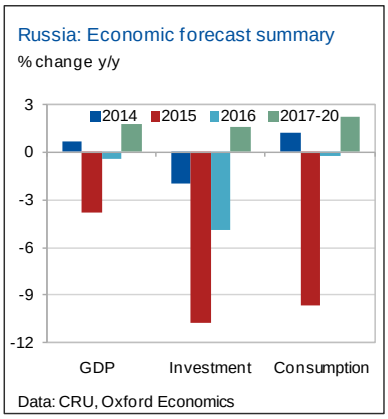
Italy: Seeing a cyclical upturn but growth prospects are limited

- Optimism surrounding the recovery in Italy has been rising steadily. Low oil prices, falling unemployment and a weaker euro are combining to produce broad based growth, albeit at a slow pace. CRU expects growth to remain relatively muted but with a cyclical boost, as Italy recovers from a three year recession.
- Further out, stubbornly high unemployment will be a drag on growth. Reform efforts have been made, with encouraging evidence of progress, but they are unlikely to solve the problem. Similarly, slow population growth will further limit potential growth, whilst productivity is likely to remain subdued without significant reform efforts.



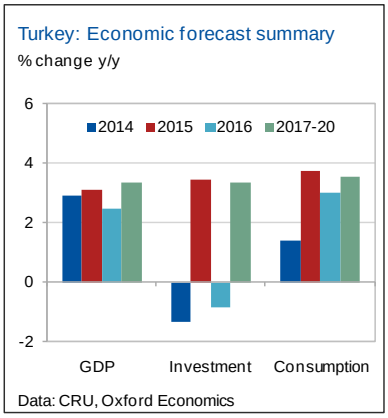
C. & E. Europe: Solid growth to continue

- The Ukrainian economy is contracting severely and we expect output to fall by 11% this year. Support from the IMF, EU and US should prompt a return to growth, eventually. However, damage to key industrial regions and future debt repayments are limiting the potential speed of that recovery.
- GDP growth in Poland is expected to be a robust 3.6% this year, supported by rising consumption. Potential growth should remain at close to this level, with Poland's good institutional climate offsetting a worsening demographic profile.
- Strong public investment, low oil prices and rising wages are supporting growth in the Czech Republic. However, slower population growth and lower FDI flows will limit growth to 2.5% p.a.



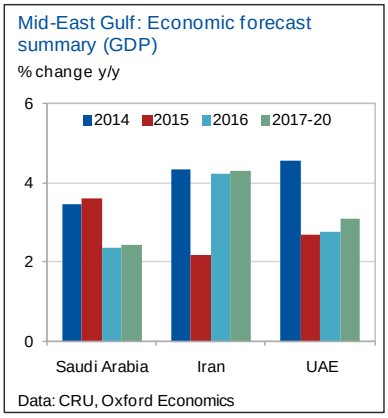
Russia: Recovery to be limited by low oil prices

- Early indications that Russia has reached a turning point have started to emerge. However, the major driver of the recession in Russia, low oil prices, is unlikely to be reversed quickly, leading us to expect a very gradual recovery, with growth likely to be close to zero or negative in 2016. In particular, the impact of lower oil prices on investment will be felt for some time.
- Looking beyond next year, a declining working age population will weigh on potential growth, whilst the low oil price will slow the pace of investment. Moreover, an over-reliance on commodities and poor economic institutions will hamper productivity growth.



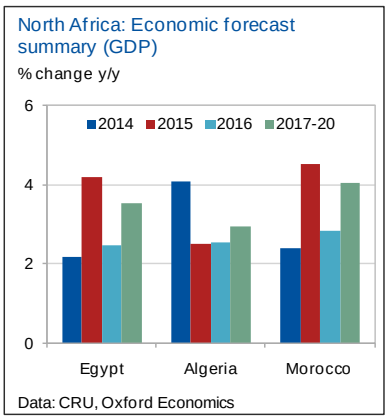
Turkey: Election leaves much unresolved

- A surprise majority victory for the AKP in the November 1st election broke the political stalemate that had hung over Turkey in the summer. The result offers some hope of short term stability but recent developments in the region may undermine even this.
- In the medium term, CRU has not yet seen sufficient evidence of a strong reform agenda to be encouraged by the election result. Indeed, the president's attempts to cement his own powers using increasingly nationalistic language could create more political uncertainty than a coalition. As will the breakdown in the ceasefire with Kurdish militants. On the positive side, Turkey's robust labour market presents a strong platform for growth, should the government pursue a more reformist agenda than anticipated.



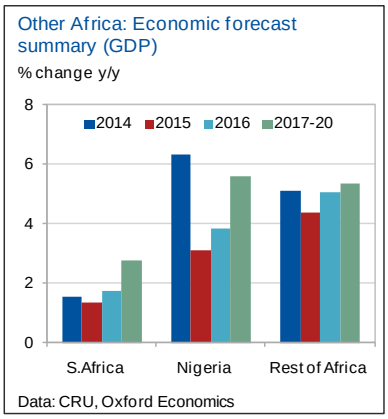
Mid-East Gulf: Iran to avoid 2016 slump

- Saudi Arabia is continuing its strategy of extracting oil at record volumes to drive marginal producers out of the market. However, achieving their aim is taking longer than they envisaged and putting pressure on the government's finances. Growth is likely to slow in 2016 as a result.
- Unlike Saudi Arabia, the UAE has not been able to ramp oil production and mitigate falling oil prices. As a result, GDP growth is expected to slump in 2015 and 2016. However, preparation for the World Expo in Dubai should help growth towards the end of our forecast period.
- In Iran, the lifting of sanctions in 2016 is increasingly likely. CRU expects easing sanctions to result in increased oil exports and larger inflows of FDI, which should boost growth to close to 4%.



N.Africa: Growth despite diverse problems

- In Egypt, the current account and government budget deficits have come to the fore. In particular, access to foreign currency for non-priority imports is becoming more difficult, undermining businesses. This issue looks unlikely to be resolved and as a result, we have downgraded our expectations for growth in Egypt to closer to 3.3%
- After a bumper year for agriculture in 2015, Moroccan GDP growth is set to slow in 2016. Nonetheless, Morocco should benefit from rising demand from the Eurozone and a relatively stable political environment. CRU expects growth of close to 4% from 2017-2020.
- The low oil price remains the dominant factor in Algeria's outlook. The slow pace of recovery in oil prices will limit exports and state spending to similarly gradual growth.



Other Africa: Key themes of 2015 to persist

- In Nigeria, slow progress in forming a cabinet has undermined optimism that followed the March election. The country faces several issues, including low oil prices and conflict with Boko Haram. Nonetheless, with reforms, Nigeria's prospects are good and growth should improve.
- Low commodity prices and weaker growth in China are undermining South African growth. A growing labour force is an encouraging sign for medium term growth but will be mitigated by high unemployment.
- For the region as a whole, CRU expects a slight improvement in growth but key issues from 2015 will persist into 2016, including low energy prices and US monetary policy tightening. Moreover, with elections scheduled in 14 countries, political risk will be elevated.

World economic growth

(percentage change in real GDP/GNP year-on-year)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
North America	**1.9**	**2.3**	**1.6**	**2.4**	**2.3**	**2.4**	**2.5**	**2.6**	**2.5**	**2.4**
Canada	3.1	1.7	2.2	2.5	1.3	1.8	2.4	2.4	2.3	2.3
Mexico	4.0	3.8	1.6	2.3	2.5	2.6	3.5	3.5	3.4	3.0
USA	1.6	2.2	1.5	2.4	2.4	2.5	2.5	2.5	2.4	2.4
Central & South America	**4.7**	**2.7**	**3.1**	**0.6**	**-1.6**	**-0.8**	**1.9**	**2.8**	**3.1**	**3.2**
Argentina	8.4	0.8	2.9	0.5	1.3	0.9	2.4	2.5	2.7	2.8
Brazil	3.9	1.9	3.0	0.1	-3.7	-2.7	1.0	2.0	2.2	2.4
Chile	5.8	5.5	4.3	1.8	2.1	2.6	3.2	3.7	3.8	3.6
Colombia	6.6	4.0	4.3	4.6	3.0	2.8	3.4	3.6	4.0	4.0
Venezuela	4.2	5.6	1.3	-3.7	-7.3	-4.9	2.0	5.3	5.8	5.8
Europe	**2.0**	**0.0**	**0.4**	**1.3**	**1.2**	**1.7**	**1.9**	**1.8**	**1.8**	**1.8**
Eurozone	1.6	-0.8	-0.3	0.9	1.5	1.7	1.7	1.6	1.5	1.4
France	2.1	0.2	0.7	0.2	1.2	1.4	1.5	1.6	1.8	1.7
Germany	3.7	0.6	0.4	1.6	1.5	1.9	1.8	1.5	1.1	1.0
Italy	0.7	-2.9	-1.8	-0.4	0.7	1.2	1.1	1.0	1.0	0.8
Spain	-1.0	-2.6	-1.7	1.4	3.1	2.8	2.4	2.3	2.1	2.0
Poland	5.0	1.7	1.3	3.4	3.5	3.3	3.5	3.4	3.1	3.1
Russia	4.3	3.4	1.3	0.6	-3.8	-0.4	1.2	1.8	1.9	2.1
UK	2.0	1.2	2.2	2.9	2.4	2.5	2.4	2.2	2.4	2.5
Asia & Australasia	**5.1**	**4.6**	**4.4**	**4.1**	**4.1**	**4.2**	**4.2**	**4.3**	**4.3**	**4.3**
Australia	2.7	3.5	2.0	2.6	2.3	2.9	3.1	2.8	2.7	2.6
China	9.5	7.7	7.7	7.3	6.9	6.3	6.1	6.2	6.3	6.2
India	7.9	5.3	6.4	7.1	7.4	6.7	6.6	6.6	6.7	6.6
Indonesia	6.2	6.0	5.6	5.0	4.6	4.8	5.4	5.8	5.6	5.3
Japan	-0.4	1.7	1.6	-0.1	0.4	1.3	1.0	0.9	0.8	0.6
Malaysia	5.3	5.5	4.7	6.0	4.7	4.1	4.5	4.0	3.9	3.9
Philippines	3.7	6.7	7.1	6.1	5.6	6.1	5.6	5.3	5.0	4.8
South Korea	3.7	2.3	2.9	3.3	2.5	3.0	3.3	3.1	2.3	2.0
Taiwan	3.8	2.1	2.2	3.9	0.9	3.0	4.2	3.4	3.0	2.6
Thailand	0.8	7.3	2.8	0.9	2.7	3.1	3.5	3.4	3.4	3.4
Vietnam	6.2	5.2	5.4	6.0	6.2	6.3	6.8	6.4	6.4	6.3
Africa	**1.2**	**5.0**	**3.2**	**3.8**	**3.1**	**3.5**	**4.1**	**4.4**	**4.8**	**4.8**
South Africa	3.2	2.2	2.2	1.5	1.4	1.7	2.5	2.7	2.9	2.9
Middle East	**7.2**	**3.7**	**2.0**	**2.7**	**2.7**	**2.8**	**3.0**	**3.0**	**3.3**	**3.7**
Gulf Cooperation Council	7.5	5.0	4.4	3.9	3.2	2.6	2.5	2.3	2.9	3.5
Turkey	8.8	2.1	4.2	2.9	3.1	2.5	2.9	3.3	3.5	3.6
Saudi Arabia	10.0	5.4	2.7	3.5	3.6	2.4	2.1	1.5	2.3	3.9
UAE	5.2	6.9	4.3	4.6	2.7	2.8	2.8	3.0	3.5	3.0
World	**3.1**	**2.4**	**2.4**	**2.6**	**2.4**	**2.7**	**3.0**	**3.1**	**3.1**	**3.1**
Developed economies	1.6	1.2	1.1	1.7	1.8	2.1	2.1	2.1	2.0	1.9
Emerging economies	6.5	5.1	4.5	4.1	3.4	3.6	4.2	4.4	4.6	4.8

Data: OE, CRU

Notes: Regional totals include countries not shown in the table; Gulf Cooperation Council (GCC) is defined as the union of the Arab states Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE. Weighted by gross value added at 2010 prices and market exchange rates

Scenario

Upside: OECD recovery takes off

While the major developed economies have struggled to recover since the financial crisis, there have been signs of improvement recently. A consistently improving job market is giving US consumers the confidence to make bigger purchases while cheaper oil prices have boosted disposable incomes in countries which import their hydrocarbons. Moreover, a prolonged period of ultra-loose monetary policy – including ongoing programs of quantitative easing in the Eurozone and Japan – at a time when confidence amongst consumers and businesses is rising in a number of countries, is supportive of demand.

In this scenario we assume that the OECD's recovery takes off as pent-up consumer and investment demand is released after years of economic underperformance. The US economy is best placed and sees the greatest upside in this scenario but the Eurozone and Japan also see a stronger performance. Faster growth in the developed economies benefits emerging economies via stronger growth in world trade. Rising confidence in the developed economies could also boost foreign direct investment into emerging markets, with those making more conciliatory efforts to boost potential growth rates (such as India) making themselves more appealing than the likes of Brazil, which struggles with unwieldy politics.

Alternative Scenario - OECD recovery takes off

(percentage change in real GDP/GNP year-on-year)

		2014	2015	2016	2017	2018	2019	2020
USA:	Base case	2.4	2.4	2.5	2.5	2.5	2.4	2.4
	Scenario	2.4	2.5	3.5	3.6	2.5	2.2	2.4
Eurozone:	Base case	0.9	1.5	1.7	1.7	1.6	1.5	1.4
	Scenario	0.9	1.7	2.4	2.7	1.7	1.3	1.4
Japan:	Base case	-0.1	0.4	1.3	1.0	0.9	0.8	0.6
	Scenario	-0.1	0.5	1.6	1.8	1.2	0.6	0.6
China:	Base case	7.3	6.9	6.3	6.1	6.2	6.3	6.2
	Scenario	7.3	7.0	6.9	6.6	6.3	6.2	6.2
Brazil:	Base case	0.1	-3.7	-2.7	1.0	2.0	2.2	2.4
	Scenario	0.1	-3.7	-2.0	1.6	2.2	2.3	2.4
Russia:	Base case	0.6	-3.8	-0.4	1.2	1.8	1.9	2.1
	Scenario	0.6	-3.7	0.5	2.0	1.8	1.9	2.1
India:	Base case	7.1	7.4	6.7	6.6	6.6	6.7	6.6
	Scenario	7.1	7.5	7.9	7.8	7.3	6.7	6.6
World:	Base case	2.6	2.4	2.7	3.0	3.1	3.1	3.1
	Scenario	2.6	2.5	3.5	3.9	3.2	2.9	3.1

Data: CRU

Downside: Emerging market crisis

Investors are withdrawing capital from emerging markets and currencies are depreciating from Kazakhstan to Chile. Economic weakness, such as in Brazil and Russia, political uncertainty in Turkey and Malaysia, for example, and a general reliance on commodity exports are all contributing to negative investor sentiment. At the same time, US investments are becoming more attractive as interest rates rise. In this scenario, the exit of capital from emerging markets prompts collapses in exchange rates and soaring inflation and interest rates. Debts denominated in foreign currency become unserviceable and are defaulted upon. Financial market contagion sees even relatively sound emerging markets hard hit, spreading the crisis wider than the initial at risk countries. Business, household and market confidence around the world suffers, exacerbating the impact on the real economy of weaker world trade growth.

The emerging market economies see the greatest deceleration in growth relative to the base case. The developed economies, especially Europe and Japan due to their greater reliance on export markets, also see growth reduced and policymakers have only limited scope to respond via fiscal and monetary policy. Commodities fare particularly badly due to their reliance on emerging markets as drivers of demand growth. Moreover, plummeting currencies versus the US$ drive down cost curves and prices with them. The world economy begins to recover in 2017 but the level of GDP remains below the base case throughout the forecast period.

Alternative Scenario - Emerging market crisis

(percentage change in real GDP/GNP year-on-year)

		2014	2015	2016	2017	2018	2019	2020
USA:	Base case	2.4	2.4	2.5	2.5	2.5	2.4	2.4
	Scenario	2.4	2.4	2.0	2.3	2.6	2.6	2.4
Eurozone:	Base case	0.9	1.5	1.7	1.7	1.6	1.5	1.4
	Scenario	0.9	1.5	1.0	1.2	1.8	1.9	1.4
Japan:	Base case	-0.1	0.4	1.3	1.0	0.9	0.8	0.6
	Scenario	-0.1	0.3	-0.3	0.7	1.4	1.5	0.6
China:	Base case	7.3	6.9	6.3	6.1	6.2	6.3	6.2
	Scenario	7.3	6.8	4.7	5.2	6.1	6.7	6.2
Brazil:	Base case	0.1	-3.7	-2.7	1.0	2.0	2.2	2.4
	Scenario	0.1	-4.0	-4.8	-1.1	0.3	1.1	2.4
Russia:	Base case	0.6	-3.8	-0.4	1.2	1.8	1.9	2.1
	Scenario	0.6	-3.9	-2.0	-1.0	0.5	1.4	2.1
India:	Base case	7.1	7.4	6.7	6.6	6.6	6.7	6.6
	Scenario	7.1	7.2	5.7	6.0	6.4	7.0	6.6
World:	Base case	2.6	2.4	2.7	3.0	3.1	3.1	3.1
	Scenario	2.6	2.3	1.7	2.3	2.9	3.3	3.1

Data: CRU