

## Argus White Paper

### NPKs: The New Market Driver

The modern chemical fertilizer industry produces nitrogen (N) products from different feedstocks - mainly natural gas today - and phosphate (P) and potash (K) by treating the respective minerals. The first chemical fertilizer products, which were relatively low in nutrient content, were produced in factories located near the end-users. Improvements in technology over time have resulted in a situation where the main fertilizer carriers of N, P and K now contain 45-65pc nutrient, and they are increasingly produced in plants close to the sources of nitrogen feedstock or phosphate raw material and shipped to end-users, sometimes over very long distances. Lower-grade fertilizer products continue to be available, either because they satisfy a particular requirement in agriculture, or because they are generated as by-products from other industries. In some developing countries, notably China, there is still a demand from older traditional farmers for low-analysis products.

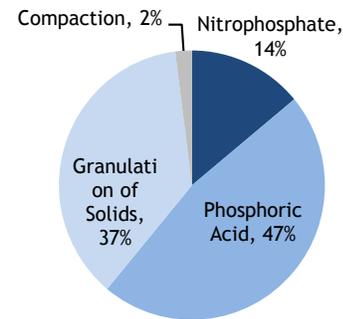
Most crops need to receive doses of two or three of the primary nutrients, which can be achieved with successive applications of the individual fertilizer products that contain each nutrient. However this is inefficient, especially in regions where labour costs are high. The solution is to use multi-nutrient fertilizers, particularly compound fertilizers in which two or three primary nutrients are combined within each granule in consistent ratios. To meet this need, a compound fertilizer industry has grown over the past century in the regions that consume these fertilizers. But with a migration of large-scale fertilizer production to the sources of raw materials, there is now an interest in developing export-orientated capacity for compound fertilizers at these sites.

Apart from compounds, the other important route for the supply of multi-nutrient fertilizers involves mixing single-nutrient fertilizers in simple units that are located near the consumers - a technology commonly described as bulk-blending. One key difference is that compound fertilizers are homogenous, with each granule having the same composition, while blended mixtures are heterogeneous, i.e. made up of different components. The main production routes for compound NPKs are

- the nitrophosphate process;
- chemical granulation (the process based on the neutralization of phosphoric acid and other acids that is followed by granulation);
- steam granulation (often called physical granulation);
- compaction;
- bulk blending.

The first four process types yield compound fertilizers that consist of homogeneous granules, whereas the bulk-blended mixtures are made up of discrete particles. Three quarters of chemical granulation capacity is linked to on-site production of phosphoric acid for which phosphate rock raw material is needed.

**FIGURE 1: COMPOUND FERTILIZER CAPACITY, BY PRODUCTION ROUTE**



Another important distinction between the processes is represented by those that treat phosphate rock raw material - roughly one half of the total - and those that handle phosphate intermediates, such as phosphoric acid, MAP, DAP and other phosphate fertilizers that are brought in from other suppliers, often vertically-integrated exporters. Traditionally the big phosphate rock producers have shown little enthusiasm for making compound fertilizers for export. Recently, however, the potential for NP fertilizers, particularly sulphur enhanced grades, has attracted the interest of US phosphate company Mosaic and Moroccan producer OCP, as well as the new Saudi Ma'aden operation. OCP has also begun a campaign to develop export markets for NPK compounds produced in Morocco.

The distribution of compound fertilizer capacity across the major regions is shown in the following chart. With the decline of the European industry over the past two decades, Asia has become the biggest producer of compound fertilizers, even when China is not included.

The total amount of compound fertilizer capacity in China is very difficult to assess: the official data reveals the registration of some 4,000 plants with an aggregate capacity of 200 million t/yr; data collated by the International Fertilizer Development Centre (IFDC) encompasses 135 production sites with capacity totalling 47 million t/yr; while the International Fertilizer Industry Association (IFA)

Market Reporting

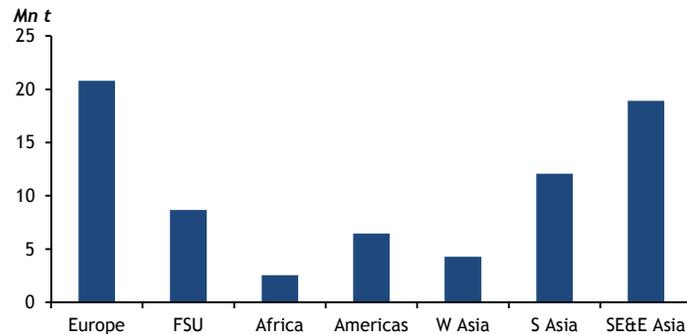
Consulting

Events

Fertilizer

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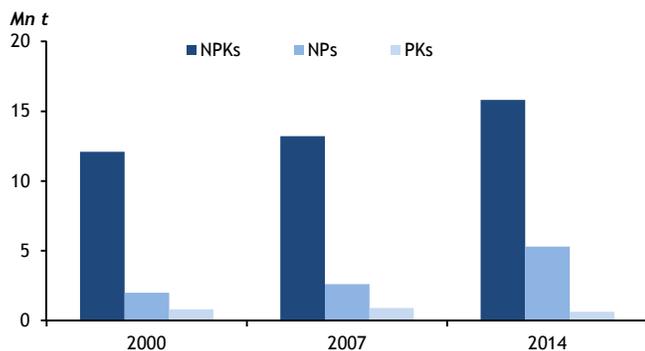
**FIGURE 2: COMPOUND FERTILIZER CAPACITY, BY REGION, IN 2014**



appears to list half as many sites with much the same overall total. Other global regions that have a significant amount of compound fertilizer capacity include the Former USSR (mainly Russia), the Americas and West Asia/Middle East. Although blended fertilizers dominate mixed fertilizer supply in the Americas, the volume of compounds in this region is boosted by the inclusion of Mosaic's Microessentials operations.

International trade in multi-nutrient fertilizers totalled some 22 mn t in 2014. National trade statistics do not distinguish between compounds and blends, but it is safe to say that almost all of the traded mixed fertilizers are compounds, since blends are not well suited to the logistics of international trade.

**FIGURE 3: GROWTH OF WORLD TRADE IN COMPOUND FERTILIZERS BETWEEN 2000 & 2014**



In the period since 2000, trade has expanded by 7 mn t, equivalent to a CAGR of 2.7pc. This has grown to meet what we estimate to be an aggregate demand for solid multi-nutrient fertilizers in 2014 of around 160 million t. Clearly this is an interesting prospect for producers.

The bulk of future growth for multi-nutrient fertilizers is likely to be driven by the increase in agricultural consumption of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O from Africa, Latin America and most of Asia. In contrast to the growth in these regions, we expect relatively little change in Europe and North America. This pattern of growth will raise some key questions for the industry:

- Where are the future opportunities for the big resource-based exporters of NPK & NP fertilizers?
- Will they participate in the very large import market for NPKs, making a big range of products and using their resource advantage to be a competitive supplier?
- Will phosphate producers find limitations in buying in potash raw material and re-selling it in NPKs and perhaps focus on making NP and NP+S products?

Argus Consulting Services' new report NPK: The New Market Driver addresses the latest developments in this dynamic sector of the fertilizer market. The report combines a wide ranging overview of the industry with detailed regional analysis of the major players and consuming markets.

The report:

- Explains the different NPK processes and the global structure of the industry
- Reviews 2014 global patterns for NPK products
- Provides an outlook for the industry and for NPK pricing
- Reveals local patterns of supply and demand in key regional markets
- Assesses production volumes and formulations of major NPK producers

Request the table of contents at [info@argusmedia.com](mailto:info@argusmedia.com) or call your local office, [www.argusmedia.com/contact](http://www.argusmedia.com/contact).



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